

BBN-ANG-243 Phonological analysis

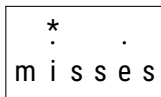
PREDICTING WORD STRESS

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what is phonological stress?

- stress is a **suprasegmental** feature: unlike features like voicing or place of articulation, it is not realised on a single segment, but it extends over more than one segment: it is associated with a **syllable** (often signalled with σ)
- stress is not an absolute property: it is the **relative prominence** of syllables over another, it is not possible to tell whether a syllable is stressed or unstressed without **comparing** it to another syllable
- is /tʃ/ in *leg**end*** voiced? vs. is the first syllable stressed in *mi**ss**es*?



- prominence is achieved by: **loudness** (also: pitch change & increased length)

stress vs. accent

- STRESS** is a lexical property of syllables of **words**. Stress is **binary**: some syllables of a word are stressed (s/1), others are unstressed (w/0):

a.gen.da	sar.dine	ci.ga.rette	unbeLIEvable	he.li.cop.ter
w.s.w	s.s	s.w.s	s.w.s.w.w	s.w.w.w
0.1.0	1.1	1.0.1	1.0.1.0.0	1.0.0.0

- ACCENT** is a property of some syllables in **utterances** = when a word is actually uttered together with other words (phrases, sentences), or in isolation:

Her new film was unbeLIEvable.	(How was her film?) – UnbeLIEvable!
0 2 2 0 2 0 1 0 0	2 0 1 0 0

- Stress vs. accent: **stress is a placeholder for accent**, potential site for accent.
 - Only lexically stressed syllables can be accented: a.GEN.da
 - Lexically unstressed syllables never get accented: a.GEN.da
 - Accent typically falls on a syllable that is stressed lexically. But an accent may move: Ja.pa.NEESE (201) → Ja.pa.neese GIRLS (203 1)

from stresses to degrees of accent

	Her	new	film	was	unbeLIEvable.
stress:	0	1	1	0	1 0 1 0 0
accent:	0	2	2	0	2 0 1 0 0

degrees: one vs. more than one stress in a word

- some languages have just one stress in a word (= two degrees of stress: stress vs. no stress)
- Hungarian: each word has an initial stressed syllable, otherwise the word is “flat” stress-wise independently of how long it is:

*	*	*	*	*	*
mátek	mátekös	máteközik	máteközhatnak	máteközhatnának	átmáteközhatnának

- English is different because more than one syllable can be stressed in a word, there are degrees of prominence:

*	*	*	*	*	*
atom	atomic	atomistic	excommunicate		

primary, secondary, tertiary, and no stress

primary ("1ry") stress

It is the **rightmost stress**, and **may receive accent** in speech. If it does, it is always the **most prominent** one.

secondary ("2ry") stress

It is the stress which is always **before the 1ry**, and **may also receive accent** in speech, but is always **less prominent** than the 1ry.

tertiary ("3ry") stress/strong-unstressed

It is a syllable which has a **full vowel** but can **never receive accent**.

unstressed

It is a syllable which has a **reduced vowel** and can **never receive accent**.

notation of stress/accent

spelling:	átom	atómic	àtomístic	èxcommúnicate
transcription:	/átəm/ /'atəm/	/ətómik/ /ə'tomik/	/àtəmístik/ /,atə'mistik/	/èkskəmjúwnikejt/ /,ekskə'mjuwnikejt/
other:	numbers: 1 2 3 0; grids of *			

metrification

The procedure of assigning stress to certain syllables.

predicting secondary stress

- the place of 2ry stress is predictable from the place of 1ry stress, which is always the rightmost (= last) stress
- this means that 2ry will be always be somewhere **before** 1ry
- two principles predict the place of 2ry:

No Stress Clash (NSC)

Two stresses are not allowed next to each other.

Early Stress Requirement (ESR)

A word cannot begin with two unstressed syllables.

- No Stress Clash has very few exceptions: *sárdíne*, *príncéss*, *mónsóon*, *Chínése*, *máltréat*, *tórmént* (verb), numerals with *-éen*: *fíftéen*
- however: the last stress usually loses accent in speech if another stress follows: *Príncéss Ánn* 21 1 → 23 1 ("Rhythm Rule", see next lecture)

how do NSC and ESR predict 2ry stress?

- once we know the place of 1ry, they can predict place of 2ry
- $\sigma.\sigma.\acute{o}$
- Early Stress requires $\acute{o}.\sigma.\acute{o}$ or $\sigma.\acute{o}.\acute{o}$
- but No Stress Clash does not allow $\sigma.\acute{o}.\acute{o}$
- the only possibility for 2ry is: $\acute{o}.\sigma.\acute{o}$
- examples: *má.ga.zíne*, *ré.pre.sént*, *Pór.tu.guése*, *á.ca.dé.mic*, *dé.co.rá.tion*,
pér.so.ná.li.ty, *pé.da.gó.gi.cal*
- this pattern of stressed–unstressed–stressed... is often called **iambic rhythm**

2ry stress when there are more syllables before 1ry

- this usually happens when a word is **derived**, i.e., **morphologically complex**
- e.g., *character* + *ístic*, *originál* + *ity*, etc.
- options: *chá*cter + *ístic* or *chará*cter + *ístic* (why not *charactér* + *ístic*?...)
- in these cases, a third principle takes action:

Stress Preservation/Derivational Secondary Stress

The derived word has to **preserve the place of the stress of its base**.

- base word: *chá*cter, derivation will preserve it:
*chá*cter + *ístic*
- the other option violates Stress Preservation: *chá*cter
*chará*cter + *ístic*

Stress Preservation examples

- *orí*ginal
*orí*ginálicity
- *jú*stify
*jú*stificátion
- *compú*ter
*compú*terizátion
- *impré*ssion
*impré*ssionístic

Iambic Reversal, Iambic 2ry Stress

- base: *re**fó**rm*, derived form: *reform+ation*
- 1ry is on *-átion*: *reformátion*
- option 1: *re**fó**rm+átion*
- option 2: ***ré**form+átion*
- option 1: Stress Preservation is satisfied, but No Stress Clash isn't
- option 2: Stress Preservation is not satisfied, but No Stress Clash is
- the winner is option 2: ***ré**formátion*
- it is more important to obey No Stress Clash (iambic rhythm) and Early Stress Requirement than Stress Preservation, i.e., Stress Preservation is a violable constraint
- option 2 thus “reverses” the stress of the base to satisfy iambic rhythm, and so this reversal is called **Iambic Reversal**, which thus creates **Iambic 2ry Stress**

examples for Iambic 2ry Stress

notice how the original stress of the base is reversed in the derived forms:

Japán	→	Jápanése
suppóse	→	súpposítion
deríve	→	dérivátion
acádemy	→	ácadémic
philósophy	→	phílosóphical

2ry stress in underived long words

- there are extremely few long underived words
- famous examples: *Apalachicola*, *Winnepesaukee*
- in these cases, the principles can predict various places for 2ry stress, i.e., its placed is undetermined:
- *Ápaláchicola*, *Wínnipesaukee*
/ápəláʃikéwlə/, /wínəpəsó:kij/

1ry stress: predictability & fixedness

- in some languages 1ry stress is **predictable** (from some property of the of the stressed syllable, e.g., its position in the word); in others it is **not predictable**, it must be specified (memorised by the speaker) for every word (or some/most words), unpredictable stress is called **lexical stress**
- in some languages stress **always falls on the same syllable** of a word: **fixed stress**; in other languages any syllable of a word may be stressed (= **not fixed**); if stress is fixed, it is predictable, but it may or may not be predictable if not fixed

PREDICTABLE	FIXED	Example language
fully predictable	fixed	Hungarian: leftmost syllable Macedonian: antepenultimate* syllable Polish: penultimate* syllable
fully predictable	not fixed	Classical Arabic
not fully predictable = partially lexical	not fixed	Russian, Italian, Spanish English?

**penultimate*: 2nd-last; *antepenultimate* = 3rd-last

the syllable – some important terms

open & closed syllable

A syllable is **open** if it **ends** in a **vowel**. A syllable is **closed** if it **ends** in a **consonant**. NOTE: **diphthongs** /ij, ej, oj, aj, aw, əw, uw/ are analysed as complex **vowels**, not VC sequences.

syllabification

Syllabification is the **division of words into syllables**. Careful: it is not the same as hyphenation in typography/orthography!
Parts of the syllable: **onset–nucleus–coda**.

Onset Maximisation Principle

When syllabifying, prefer (“maximise”) onsets: **put consonants into the onset as long as it creates a possible/existing onset**, which exists word-initially.

a little practice

syllabify these words, then for each syllable decide if it's open or closed:

- cinema, visa, rapid, acrid, hatred, bandit, angel, banquet, martyr, atlas
- /si.nə.mə, vij.zə, ra.pɪd, a.krɪd, hej.trɪd, ban.dɪt, ejn.ʤəl, baŋ.kwɪt, ma:.tə, at.ləs/
- syllabification $\neq$ hyphenation: Hung. *már-tír* = *Mát-ra*, BUT: *mar.tyr* $\neq$ *me.tric*

stress & quantity: syllable weight (quantity sensitivity)

- in some languages it makes sense to distinguish between **syllable weights**
- syllable weights/quantities: **light, heavy, superheavy**

light syllable

A syllable is light (**L**) if it is **open** and the vowel is **short** (= it is not a long vowel or a diphthong).

heavy syllable

A syllable is heavy (**H**) otherwise: it has a short vowel in a **closed** syllable, or its vowel is a **long vowel** or a **diphthong**.

superheavy syllable

A subtype of a heavy syllable is **superheavy** (**S**): a **heavy syllable + C or CC**.

syllable weight examples

La.na	/la.nə/	LL
le.mon	/le.mən/	LH
a.crid	/a.kɹɪd/	LH
ci.ne.ma	/si.nə.mə/	LLL
A.me.ri.ca	/ə.me.ri.kə/	LLLL
ho.ri.zon	/hə.raɪ.zən/	LHH
aw.ful	/oʊ.fəl/	HH
ban.quet	/bən.kwɪt/	HH
an.gel	/ejn.ɔ̃l/	SH
e.lect	/i.lekt/	LS
flaunt	/flo:nt/	S

your turn: give the syllable weights

Canada
canteen
algebra
diagnose

your turn: give the syllable weights

Canada	/ka.nə.də/	LLL
canteen	/kan.tijn/	HS
algebra	/al.ɢə.brə/	HLL
diagnose	/daj.əg.nəwz/	HHS

quantity/weight-sensitive stress systems, e.g. Cl. Arabic

- such systems distinguish **L** syllables from **H** in terms of conditioning stress: typically **H** syllables attract stress, a simplified rule for Classical Arabic:
1. The last syllable is **extrametrical** = ignore the last syllable.
 2. Stress the rightmost **H** syllable if there is one, otherwise stress the leftmost **L** syllable.

ká **ta** <**ba**> 'he wrote'

L **L**

bá **la** **ħa** <**tun**> 'date (nom.sg)'

L **L** **L**

ki **tá:** <**bun**> 'book (nom.sg)'

L **H**

ju **ǰá:** **ri** <**ku**> 'he participates'

L **H** **L**

ma **na:** **dí:** <**lu**> 'kingdom (nom.sg)'

L **H** **H**

quantity/weight-insensitive stress systems, ex.: Hungarian

paripa	LLL	Barbara	HLL
karácsony	LHH	Melinda	LHL
Abigél	LLS	Aladár	LLS

(but compare this with Hungarian metrical verse: *takará el a bérci tetőt*)

predicting primary stress in English

- **the 3-syllable window**: very strong tendency that here must be a stress within the final 3-syllable window of a word ($\sigma\sigma\sigma\#$)
- á.ni.mal ho.rí.zon kan.ga.róo
- not counterexamples: productive, frequent suffixes (marked with #) are outside of the domain of metrification (**stress-neutral** suffixes)
- rá.di.at # ing ám.pli.fi # er ú.ni.lá.te.ral #ism cá.pi.ta.l #ize
- real counterexamples (true exceptions) are rare:
 á.ris.to.crat (but also a.rís.to.crat!) mé.lan.cho.ly cá.ter.pi.llar

two views of predicting 1ry stress in English

- **The “no pattern” view:** English 1ry stress is lexical, i.e. (mostly/completely) **unpredictable**. It is lexically determined for every word (=you have to memorise stress for each and every word), and it can be anywhere within the 3-syllable window independently of the phonological properties of the syllables within the window and/or the morphological features of the word.
- **The “pattern-with-exceptions” view:** English 1ry stress is mostly/generally **predictable**. Metrifcation has to take into consideration phonological properties of the syllables within the 3-syllable window, extrametricality and the morphological features of the word (what follows is based on the classic analysis of Bruce Hayes (1982): ‘Extrametricality and English stress’, *Linguistic Inquiry* 13: 227–276).

elements of predicting 1ry stress in English

- English stress is **quantity-sensitive**: stress is influenced by the syllable being **L** or **H**.
- English stress is sensitive to **word class**: whether the word is a **noun** or a **verb** (adjectives?...).
 - In **nouns** the **final syllable is extrametrical**.
 - In **verbs** the **final consonant is extrametrical**.
- **Long Vowel Stressing (LVS)**: stress long-vowelled final syllables.
- **Alternating Stress Rule (ASR)**: ... $\sigma \sigma \acute{\sigma} \# \rightarrow \dots \acute{\sigma} \sigma \sigma \#$
- **Morphological effects**: affixes may or may not count in metrification (non-neutral vs. neutral affixes).

the English Main Stress Rule

Main Stress Rule (MSR)

Stress the rightmost syllable if it is **H**, otherwise stress the preceding syllable.

ordering of stress rules

1. Long Vowel Stressing
2. Extrametricality
3. Main Stress Rule
4. Alternating Stress Rule

If Long Vowel Stressing applies, 2. and 3. will not apply.

example: *tenant*

te.nant /te.nənt/

1. LVS: —
 2. Extram.: /te.⟨nənt⟩/
 3. MSR: /té.⟨nənt⟩/
 4. ASR: —
- /té.nənt/

similar words: *párr*ot, *Á*dam, *bí*shop, *pléa*sure, *sá*lad, *pá*lace, *Pá*ris... (do the derivations for these yourself)

example: *Peter*

Pe.ter /pij.tə/

1. LVS: —
2. Extram.: /pij.<tə>/
3. MSR: /píj.<tə>/
4. ASR: —
/píjtə/

similar words: *páper*, *bánquet*, *Égypt*, *ágent*, *pátience*, *mótion*, *pírate*... (do the derivations for these yourself)

example: *origin*

o.ri.gin /*o.ri.ɰin*/

1. LVS: —
2. Extram.: /*o.ri.⟨ɰin⟩*/
3. MSR: /*ó.ri.⟨ɰin⟩*/
4. ASR: —
/*óriɰin*/

similar words: *cínema*, *áñimal*, *évidence*, *ámateur*, *cárvan*, *páradox*... (do the derivations for these yourself)

example: *America*

A.me.ri.ca /ə.me.ri.kə/

- 1. LVS: —
- 2. Extram.: /ə.me.ri.<kə>/
- 3. MSR: /ə.mé.ri.<kə>/
- 4. ASR: —
/əmérikə/

similar words: *adrénaline*, *currículum*, *análisis*, *rhinóceros*, *thermómetro*,
aspáragus... (do the derivations for these yourself)

example: *horizon*

ho.ri.zon /hə.raj.zən/

1. LVS: —
2. Extram.: /hə.raj.⟨zən⟩/
3. MSR: /hə.ráj.⟨zən⟩/
4. ASR: —
/hərájzən/

similar words: *discíple*, *Oríon*, *papýrus*, *volcáno*, *Koréa*, *Genéva*, *agénda*, *veránda*, *Septémber*, *moméntum*... (do the derivations for these yourself)

example: *police*

po.lice /pə.lijs/

1. LVS: /pə.lijs/
2. Extram.: —
3. MSR: —
4. ASR: —

/pəlijs/

similar words: *Julý*, *giráffe*, *cigár*, *trombóne*, *machíne*, *domáin*, *Ukráine*, *papá*,...
(do the derivations for these yourself)

example: *cabaret*

ca.ba.ret /ka.bə.rej/

1. LVS: /ka.bə.réj/
2. Extram.: —
3. MSR: —
4. ASR: /ká.bə.rej/
/kábərej/

similar words: *cá*talogue, *á*ncedote, *á*venue, *cró*codile, *hó*liday, *pá*rachute, *cóm*promise, *É*skimo... (do the derivations for these yourself)

example: *travel*

tra.vel /*tra.vəl*/

1. LVS: —
2. Extram.: /*tra.və<1>*/ (!)
3. MSR: /*trá.və<1>*/
4. ASR: —
/trávəl/

similar words: *vómit*, *fínish*, *shíver*, *rével*, *pívot*, *réckon*; *énter*, *ánswer*, *ínjure*...
(do the derivations for these yourself)

example: *imagine*

i.ma.gine /i.ma.ʤin/

1. LVS: —
2. Extram.: /i.ma.ʤi<n>/
3. MSR: /i.má.ʤi<n>/
4. ASR: —
/imáʤin/

similar words: exámine, devélop, abólish, inhérit, solícit, consíder, delíver;
detérmine, intérpret, remémber, surrénder... (do the derivations for these
yourself)

example: *defend*

de.fend /di.fend/

1. LVS: —
2. Extram.: /di.fen<d>/
3. MSR: /di.fén<d>/
4. ASR: —
/difénd/

similar words: *adópt*, *prevént*, *accépt*, *consíst*, *seléct*, *arrést*... (do the derivations for these yourself)

example: *suppose*

su.ppose /sə.pəwz/

1. LVS: /sə.pəwz/
2. Extram.: —
3. MSR: —
4. ASR: —

/səpəwz/

similar words: *donáte*, *prodúce*, *destróy*, *obéy*, *sedáte*, *excúse*, *contáin*, *belíeve*, *baptíze*, *contról*, *prefér*, *reviév*... (do the derivations for these yourself)

example: *decorate*

de.co.rate /de.kə.rejt/

1. LVS: /de.kə.réjt/
2. Extram.: —
3. MSR: —
4. ASR: /dé.kə.rejt/
/dékərejt/

similar words: *dú*PLICATE, *sú*BSTITUTE, *é*XECUTE, *sá*TISFY, *ré*COGNIZE, *á*NALYSE, *sá*CRIFICE, *dí*AGNOSE, *invé*STIGATE, *elí*MINATE, *solí*DIFY... (do the derivations for these yourself)

example: *complement* (verb)

com.ple.ment /*kóm.plə.ment*/

1. LVS: —
2. Extram.: /*kóm.plə.men*<t>/
3. MSR: /*kóm.plə.mén*<t>/
4. ASR: /*kóm.plə.men*<t>/
/kómpləment/

similar words (all are verbs): *dó*cument, *có*mpliment, *sú*pplement, *gé*nuflect, *má*nifest... (do the derivations for these yourself)

Affixes and stress

stress-neutral suffixes

They **do not change the stress-pattern** of their bases. We indicate them with the # symbol: they are outside the domain of metrification.

-al (arriv#al), **-ed** (limit#ed), **-er** (manag#er), **-es** (orang#es), **-ful** (béauti#ful),
-hood (nation#hood), **-ing** (decorat#ing), **-less** (merci#less), **-ly** (similar#ly),
-ness (lazi#ness), **-able** (publish#able), **-ism** (modern#ism)

fé⟨ver⟩ – **fé**⟨ver⟩ #ish
édi⟨t⟩ – **édi**⟨t⟩ # ing

Affixes and stress

pre-stressed 1 suffixes

1ry stress falls on the syllable **preceding the suffix**.

Type A: These suffixes follow the **noun** pattern and stress placement follows from their shape.

ab**í**li<ty> con**fó**rmi<ty>

-uble, -ity, -ety, -erie, -ion, -ular, -logy, -meter, -graphy, -poly, -tomy, -pathy, -thesis, -gamy

Type B: These suffixes follow the **verb** pattern and stress placement follows from their shape.

ana**tó**mi<c> milita**rí**sti<c>

-ic, -ish

Affixes and stress

pre-stressed 1/2 suffixes

1ry stress falls on the syllable **preceding** the suffix if it is **H**, but on the **2nd syllable** preceding the suffix if the syllable before the suffix is **L**.

Type A: These suffixes follow the **noun** pattern and stress placement follows from their shape.

medíci⟨nal⟩ parén⟨tal⟩

-age, -al, -ous, -ive, -ant, -ance, -ent, -ence

Type B: 1ry stress placement does not follow from the shape of these suffixes.

fí.gu.rative de.món.strative

-ative, -ature, -ible, -ery, -ary, -ory

Affixes and stress

pre-stressed 2 suffixes

1ry stress falls on the **2nd syllable** preceding the suffix (if possible). These suffixes place 1ry stress by Long Vowel Stressing (+ the Alternating Stress Rule).

rá.di.ate se.**dá**te

-ate, -ize, -ite, -ene, -ine, -cide, -oir, -ose, -tude, -(i)fy

Affixes and stress

auto-stressed (self-stressed) suffixes

1ry stress falls on the suffix **itself**. Auto-stressed suffixes are exceptional and 1ry stress placement does not follow from their shape.

lemon**áde** pictur**ésque** novel**étte**

-ade, -ese, -ique /**ijk**/, -ee /**ij**/, -esque, -esce, -ette

how reliable are the rules for 1ry stress in English?

- for almost every pattern considered regular according to the rules we discussed there are counterexamples (= exceptions)
- but certain patterns are very strong while others are weaker

vanilla-nouns

- **nouns with more than 2 syllables**, if the penult is light, get 1ry on the antepenult acc. to the MSR
- **á**.ni.<mal>, **cí**.ne.<ma>, etc.
- however, some nouns get 1ry on the **L** penult:
- va.**ní**.<lla>, an.**té**.<nna>, a.**ssá**.<ssin>, di.**lé**.<mma>, um.**bré**.<lla>, Vi.**é**.<nna>, pro.**fé**.<ssor>, a.do.**lé**.<scent>...(also: e.**ná**.<mel>, Di.**á**.<na>, Vi.**á**.<gra>, pi.**á**.<no>)
- the proportion of **vanilla-nouns** is around 35%
- if the penult is **H**, there are only few exceptions, most (around 97%) follow what the rules predict:
- e.**níg**.<ma>, ho.**rí**.<zon>...
- but: **chá**.rec.<ter>, **ád**.jec.<tive>, **cá**.len.<dar>, **á**.nec.<dote>

medial sC clusters

- according to the OMP, medial sC clusters are syllabified as **.sC**
- these words thus behave regularly:
mí.ni.<ster>, **án**.ce.<stor>, **ór**.che.<stra>, **ín**.du.<stry>, **Pró**.te.<stant>
- however, these then will be exceptions:
- A.**lá**.<ska>, con.**té**.<stant>, as.**bé**.<stos>