

# BBN-ANG-243 Advanced Phonology: Phonological Analysis

## Word Stress part 1

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### (1) Stress/accent is *syllable prominence*

EX.co.MMU.ni.cate    ,ɛkskəm'jɛwnɪkɛjt    ●    ●    ●    ●

### (1.1) Phonetic properties of stress/accent :

relative

compare [coronal] k I s

\*

\*

\*

\*

\*

grid representation of prominence

kiss

kisses

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 Cl.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 syllables 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	ɛkskəmˈjʊwnɪkeɪt

## Notation

spelling	átom	atómic	àtomístic	èxcommúnicate
transcription	'atəm	ə'tɔmɪk	ˌatə'mɪstɪk	ˌɛkskəm'jʊwnɪkeɪt
	átəm	ətɔ́mɪk	àtəmístik	èkskəmjúwnɪkeɪt

**(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 &  
(partially) LEXICAL

NOT FIXED

## (2.3) Stress &amp; 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 in 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 $V_S C(C).$			$V.$		
SUPERHEAVY ( $H_{SH}$ )					
HL	<b>vi.sa</b>	vɪj.zə	$H_{SH}H$	<b>an.gel</b>	ɛjn.dʒəl
HH	<b>aw.ful</b>	o:ˌfəl	$H_{SH}$	<b>flaunt</b>	flo:nt
HH	<b>ban.quet</b>	bɑŋ.kwɪt	$H_{SH}$	<b>act</b>	akt
LL	<b>A.bba</b>	a.bə			
LH	<b>a.crid</b>	a.krɪd			

- (ii) Two interpretations of diphthong

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

b.  $D = V_S C$       ne.on      **nɪ** . jən      **LH**

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

a. 'ka ta <ba> 'he wrote'  
 L L

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

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

ju 'ʃa: ri <ku> 'he participates'  
 L H L

ma na: 'di: <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 'L L L Barbara 'H L L

karácsony 'L H L Melinda 'L H L

Abigél 'L L H Aladár 'L L H

(not the same as the pattern of Hungarian metrical verse: taka<sup>r</sup>á el a <sup>b</sup>érci te<sup>t</sup>ót)

## (2.4) Stress &amp; 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. 'ka ta <ba>      'he wrote'  
 L L

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

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

ju 'ʃa: ri <ku>      'he participates'  
 L H L

ma na: 'di: <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	i:	ɪj
FACE	eɪ	ɛj
PRICE	aɪ	ɑj
CHOICE	ɔɪ	oj
MOUTH	aʊ	aw
GOAT	əʊ	əw
GOOSE	u:	ʊw

Lexical set	Trad BrE	CuBE
NEAR	ɪə	ɪ:
SQUARE	eə	ɛ:
START/PALM/BATH	ɑ:	ɑ:
NURSE	ɜ:	ə:
FORCE/NORTH/THOUGHT	ɔ:	o:
CURE [palatal] __	ʊə	ə:
POOR		o:

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

## (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).

parámeter

[pə'ramətə]

Jàpanése

[,dʒapə'nɪz]

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

á t o m ~ a t ó m i c

a	ə	ə	ɔ
F	R	R	F

a c á d e m y ~ à c a d é m i c

ə	a	ə	a	ə
R	F	R	F	R

é d i t ~ e d í t i o n

ɛ	ə	ɪ	ɪ
F	R	R	F

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

October

ɔk'təwbə

variation

ambassador

am'basədə

direct dɔj'rekt % dɪ'rekt

róbot

'rəwbɔt

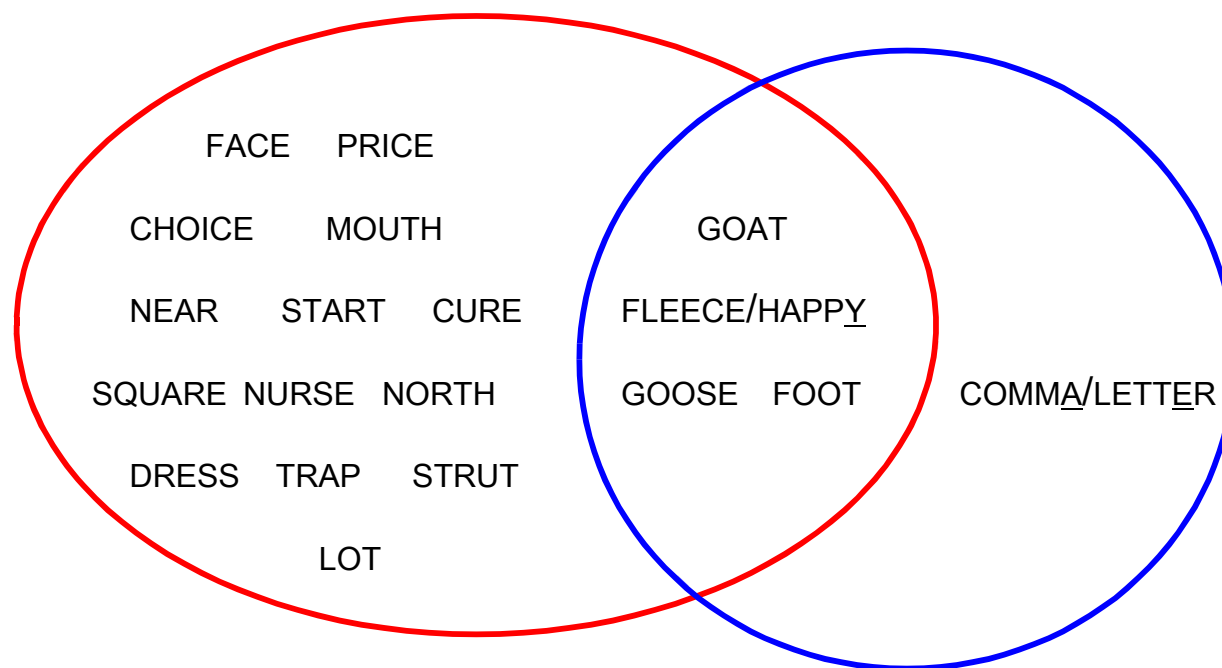
% də'rekt

órgasm

'o:gazəm

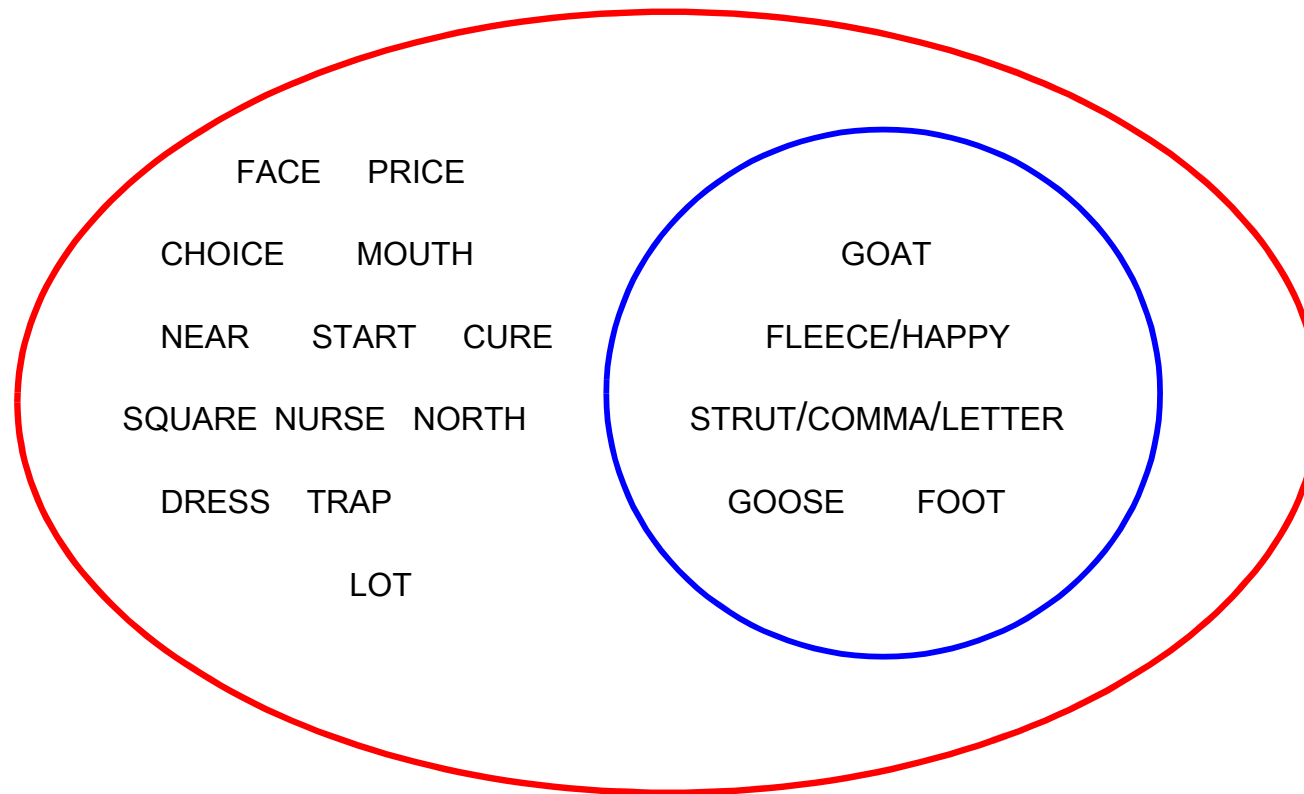
(2.5.3) FULL vs. REDUCED:

Overlap between full and reduced vowels



### (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



## (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”

## (2.7.1) Notation

2 0 1 0 3  
 èxcommúnicate  
 ,ɛkskə'mjʊwnɪkɛjt

"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 ['vɒmɪt] 1 0 or 1 3

F ?

ambush ['ambʊʃ] 1 0 or 1 3

F ?

(format ['fo:mat] 1 3)

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      *fórm**at*    ['fo:ma**t**]                      *clí**mate*    ['klaɪm**ət**]  
    *pá**radise*    ['paɾəd**ə**ɪs]

(b) morphological      *gráduate*<sub>V</sub> ['grædʒu**ə**ɪt]                      *gráduate*<sub>N</sub> ['grædʒu**ə**t]

(c) phonological

Closed Syllable Tendency

open initial syllable

closed initial syllable

*A.mérica*

\*a.'mɛ-

ə.'mɛ-

*Mon.tána*

mɒn.'ta-

*a.trócious*

\*a.'trəw-

ə.'trəw-

*Oc.tóber*

ɔk.'təw-

⊗

*No.vémber*

nəw.'vɛ-

nə.'vɛ-

*con.trást*<sub>V</sub>

\*kɒn.'tra:st

kən.'tra:st

(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) <i>àcadémic</i> ,akə'dɛmɪk	She's an academic	[Acad <b>E</b> mic]	[2 1]	
		▼	▼	Rhythm Rule
	It's an academic year	[Acad <b>E</b> mic] yEAR	[2 3] 1	
<i>ávalanche</i> 'avələ'nʃ	It's an avalanche	[Aval <b>A</b> nche]	[1 3]	
	It's an avalanche year	[Aval <b>A</b> nche] yEAR	[2 3] 1	
	It's the first avalanche today	[Aval <b>A</b> nche] todAY	2 3 1	
		▼	▼	*Rhythm Rule
		*[Aval <b>A</b> nche] todAY	*2 2 1	



(b)

èverlásting  
 |evə'la:stɪŋ

The rain is everlasting

[E|ver|A|sting]

[2 1]

Rhythm Rule

She shivered in the everlasting rain

[E|verlasting] r|A|In

[2 3] 1

Octóber  
 |ɔk'təwbə

It rains in October

[|ɔct|O|ber]

[3 1]

She shivered in the October rain

[|ɔct|O|ber] r|A|In

[3 2]

\*Rhythm Rule

\*[O|ctober] r|A|In

\*[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  $\sigma$  before 1ry stress & after 1ry stress**

	position	
	2 $\sigma$ before 1ry stress	after 1ry stress
2ry (=major) stress	<i><u>a</u>cadémic</i>	–
3ry stress	–	ró <u>bot</u>

(b) 3ry & 2ry stress: 1  $\sigma$  before 1ry stress

	position		
	2 $\sigma$ before 1ry stress	1 $\sigma$ before 1ry stress	after 1ry stress
2ry (=major) stress	<u>è</u> verlásting <u>à</u> cadémic	?	–
3ry stress	–	<u>O</u> ctóber	ró <u>bot</u>

## Rhythm Rule

sàrdíne	,sɑ:'dɪjn	▶	sàrdine sándwich	,sɑ:dɪjn 'sanwɪdʒ	Rhythm Rule ✓
Octóber	ɔk'təwbə	▶	Octòber ráin	ɔk,təwbə 'reɪn	Rhythm Rule ✗
				* ,ɔktəwbə 'reɪn	

## (c)

	position		
	2 $\sigma$ before 1ry stress	1 $\sigma$ before 1ry stress	after 1ry stress
2ry stress	<u>à</u> cadémic	<u>s</u> àrdíne	–
“3ry stress” = unstressed with full V	–	<u>O</u> ctóber	ró <u>bot</u>

**Two-syllable words # F STR #**

Rhythm Rule ✓

F (full V) = 2ry

sàrdíne	ˌsa:ˈdɪjn	sàrdine sándwich	ˌsa:dɪjn ˈsanwɪdʒ
dìréct	ˌdɑjˈrɛkt	dìrect débit	ˌdɑjɹɛkt ˈdɛbɪt
cartóon	ˌkɑ:ˈtəwn	càrtoon nétworck	ˌkɑ:təwn ˈnɛtwɜ:k

**Three-syllable words # F STR 0 #**

Rhythm Rule ✗

F = 3ry

Octóber	ɔkˈtəwbə	Octòber ráin	ɔkˌtəwbə ˈreɪn
Titánic	tɑjˈtɑnɪk	Titànic's bánd	tɑjˌtɑnɪks ˈbænd
salvátion	salˈvɛɪʃən	Salvàtion Ármy	salˌvɛɪʃən ˈɑ:mi

(d)

position

	2 σ before 1ry stress	1 σ before 1ry stress		after 1ry stress
		# F STR #	# F STR 0 #	
2ry stress	<u>à</u> cadémic	<u>sà</u> rdíne	–	–
“3ry stress” = unstressed with full V	–	–	<u>O</u> ctóber	ró <u>b</u> ot

(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

2 1  
Academic.

2 2 1  
Peter's an academic.

2 2 2 1  
Peter's an academic for good.

*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<sup>RY</sup> AFTER 1<sup>RY</sup>:      \*#...1...2...#      (by definition, see (3.1))

gráduate<sub>v</sub> ['gradʒuweɪt]    >    1 0 3    NOT    \*1 0 2

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

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

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



## 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