

## SPE main stress rule breakdown

Just for fun or reference, here's a breakdown of how the giant SPE English Main Stress Rule was supposed to apply to our examples. (If I try this in class again, I think I'll divide up the sub-rules among you rather than the words!)

$$\begin{array}{l}
 V \rightarrow [1 \text{ stress}] / \left[ X\_C_0 \left( \begin{bmatrix} -\text{tense} \\ \gamma\text{stress} \\ V \end{bmatrix} C_0^1 \left( \begin{bmatrix} \alpha\text{voc} \\ \alpha\text{cons} \\ -\text{ant} \end{bmatrix} \right) \right) \right] \\
 / \text{---} \left\langle \left( \begin{bmatrix} (fik)At \\ [+D]C_0 \end{bmatrix} \right) \left\{ \begin{array}{l} <_1+C_0>_1 \begin{bmatrix} -\text{stress} \\ -\text{tense} \\ -\text{cons} \end{bmatrix} [+cons]_0 \\ <_1 \begin{bmatrix} -\text{seg} \\ <_2-\text{FB}>_2 \end{bmatrix} >_1 C_0 [\beta\text{stress}] C_0 <_2 V_0 C_0 >_2 \end{array} \right\} \right\rangle \right]_{<NSP<_1 VA>_1>}
 \end{array}$$

Conditions:  $\beta = \begin{Bmatrix} 1 \\ 2 \end{Bmatrix}$   
 $\gamma \leq 2$  [in another version, says  $\gamma$  is 2 or weaker]  
 $X$  contains no internal #

SPE p. 240

The order in which we expand it should, I think, be this:

### 1 With the material in the un-subscripted <>

1.1 with  $\begin{Bmatrix} (fik)At \\ [+D]C_0 \end{Bmatrix}$  (I don't think it matters whether we try first the options for this parenthetical material [present; absent] or the options for what's in the curly brackets [top; bottom], and I don't think the expansion conventions say what to do.)

#### 1.1.1 with the top option in the curly brackets

1.1.1.1 full version, with successively less of the parenthesized material in the upstairs environment ("WSLOFPMITUE")

1.1.1.2 without the  $<_1>_1$ , WSLOFPMITUE

#### 1.1.2 with the bottom option in the curly brackets

1.1.2.1 full version, WSLOFPMITUE

1.1.2.2 without the  $<_2>_2$ , WSLOFPMITUE

1.1.2.3 without  $<_1>_1$ , which I think implies without the  $<_2>_2$ , WSLOFPMITUE

### 1.2 without $\begin{Bmatrix} (fik)At \\ [+D]C_0 \end{Bmatrix}$

#### 1.2.1 with the top option in the curly brackets

1.2.1.1 full version, WSLOFPMITUE

1.2.1.2 without the  $<_1>_1$ , WSLOFPMITUE

#### 1.2.2 with the bottom option in the curly brackets

1.2.2.1 full version, WSLOFPMITUE

1.2.2.2 without the  $<_2>_2$ , WSLOFPMITUE

1.2.2.3 without  $<_1>_1$ , which I think implies without the  $<_2>_2$ , WSLOFPMITUE

### 2 Without the material in the un-subscripted <>s, WSLOFPMITUE

Recap of remarks, before stepping through these:

- This analysis assumes that English vowels in lexical entries are all [–stress] (so why does the environment mention stress? see 4 below on cyclicity).
- S means ‘stem’, P means ‘prefix’
- [0stress] = stressless; [1stress] = primary-stressed; [2stress] = secondary-stressed; etc. [0stress] is [–stress], and all other values are [+stress].
- I’ve used capital letters below to indicate “tense” vowels.

## 1 With the material in the big angled brackets

### 1.1 with $\left\{ \begin{array}{l} (fik)At \\ [+D]C_0 \end{array} \right\}$

We didn’t have any examples of words with the [+D] feature (a hack to deal with certain suffixes) or of words with (fik)At and then another suffix, so I’ll skip this option and all its subsidiaries.

### 1.2 without $\left\{ \begin{array}{l} (fik)At \\ [+D]C_0 \end{array} \right\}$

#### 1.2.1 with the top option in the curly brackets

##### 1.2.1.1 full version

$V \rightarrow [1 \text{ stress}] / \left[ X\_C_0 \left( \begin{array}{c} [-\text{tense}] \\ \gamma\text{stress} \\ V \end{array} C_0^1 \left( \begin{array}{c} \alpha\text{voc} \\ \alpha\text{cons} \\ -\text{ant} \end{array} \right) \right) / \_ +C_0 \begin{array}{c} [-\text{stress}] \\ -\text{tense} \\ -\text{cons} \end{array} [+cons]_0 \right]_{\text{NSPVA}}$	<div style="border: 1px solid black; padding: 5px; width: 100px; margin: 0 auto;">“upstairs”</div>	<div style="border: 1px solid black; padding: 5px; width: 100px; margin: 0 auto;">“downstairs”</div>
<p>Conditions: <math>\gamma \leq 2</math> [in another version, says <math>\gamma</math> is 2 or weaker]  <math>X</math> contains no internal #</p>		

This sub-schema looks for a monosyllabic suffix with a non-tense vowel. The remainder is then plugged into the upstairs, which will stress the penult (second-to-last-syllable) if the ultima (last syllable) is light, and otherwise stresses the ultima.

#### Full version of upstairs:

$V \rightarrow [1 \text{ stress}] / \left[ X\_C_0 \begin{array}{c} [-\text{tense}] \\ \gamma\text{stress} \\ V \end{array} C_0^1 \begin{array}{c} \alpha\text{voc} \\ \alpha\text{cons} \\ -\text{ant} \end{array} / \_ +C_0 \begin{array}{c} [-\text{stress}] \\ -\text{tense} \\ -\text{cons} \end{array} [+cons]_0 \right]_{\text{NSPVA}}$	<p>Conditions: <math>\gamma \leq 2</math> [in another version, says <math>\gamma</math> is 2 or weaker]  <math>X</math> contains no internal #</p>
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#### • [A vertebr+al]<sub>A</sub>

First we match to the downstairs environment:

—	+	C <sub>0</sub>	$\begin{array}{c} [-\text{stress}] \\ -\text{tense} \\ -\text{cons} \end{array}$	[+cons] <sub>0</sub>	]NSPVA
[Avertebr	+	Ø	a	l	] <sub>A</sub>

Then take **[<sub>A</sub>vertebr** and match it to the upstairs environment.  $\begin{bmatrix} \alpha\text{voc} \\ \alpha\text{cons} \\ -\text{ant} \end{bmatrix}$  matches /r,w,j/ (not /l/),  
so the ultima matches here (i.e., counts as light):

$$\begin{array}{ccccccc} \begin{bmatrix} & X & \boxed{\text{---}} & C_0 & \begin{bmatrix} -\text{tense} \\ \gamma\text{stress} \\ V \end{bmatrix} & C_0^1 & \begin{bmatrix} \alpha\text{voc} \\ \alpha\text{cons} \\ -\text{ant} \end{bmatrix} \\ | & | & | & | & | & | & | \\ [\text{A} & \text{v} & \boxed{\text{e}} & \text{rt} & \text{e} & \text{b} & \text{r} \end{array}$$

=> **vétebral**.

### Omitting the inner parenthetical material:

$$V \rightarrow [1 \text{ stress}] / \left[ X\_C_0 \begin{bmatrix} -\text{tense} \\ \gamma\text{stress} \\ V \end{bmatrix} C_0^1 / \text{---} + C_0 \begin{bmatrix} -\text{stress} \\ -\text{tense} \\ -\text{cons} \end{bmatrix} [+cons]_0 \right]_{\text{NSPVA}}$$

Conditions:  $\gamma \leq 2$  [in another version, says  $\gamma$  is 2 or weaker]  
X contains no internal #

- **[<sub>A</sub> person+al ]<sub>A</sub>** : again, matches the ligh-syllable specifications

$$\begin{array}{ccccccc} \text{---} & + & C_0 & \begin{bmatrix} -\text{stress} \\ -\text{tense} \\ -\text{cons} \end{bmatrix} & [+cons]_0 & \text{---} & \text{---} \\ | & | & | & | & | & | & | \\ [\text{A} \text{ person} & + & \emptyset & \text{a} & \text{l} & & ]_{\text{A}} \end{array}$$

$$\begin{array}{ccccccc} \begin{bmatrix} & X & \boxed{\text{---}} & C_0 & \begin{bmatrix} -\text{tense} \\ \gamma\text{stress} \\ V \end{bmatrix} & C_0^1 & \\ | & | & | & | & | & | & \\ [\text{A} & \text{p} & \boxed{\text{e}} & \text{rs} & \text{o} & \text{n} & \end{array}$$

=> **pérsenal**.

### Omitting all the parenthetical material:

$$V \rightarrow [1 \text{ stress}] / \left[ X\_C_0 / \text{---} + C_0 \begin{bmatrix} -\text{stress} \\ -\text{tense} \\ -\text{cons} \end{bmatrix} [+cons]_0 \right]_{\text{NSPVA}}$$

Conditions: X contains no internal #

- **[<sub>A</sub> desIr+ous ]<sub>A</sub>**

$$\begin{array}{ccccccc} \text{---} & + & C_0 & \begin{bmatrix} -\text{stress} \\ -\text{tense} \\ -\text{cons} \end{bmatrix} & [+cons]_0 & \text{---} & \text{---} \\ | & | & | & | & | & | & | \\ [\text{A} \text{ desir} & + & \emptyset & \text{ou} & \text{s} & & ]_{\text{A}} \end{array}$$

Because the last vowel is tense, the longer versions of upstairs don't match (i.e., the ultima is heavy), so we have to use this short version:

$$\begin{array}{ccccc} [ & X & \boxed{\text{---}} & C_0 \\ | & | & | & | \\ [A & \text{des} & I & r \end{array}$$

=> **desírous**.

- **[<sub>A</sub> repugn+ant]<sub>A</sub>**

Just like *desirous*. Here, the reason the short version of the upstairs environment must be used is that there are two consonants (rather than a [+tense] vowel):

$$\begin{array}{ccccccc} \text{---} & + & C_0 & \begin{bmatrix} -\text{stress} \\ -\text{tense} \\ -\text{cons} \end{bmatrix} & [+cons]_0 & \text{]NSPVA} \\ | & | & | & | & | & | \\ [A\text{repugn} & + & \emptyset & a & nt & ]_A \end{array}$$

$$\begin{array}{ccccc} [ & X & \boxed{\text{---}} & C_0 \\ | & | & | & | \\ [A & \text{rep} & u & gn \end{array}$$

=> **repúgnant**.

### 1.2.1.2 without the <<sub>I</sub>><sub>1</sub>

$$V \rightarrow [1 \text{ stress}] / \left[ X \text{---} C_0 \left( \begin{bmatrix} -\text{tense} \\ \gamma\text{stress} \\ V \end{bmatrix} C_0^1 \left( \begin{bmatrix} \alpha\text{voc} \\ \alpha\text{cons} \\ -\text{ant} \end{bmatrix} \right) \right) / \text{---} \begin{bmatrix} -\text{stress} \\ -\text{tense} \\ -\text{cons} \end{bmatrix} [+cons]_0 \text{]NSP} \right.$$

Conditions:  $\gamma \leq 2$  [in another version, says  $\gamma$  is 2 or weaker]  
 $X$  contains no internal #

Now there doesn't need to be a suffix, but only nouns (and “stems” and “prefixes”) are eligible. If the vowel of the last syllable is [-tense], the final VC\* will get stripped off and the remainder sent upstairs, where as before we stress the penult's remainder if the ultima is light, and otherwise the ultima.

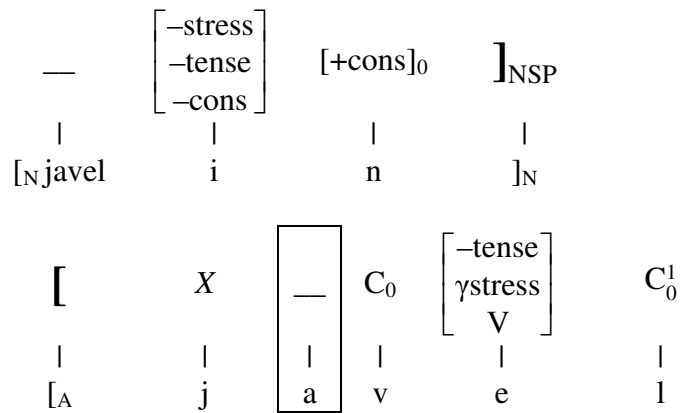
**Full version of upstairs—I don't think we had any examples**

**Omitting the inner parenthesized material:**

$$V \rightarrow [1 \text{ stress}] / \left[ X \text{---} C_0 \begin{bmatrix} -\text{tense} \\ \gamma\text{stress} \\ V \end{bmatrix} C_0^1 / \text{---} \begin{bmatrix} -\text{stress} \\ -\text{tense} \\ -\text{cons} \end{bmatrix} [+cons]_0 \text{]NSP} \right.$$

Conditions:  $\gamma \leq 2$  [in another version, says  $\gamma$  is 2 or weaker]  
 $X$  contains no internal #

- **[<sub>A</sub> javelin ]<sub>A</sub>**

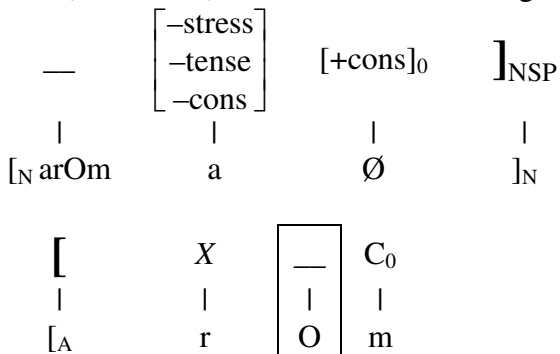


=> **jávelin.**

**Omitting all the parenthesized material:**

$V \rightarrow [1 \text{ stress}] / [ X\_C_0 / \text{---} \begin{bmatrix} -\text{stress} \\ -\text{tense} \\ -\text{cons} \end{bmatrix} [+cons]_0 ]_{NSP}$	
Conditions:	$\gamma \leq 2$ [in another version, says $\gamma$ is 2 or weaker] $X$ contains no internal #

- **[N arOma ]<sub>N</sub>** : doesn't match the longer version because of its tense vowel



=> **aróma**

**[N consensus ]<sub>N</sub>** : similar, but its reason for not matching the longer version is the /ns/ cluster

**[N larynx ]<sub>N</sub>** : matches the shorter version because once you strip off *ynx*, there's only one vowel left.

### 1.2.2 with the bottom option in the curly brackets

Because of the  $[\beta\text{stress}]$  (where beta must be 1 or 2), this sub-schema won't apply to any of our simple examples that haven't gone through a round of stressing yet.

## 2 Without the material in the un-subscripted <>s

In this sub-schema, if all the above has failed, which means we didn't have a word with a monosyllabic non-tense suffix, and we didn't have a noun/stem/prefix with a non-tense final syllable, then we try applying upstairs to the whole word: stress the penult if the ultima is light; otherwise stress the ultima.

**With all the upstairs material:** I don't think we had any examples

### Omitting the innermost parenthetical:

$$V \rightarrow [1 \text{ stress}] / \left[ X\_C_0 \begin{bmatrix} -\text{tense} \\ \gamma_{\text{stress}} \\ V \end{bmatrix} C_0^1 / \_ \right]$$

Conditions:  $\gamma \leq 2$  [in another version, says  $\gamma$  is 2 or weaker]  
 $X$  contains no internal #

- **[<sub>v</sub> imagine ]<sub>v</sub>**

Downstairs just matches the whole thing except the final bracket:

$$\begin{array}{c} \_ \\ | \\ [\text{v imagine} \end{array} \quad \begin{array}{c} ] \\ | \\ ]_{\text{v}} \end{array}$$
  

$$\begin{array}{c} [ \quad X \quad \boxed{\_} \quad C_0 \quad \left| \begin{bmatrix} -\text{tense} \\ \gamma_{\text{stress}} \\ V \end{bmatrix} \right| \quad C_0^1 \\ | \quad | \quad | \quad | \quad | \quad | \\ [\text{A} \quad \text{im} \quad \text{a} \quad \text{g} \quad \text{i} \quad \text{n} \end{array}$$

=> **imágin**e

### Omitting all the parenthetical material:

$$V \rightarrow [1 \text{ stress}] / \left[ X\_C_0 / \_ \right]$$

Conditions:  $X$  contains no internal #

- **[<sub>v</sub> mAIntAI n ]<sub>v</sub>** (I won't bother to show the downstairs)

Couldn't match the longer version because of the [+tense] vowel

$$\begin{array}{c} [ \quad X \quad \boxed{\_} \quad C_0 \\ | \quad | \quad | \quad | \\ [\text{A} \quad \text{mAInt} \quad \text{AI} \quad \text{n} \end{array}$$

=> **maintáin**

Similarly for [<sub>v</sub> collapse ]<sub>v</sub> → **colláps**e, which fails to match the longer version because of its final CC. Also [<sub>v</sub> inter=sect ]<sub>v</sub> → **interséct**.

[<sub>v</sub> per=mit ]<sub>v</sub> → **permít** has to undergo this version because the only parts of the rule schema that tolerate = are the  $X$  string at the beginning or the  $[-\text{seg}]$  in the lower part of the big curly brackets, which has to be followed by an already-stressed syllable. (Only the + boundary has the special property that a rule can match it without mentioning it.)

### 3 Further complication I: the alternating stress rule

To handle [<sub>v</sub> im=plic+Áte ]<sub>v</sub>, we first run it through the rule and get [<sub>v</sub> im=plic+Áte ]<sub>v</sub> (see section 2 above).

Then the Alternating Stress Rule applies...

$$V \rightarrow [1 \text{ stress}] / \_ C_0 (=) C_0 V C_0 [1 \text{ stress}] C_0 ]_{\text{NAV}} \quad (\text{SPE p. 240})$$

...with the convention: when a V is assigned [1stress] by rule, all other nonzero stresses are increased by 1 (p. 64). E.g., primary becomes secondary.

$\begin{bmatrix} \_ \\   \\ i \end{bmatrix}$	$C_0$	=	$C_0$	V	$C_0$	[1 stress]	$C_0$	$]_{NAV}$
i	m	=	pl	i	c	Á	t	$]_V$

=> **implicÀte**

This second rule won't apply to **[v inter=séct ]<sub>v</sub>**, though, because the boundary is in the wrong place: there have to be two syllables after the =.

**[v exorcÍse ]<sub>v</sub>** works similarly to *implicate*, getting stress on its tense vowel by the main stress rule ( $\rightarrow$ **exorcÍse**). It fails to match the full version of Alternating Stress, but matches the version without the =:

$\begin{bmatrix} \_ \\   \\ e \end{bmatrix}$	$C_0$	$C_0$	V	$C_0$	[1 stress]	$C_0$	$]_{NAV}$
e	Ø	x	o	rc	Í	s	$]_V$

=> **éxorcÍse** (acute accent ' : primary stress and grave accent ` : secondary stress)

**[N hurricÀne ]<sub>N</sub>** and **[N chickadÈE ]<sub>N</sub>** are similar (**húrricÀne**, **chíckadÈE**).

#### 4 Further complication II: cyclicity

When a word has multiple pairs of [] boundaries, SPE proposes that the list of rules applies cyclically: Take the innermost bracketed string, apply the rules to it, and erase its brackets. Repeat till all brackets gone.

Take **[N [v per=mit ]<sub>v</sub> ]<sub>N</sub>**. First, apply the rules to **[v per=mit ]<sub>v</sub>**, yielding **[v per=mít ]<sub>v</sub>** (as we saw above). Erasing its brackets we get **per=mít**.

Now replace: **[N per=mít ]<sub>N</sub>**. Apply the rules to this form now.

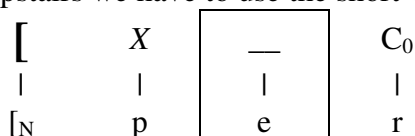
It can't match the top option in the big curly brackets, because the last vowel is [+stress]. The bottom option will match, as long as we omit the  $\langle_2 \rangle_2$  (since = is [+FB]):

$V \rightarrow [1 \text{ stress}] / \left[ X\_C_0 \left( \begin{bmatrix} -\text{tense} \\ \gamma\text{stress} \\ V \end{bmatrix} C_0^1 \left( \begin{bmatrix} \text{avoc} \\ \text{acons} \\ -\text{ant} \end{bmatrix} \right) \right) / \_ [-\text{seg}] C_0 [\beta\text{stress}] C_0 ]_{NSPVA}$	
Conditions:	$\beta = \begin{Bmatrix} 1 \\ 2 \end{Bmatrix}$ $\gamma \leq 2$ [in another version, says $\gamma$ is 2 or weaker] $X$ contains no internal #

Downstairs:

$\_$	$[-\text{seg}]$	$C_0$	$[\beta\text{stress}]$	$C_0$	$]_{NSPVA}$
$]_N \text{ per}$	=	m	í	t	$]_N$

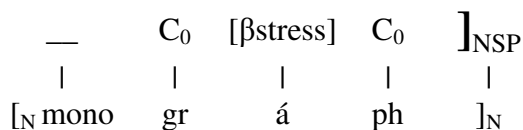
Upstairs we have to use the short version, since there's only one syllable:



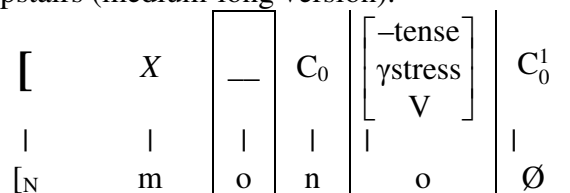
=> **pérmít** after the same stress-demotion convention as applied with the Alternate Stress Rule (when you add a stress, demote the existing ones). (cf. **Kérmít** with just one stress)

We get something similar for [<sub>N</sub> **mono** [<sub>s</sub> **graph**]<sub>s</sub> ]<sub>N</sub>: **gráph** gets stressed on the first round, so we have [<sub>N</sub> **mono** **gráph** ]<sub>N</sub>, then **mono** gets penultimate stress, since its second syllable is light (and the original stress is demoted):

Downstairs (version without <<sub>1</sub>><sub>1</sub> and <<sub>2</sub>><sub>2</sub>):



Upstairs (medium-long version):



=> **mónogràph**

I'll leave our other four cyclic cases to your imagination, with the following remarks

- In [<sub>N</sub> **mono** [<sub>N</sub> #genes+is# ]<sub>N</sub> ]<sub>N</sub>, the #s make no difference on the first cycle, but on the second cycle you'll be starting with [<sub>N</sub> **mono** #gènes+is# ]<sub>N</sub>. These are the 'internal #'s that one of the rule conditions forbids. => in contrast to **mónogràph**, you get **monogénésis**.
- Watch out for the internal # in [<sub>N</sub> [<sub>v</sub> **soliloquíz**# ]<sub>v</sub> ing ]<sub>N</sub> too.
- [<sub>N</sub> [<sub>p</sub> **parel** [<sub>s</sub>le]<sub>s</sub> lo ]<sub>p</sub> [<sub>s</sub> **gram** ]<sub>s</sub> ]<sub>N</sub> is funny because at a certain point you'll be going into the rule with [<sub>N</sub> **parallélo grám** ]<sub>N</sub>. The rule will re-primary stress the é, which demotes the stress of *grám* (=> **parallélogrà**m). The is unlike what usually happens when a segment is [αF] and a rule tries to make it [αF], so nothing changes. Another reason why stress doesn't look much like a feature...
- Forget about [<sub>N</sub> **helic+o+graph** ]<sub>N</sub> ([<sub>N</sub> **helic+o+[s graph]**]<sub>s</sub> ]<sub>N</sub> ?). On pp. 104-110 SPE has the second option in the big curly brackets as

$$\text{—} <_1 (+\gamma) \left[ \begin{array}{c} -\text{seg} \\ <_{-2} \text{FB} >_2 \end{array} \right] >_1 C_0 [\beta\text{stress}] C_0 <_2 V_0 C_0 >_2 .$$

in order to deal with just such cases, but then the (+γ) gets lost when material to deal with *-At* gets added (p. 142). I don't know if this was a mistake or what.