BBN-ANG-243 Advanced Phonology: Phonological Analysis

Word Stress part 1

Kiss Zoltán / Starcevic Attila / Szigetvári Péter / __Törkenczy Miklós__

Dept of English Linguistics, Eötvös Loránd University

(1) Stress/accent is *syllable prominence*

EX.co.MMU.ni.cate   ˌɛkskəmˈjʉwnɪkɛjt   ● ˌ●˙ ˙ ˙

(1.1) Phonetic properties of stress/accent :

relative

compare [coronal]   k ɪ s

```
                                         *       *
                                         *     * *
grid representation of prominence      kiss   kisses
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syllable prominence is due to   loudness
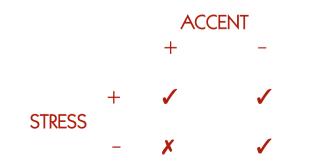   pitch
                                 length

(1.2) Stress vs. accent

- **STRESS** is a (predictable or unpredictable) lexical property of syllables of *words*. Some syllables of a word are stressed others are unstressed

    a.LAS.ka   SAR.DINE   CI.ga.RETTE   HELicopter

- **ACCENT** is a property of some syllables of *utterances* (which may consist of one or more words). Accented syllables are rhythmically prominent and are potential sites of pitch change. In neutral sentences the last accent has the actual pitch change (the tonic, 1ry stress)

    CATS DON'T READ
    CATS DON'T READ
    CATS DON'T READ

- **STRESS vs. ACCENT**
    Only lexically stressed syllables can be accented, but some lexically stressed syllable may not receive accent: E.ver.LAS.ting   vs.   E.ver.las.ting RAIN

		ACCENT	
		+	–
STRESS	+	✔	✔
	–	✘	✔

(2) Word stress:

(2.1) Degrees (one stress vs more than one stress in a word)

● Hungarian

```
 *          *          *           *              *                  *
 * *        * * *      * * * *     * * *  *  *    * * *  *  * *      *  * * *  *  * *
matek     matekos    matekozik   matekozhatnak   matekozhatnának    átmatekozhatnának
```

● English

```
    *          *         *    *            *        *
    * *        * * *     * * *  *          *   *   * * *
   atom       atomic    atomistic        excommunicate

   atəm       ətɔmɪk    atəmɪstɪk        ɛkskəmjɯwnɪkɛjt
```

Notation

spelling	átom	atómic	àtomístic	èxcommúnicate
transcription	ˈatəm	əˈtɔmɪk	ˌatəˈmɪstɪk	ˌɛkskəmˈjɯwnɪkɛjt
	átəm	ətɔ́mɪk	àtəmístɪk	ɛ̀kskəmjɯ́wnɪkɛjt

(2.2) Predictability (fully predictable vs. fully lexical)

Hungarian: leftmost syllable

- Macedonian: antepenultimate syllable   FULLY PREDICTABLE   &   FIXED

Polish: penultimate syllable

- classical Arabic: FULLY PREDICTABLE   &   NOT FIXED

- Russian, Italian, Spanish   NOT (FULLY) PREDICTABLE &   NOT FIXED
                    (partially) LEXICAL

(2.3) Stress & quantity/syllable weight (quantity sensitivity)

(i)   syllable weight: heavy, superheavy, light   (V_L=long V, D=diphthong, V_S=short V, "." = syllable boundary; open syllable ends is V, closed syllable ends in C)

HEAVY SYLLABLE: **H**		LIGHT SYLLABLE: **L**
(contains a long V *or* diphthong *or* is closed)		(contains a short V *and* is open)
$V_L(C).$ *or* $D(C).$ *or* $V_SC(C).$		V.
	SUPERHEAVY (H_{SH})	
HL **vi.sa** vɪj.zə	$H_{SH}H$ **an**.*gel* ɛjn.dʒəl	LL **A.bba** a.bə
HH **aw.ful** ɔː.fəl	H_{SH} **flaunt** floːnt	LH **a**.*crid* a.krɪd
HH **ban.quet** baŋ.kwɪt	H_{SH} **act** ɑkt	

(ii) Two interpretations of diphthong

a. $D = V_L$ ne.on   **nɪj** . ən   **H**H

b. $D = V_SC$ ne.on   **nɪ** . jən   **L**H

(iii) Quantity-sensitive system, example: Classical Arabic

a. ˈka ta <ba>   'he wrote'   b. ki ˈtaː <bun>   'book (nom sg)'
     L   L   L   **H**

    ˈba la ħa <tun>   'date (nom sg)'   ju ˈʃaː ri <ku>   'he participates'
     L   L   L   L   **H**   L

                                                            ma naː ˈdiː <lu>   'kingdom (nom sg)'
                                                             L   H   **H**

Ignore last syllable; stress rightmost H *if there is one, otherwise stress leftmost* (L) *syllable*

(iv) Quantity-insensitive system, example: Hungarian

paripa   ˈ**L** L L   Barbara   ˈ**H** L L

karácsony   ˈ**L** H L   Melinda   ˈ**L** H L

Abigél   ˈ**L** L H   Aladár   ˈ**L** L H

(not the same as the pattern of Hungarian metrical verse: takaˈrá el a ˈbérci teˈtőt)

(2.4) Stress & the domain of stress assignment (extrametricality)

In a stress system with *extrametricality* some peripheral parts of the word are systematically outside the domain of metrification, e.g. last syllable in Classical Arabic:

a. ˈka ta <ba>   'he wrote'
    L L

   ˈba la ħa <tun>   'date (nom sg)'
   L L L

b. ki ˈtaː <bun>   'book (nom sg)'
    L H

   ju ˈʃaː ri <ku>   'he participates'
    L H L

   ma naː ˈdiː <lu>   'kingdom (nom sg)'
    L   H H

(2.5) Stress & vowel quality (vowel reduction: full vs. reduced vowels)

In a stress system with *Vowel Reduction* unstressed syllables have a limited set of vowels (called 'reduced vowels'), i.e. fewer vowel contrasts, compared to stressed syllables (e.g. Catalan, Russian).

(2.5.1) Inventory: Trad BrE ('old school') vs. Current BrE

Lexical set	Trad BrE	CuBE
FLEECE	iː	ɪj
FACE	eɪ	ɛj
PRICE	aɪ	ɑj
CHOICE	ɔɪ	oj
MOUTH	aʊ	aw
GOAT	əʊ	əw
GOOSE	uː	ʉw

Lexical set	Trad BrE	CuBE
NEAR	ɪə	ɪː
SQUARE	eə	ɛː
START/PALM/BATH	ɑː	ɑː
NURSE	ɜː	əː
FORCE/NORTH/THOUGHT	ɔː	oː
CURE　　[palatal] __	ʊə	θː
POOR	ʊə	oː

Lexical set	Trad BrE	CuBE
KIT	ɪ	ɪ
DRESS	e	ɛ
TRAP	æ	a
STRUT	ʌ	ʌ
LOT	ɒ	ɔ
FOOT	ʊ	θ

(2.5.2) Vowel reduction in English

In English vowel quality and stress are *interdependent*, there are two sets of vowels: full vs. reduced.

　(i) stressed syllables have full vowels and

　(ii) there is a strong tendency for reduced vowels to occur in unstressed syllables (= vowel reduction).

<div align="center">

parámeter　　　　　　Jàpanése

[pəˈramətə]　　　　　[ˌdʒapəˈnɪjz]

</div>

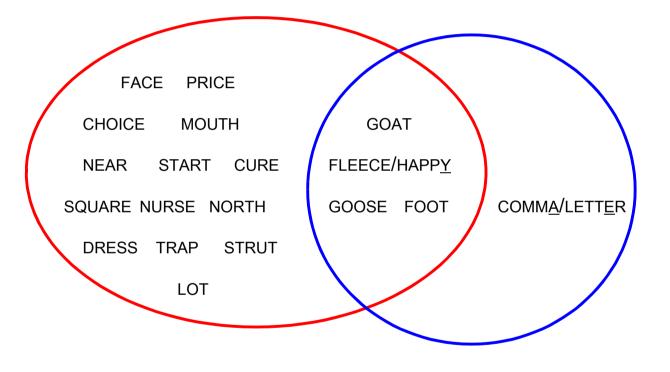*Therefore*: a reduced vowel can alternate with *any* full one

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átom ~ atómic        acádemy ~ àcadémic        édit ~ edítion
|  |    |  |          |  | |      |  | |          | |   | |
a  ə    ə  ɔ          ə  a ə      a  ə ɛ          ɛ ə   ɪ ɪ
F  R    R  F          R  F R      F  R F          F R   R F
```
.

However: while stressed syllables *must* have full vowels, unstressed syllables can have full vowels too.

<div align="center">

October　　　ambassador　　　róbot　　órgasm

ɔkˈtəwbə　　amˈbasədə　　　　ˈrəwbɔt　　ˈoːgazəm

variation　　direct　dɑjˈrɛkt %　dɪˈrɛkt　%　dəˈrɛkt

</div>

(2.5.3) FULL vs. REDUCED:

Overlap between full and reduced vowels

FACE   PRICE

CHOICE   MOUTH   GOAT

NEAR   START   CURE   FLEECE/HAPP<u>Y</u>

SQUARE NURSE NORTH   GOOSE   FOOT   COMM<u>A</u>/LETT<u>E</u>R

DRESS   TRAP   STRUT

LOT

(2.5.4) A possible alternative analysis of the vowel inventory

If we analyse the vowel of STRUT [ʌ] and the vowel of COMMA/LETTER [ə] as allophones of the same vowel phoneme, then the reduced vowels are a subset of the full ones

FACE   PRICE

CHOICE   MOUTH

NEAR   START   CURE

SQUARE NURSE   NORTH

DRESS   TRAP

LOT

GOAT

FLEECE/HAPPY

STRUT/COMMA/LETTER

GOOSE   FOOT

(2.6) Degrees of stress in English words

■ when we study word stress, we study one-word sentences

■ traditional: 1ry, 2ry, 3ry, 0

        1ry & 2ry = stressed = may receive accent

        3ry & 0 = unstressed = may not receive accent

(2.7) Unstressed syllables with full vowels: "TERTIARY stress"

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            2  0  1 0 3
```

(2.7.1) Notation

```
            èxcommúnicate
            ˌɛkskəˈmjʉwnɪkɛjt
```

"3ry" stress is not indicated explicitly in transcription: full vowel without stress mark

(2.7.2) Indeterminacy

Since there is an overlap between full vowels & reduced vowels, *sometimes* it is not possible to tell if a syllable has a full vowel or a reduced vowel, i.e. whether it is "3ry stressed" or unstressed

vomit [ˈvɔmɪt] 1 0 or 1 3   ambush [ˈambəʃ] 1 0 or 1 3   (format [ˈfoːmat] 1 3)
         F   ?   F   ?   F   F

(2.7.3) The predictability of "tertiary stress"

(i) If you know that a syllable is unstressed, how can you tell if its vowel will be reduced or full (=3ry)?

You cannot: it is mainly (mainly) lexical

(a) lexical/arbitrary   *fórmat*   [ˈfoːmat]   *clímate*   [ˈklɑjmət]

                       páradise   [ˈparədɑjs]   *cháracter*   [ˈkarəktə]

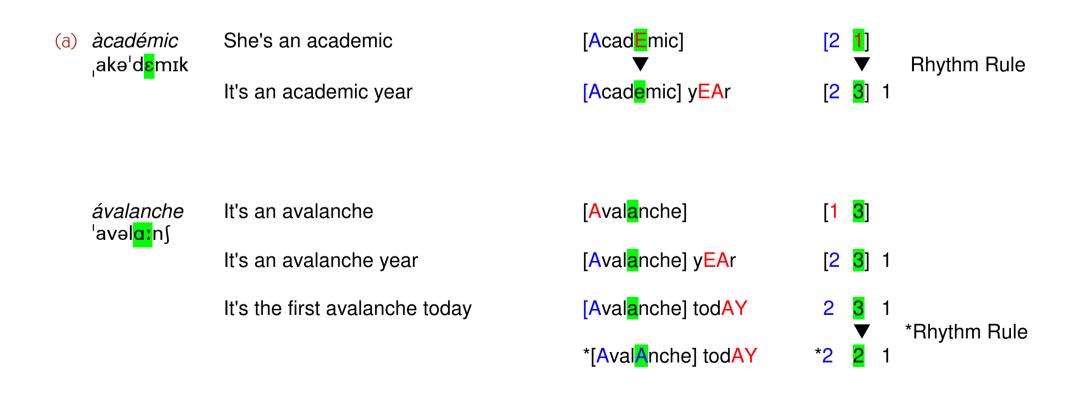(b) morphological   *gráduate*$_V$ [ˈgradʒʉwɛjt]   *gráduate*$_N$ [ˈgrædʒʊət]

(c) phonological

Closed Syllable Tendency		open initial syllable		closed initial syllable	
	A.mérica	*a.ˈmɛ-	ə.ˈmɛ-	*Mon.tána*	mɔn.ˈta-
	a.trócious	*a.ˈtrəw-	ə.ˈtrəw-	*Oc.tóber*	ɔk.ˈtəw-
☹	*No.vémber*	nəw.ˈvɛ-	nə.ˈvɛ-	*con.trást*$_V$	*kɔn.ˈtrɑːst kən.ˈtrɑːst

(ii) If you know that a syllable is has a full vowel, how can you tell if it is stressed or unstressed (1ry/2ry vs. 3ry)?

a *stressed* syllable in a word may be a rhythmically stressed/strong (=accented) syllable in a sentence (and may also lose it's rhythmical prominence (its accent) under certain conditions due to the Rhythm Rule).

In the sentence a stress can be reduced to 3ry (=may not receive accent) as a result of the Rhythm Rule (Rhythmic Stress Deletion, Stress Shift), but 3ry stress (i.e an unstressed syllable) cannot be upgraded to become accented for rhythmic reasons.

(a) *àcadémic*
ˌakəˈdɛmɪk

She's an academic	[AcadEmic]	[2 1]
	▼	▼ Rhythm Rule
It's an academic year	[Academic] yEAr	[2 3] 1

ávalanche
ˈavəlɑːnʃ

It's an avalanche	[Avalanche]	[1 3]
It's an avalanche year	[Avalanche] yEAr	[2 3] 1
It's the first avalanche today	[Avalanche] todAY	2 3 1
	▼ *Rhythm Rule	
*[AvalAnche] todAY	*2 2 1

(b)

èverlásting   The rain is everlasting   [EverlAsting]   [2   1]
ˌɛvəˈlɑːstɪŋ   ▼   ▼   Rhythm Rule
                           She shivered in the everlasting rain   [Everlasting] rAIn   [2   3] 1

Octóber   It rains in October   [octOber]   [3 1]
ɒkˈtəwbə
                           She shivered in the October rain   [octOber] rAIn   [3 2]
                                                                             ▼   ▼   *Rhythm Rule
                                                                       *[October] rAIn   *[2 3]

(2.7.4) Distribution: 3ry stress vs. 2ry stress

(i) Rightmost stress in a word = primary (1ry)   non-rightmost stress(es)= secondary (2ry)

Let us assume we know where the last stress is.

(ii) Distribution

(a) 3ry & 2ry stress: complementary distribution: **2 σ before 1ry stress & after 1ry stress**

	position	
	2 σ before 1ry stress	after 1ry stress
2ry (=major) stress	*à̲cadémic*	–
3ry stress	–	ró**bot**

(b) 3ry & 2ry stress: **1 σ before 1ry stress**

	position		
	2 σ before 1ry stress	1 σ before 1ry stress	after 1ry stress
2ry (=major) stress	**è**verlásting **à**cadémic	?	–
3ry stress	–	**Oc**tóber	ró**bot**

Rhythm Rule

sàrdíne	ˌsɑːˈdɪjn	▸	sàrdine sándwich	ˌsɑːdɪjn ˈsanwɪdʒ	Rhythm Rule ✓
Octóber	ɔkˈtəwbə	▸	Octòber ráin	ɔkˌtəwbə ˈrɛjn	Rhythm Rule ✗
				*ˌɔktəwbə ˈrɛjn	

(c)

	position		
	2 σ before 1ry stress	1 σ before 1ry stress	after 1ry stress
2ry stress	**à**cadémic	**sàr**díne	–
"3ry stress" = unstressed with full V	–	**Oc**tóber	ró**bot**

Two-syllable words # F <u>STR</u> #   Rhythm Rule ✓   F (full V) = 2ry

sàrdíne   ˌˌsɑːˈdɪjn   sàrdine sándwich   ˌsɑːdɪjn ˈsanwɪdʒ

dìréct   ˌdɑjˈrɛkt   dìrect débit   ˌdɑjrɛkt ˈdɛbɪt

cartóon   ˌkɑːˈtʉwn   càrtoon nétwork   ˌkɑːtʉwn ˈnɛtwɜːk

Three-syllable words # F <u>STR 0</u> #   Rhythm Rule ✗   F = 3ry

Octóber   ɔkˈtəwbə   Octòber ráin   ɔkˌtəwbə ˈrɛjn

Titánic   tɑjˈtanɪk   Titànic's bánd   tɑjˌtanɪks ˈband

salvátion salˈvɛjʃən   Salvàtion Ármy   salˌvɛjʃən ˈɑːmi

(d)

	position			
	2 σ before 1ry stress	1 σ before 1ry stress		after 1ry stress
		# F **STR** #	# F **STR** 0 #	
2ry stress	**à**cadémic	**sàr**díne	–	–
"3ry stress" = unstressed with full V	–	–	**Oc**tóber	ró**bot**

(The complementary distribution of 2ry stress & 3ry stress can be an argument for not distinguishing between them: we will not pursue this here and continue to refer to a full vowel that does not have 1ry/2ry stress as having 3ry stress)

(2.8)   Difference between stresses: 1ry vs. 2ry –   pitch change

<div align="center">

2   1
Acad<u>e</u>mic.

2   2   1
Peter's an   acad<u>e</u>mic.

2   2   2   1
Peter's an   acad<u>e</u>mic for good.

</div>

The distinction between 1ry & 2ry stress is a **predictable** *phrase/sentence level distinction (they are both accented and the 1ry is the tonic). At the level of words 1/2ry stress is* **the same kind of** *stress (as opposed to 3ry & 0 syllables, which are unstressed).*

At phrase/sentence level, in neutral sentences the rightmost accent is the tonic (=1ry).

Thus: in isolated words (=one-word sentences) the last stress is 1ry, the other stresses are 2ry.

(3) Predictability of stresses in a word

(3.1) Non-rightmost stress is predictable ('2ry') when the place of the rightmost stress ('1ry') is known

(3.2) The phonotactics of '2ry' stress in English words (constraints)

NO 2^{RY} AFTER 1^{RY}:   *#...1...2...#   (by definition, see (3.1))

gráduate$_V$ ['gradʒʉwɛɪt]   >   1 0 3   NOT   *1 0 2

a.   NO STRESS CLASH: * #...STR STR...#   (= *#...21...#; *#...22...#)

very few "exceptions"   sàrdíne   Rhythm Rule: sàrdine tín   *sardìne tín
                             prìncéss   Prìncess Ánn   *Princèss Ánn

b.   EARLY STRESS: *#00; *#30; *#03   exceptionless

(3.3) Relationship between the stressing of derived words and their bases

STRESS PRESERVATION   The derived word has to preserve the place of the stresses of its base.

base	derived word

STR   STR
✓   {chá racter}   {chà racter} + ístic

   STR   STR
✓   {o rí ginal}   {o rì ginál} + ity

    STR   STR
✗   {Ja pán}   {Jà pan} + ése

STRESS PRESERVATION is an inherently violable constraint: it applies as long as NO STRESS CLASH and EARLY STRESS are not violated = it is more important to obey NO STRESS CLASH and EARLY STRESS than STRESS PRESERVATION:

a.   ranking   **NO STRESS CLASH, EARLY STRESS >>   STRESS PRESERVATION**

● Long underived words with a stress later tan the 3rd from the beginning of the word: 2ry stress is unpredictable: either one or two syllables are skipped

  Àpalàchicóla (*Apàlachicóla)   but   Wìnnipesáukee (*Winnìpesáukee)
    1σ   1σ   2σ

2ry stress is

- calculated from the location of 1ry stress

- weight insensitive

- iterative (a word can have more than one)

- stress preserving (if possible)

- partially unpredictable: long underived words