

## THE PATHOLOGY OF LEVEL-SPECIFIC MORPHO-PHONOLOGY

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### 1. Outline

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### 2. Issues with current analyses of English Morpho-Phonology

2.1 In a Distributed Morphology + Phases account, how do we account for the phonological behaviour of affixes?

- The prediction is that all words will behave, phonologically, like : ‘(ω’ here indicates a domain for phonological rule application)

- (1) a. [[[[[govern]<sub>v</sub> ∅ ]<sub>v</sub> ment]<sub>n</sub> less]<sub>a</sub> ness]<sub>a</sub> →  
 b. [[[[[góvern]<sub>ω</sub> ment]<sub>ω</sub> less]<sub>ω</sub> ness]<sub>ω</sub>

...where outer cycles are independent from inner cycles and the phonological form built in cycle 1 persists.

- Current theories of DM+Phases (Embick 2010, Marantz 2013) propose that cycle 1 consists of the root + the 1<sup>st</sup> category defining head (whether overt or null), each outer cat. def. head is interpreted separately from cycle 1, and separately from each other. (modulo phase suspension à la Bobaljik & Wurmbrand 2013) (see also Lowenstamm 2010 for a discussion and an alternate analysis)

- A word like (2), where an outer cat. def. affix (-al) affects inner domains (govern), (-ment), is therefore problematic, all else being equal,

- (2) a. [[[govern]<sub>v</sub> ∅ ]<sub>v</sub> ment]<sub>n</sub> al]<sub>a</sub> →  
 b. [gòvernment]<sub>ω</sub> (cf. [[govern]<sub>ω</sub> ment]<sub>ω</sub>)

### 2.2 2 alternatives: Selective Spell-Out

- Spell-out is not triggered by every category-defining head, but only a few. These cyclic/phase heads are lexically specified. (see a detailed discussion of the following options in Scheer 2011, ch. 8 & 9)

#### 2.2.1 Level 1 heads are cyclic: Halle & Vergnaud (1987)

- Phonological rules are triggered by
  - the root
  - Level 1 affixes (interior to cycle)
- Stress (and other phonological operations) assigned at previous cycles is overridden (but may be copied)

- (3) a. [[parent]<sub>root</sub> al]<sub>level 1</sub> → [paréntal]<sub>ω</sub>  
 b. [[parent]<sub>root</sub> hood]<sub>level 2</sub> → [párent]<sub>ω</sub> hood

**2.2.2 Level 2 heads are cyclic: Kaye (1995):**

- Phonological rules are triggered by
  - Level 2 affixes (exterior to the cycle)
  - the word
- Stress (and other phonological operations) implemented at previous cycles is frozen/unmodifiable

- (4) a. [[parent] al]<sub>word</sub> → [paréntal]<sub>ω</sub>  
 b. [[parent]<sub>Level 1</sub> hood]<sub>word</sub> → [[párent]<sub>ω</sub> hood]<sub>ω</sub>

- But these types of accounts are problematic

**3. What we need to account for: Semantics, Morpho-syntax, Phonology**

**3.1** Outer level 1 affixes can influence the stress of an inner domain:

- Kaye predicts something like: [[góvern]<sub>ω</sub> mèntal]<sub>ω</sub>
- H&V can do governmental, but predict a single phonological domain: [gòvernméntal]<sub>ω</sub>
- But outer level 1 affixes do not induce re-footing on an domain interior to a level 2 affix:

- (5) a. [[[probable]<sub>Level 1</sub> ist ]<sub>Level 2</sub> ic]<sub>Level 1</sub> →  
 b. [[(prò.ba).ble]<sub>ω</sub> (ís.tic)]<sub>ω</sub>

... This is true even when a lapse is created:

- c. \*[[pro(bàbl)(ístic)]<sub>ω</sub> (cf. aristocrátic)

- H&V appeal to stress copying, but this is inconsistent in English (cónnd[ε]nsation vs cóns[ə]ltation) when the overt affix is level 1 (cóndem[n]ation), but consistent when an overt level 2 affix intervenes.

**3.2** Affixes are rampantly dual-affiliated

- Level 2 affixes can have Level 1 behaviour

- (6) a. [[[compare]<sub>v</sub> able ]<sub>a</sub> →  
 b. [kómprəb]<sub>ω</sub>

- (7) a. [[[compare]<sub>v</sub> ∅ ]<sub>v</sub> able]<sub>a</sub> →  
 b. [[kəmpér]<sub>ω</sub> əb]<sub>ω</sub>

- See Giegerich (1999) for examples involving *-y*, *-ment*, *-ous*, *-ism*, *ist*, *-ise*, *-ess*, *-ette*, *-esque*, *-(e)ry*, *-er*, *-ant/-ent*, *-able/-ible*
- *No level 2 affix has level 1 behaviour when affixed outside another affix.* Having 2 affixes, ex. *-able<sub>Level1</sub>* and *-able<sub>Level2</sub>* does not predict this pattern.
- In other words, all affixes can be level 1 *when affixed to a root.*

- (8) a. [[[sign]<sub>v</sub> al ]<sub>n</sub> ∅ ]<sub>v</sub> er]<sub>n</sub> →  
 b. [[sígna]<sub>ω</sub> er]<sub>ω</sub>  
 c. \*[[signáler]<sub>ω</sub> (in a universe where *-er<sub>Level1</sub>* followed *-al*)

### 3.3 Neither H&V nor Kaye predict the correct semantics

- For H&V there is always a cycle on the root. If semantic cycles parallel phonological cycles, then they predict no root allosemy

- (9) a. [[globe]<sub>v</sub>al]<sub>Level 1</sub>  
'pertaining to the entire domain/world'  
b. [globe]<sub>v</sub>less<sub>Level 2</sub>  
'without a globe (\*without a domain/world)'

- Kaye predicts allosemantic domains consisting of the root + any number of Level 1 affixes. This is not borne out.

- c. [[globe]<sub>v</sub>al]<sub>Level 1</sub>ity]<sub>Level 1</sub>  
'the state of pertaining to the entire domain/world(/\*a globe)'  
(c.f. *globe-y-ness*)

- NB there are some words that appear to be exceptions (ex. *editorial* (Harley 2014) *personality* (Lowenstamm 2010)) See Harley (2014) and Marantz (2013) for a discussion of allosemy vs. idiomaticity.
  - Is *editorial* like *global*, or like *kick the bucket*?
  - For the moment we will presume the latter.
  - Also see Arad (2003) for arguments that allosemy in Hebrew is restricted to the root + 1<sup>st</sup> cat. def. head

### 3.4 Cross-linguistic Consistency of cycles: inner/outer domains

- vP (agent) is the domain for idiomaticity (Marantz 1995)
- vP is a landing site for successive-cyclic movement
- xP is the domain for allosemy (Arad 2003, Marantz 2013)

- lexical vs. syntactic causatives
- alienable vs. inalienable possession
- etc...
- If cycles are determined lexically (H&V and Kaye) then we predict no persistent cross-linguistic patterns with regard to cycles.

**Interim Conclusion:** Morphologically defined affix classes/cycles/ phases account for neither the English pattern, nor the cross-linguistic pattern.

### 4. Size Matters: Why phonology is the only one who can get the job done

- What we need is an analysis that gives us the phonological domains of Kaye, allows for stress-shift that respects internal domains, and gives us the correct morpho-semantic patterns.
- The DM account ([root+x] y] z]) gives us :
  - The correct semantics
  - The dual affiliation pattern: the 1<sup>st</sup> affix affixed to the root is always 'Level 1'
- It does not get us :
  - The phonological behaviour of outer level 1 affixes
- The answer to this problem is phonological and a misdiagnosis of some affixes' Level-affiliation holds the key

#### 4.1 Outer stress-attracting Level 2 affixes

- As noted, (i) many affixes are dual-affiliated, and (ii) Level 2 affixes only behave like Level 1 affixes when attached to a root.
- But, some affixes diagnosed as Level 1 are really Level 2 affixes that attract stress:
- NC/CN clusters are not repaired when followed by a Level 1 affix. The cluster is heterosyllabic.

(10) a. (i) si(g)n ~ si[g.n]ature  
 (ii) bom(b) ~ bo[m.b]ard  
 (iii) dam(n) ~ da[m.n]ation

- They are repaired before level 2 affixes

(b) (i) si(g)ner  
 (ii) bom(b)y  
 (iii) dam(n)ing

- *-ology, ography, -ee, -ese, (-esque)* can all attract stress and behave like Level 2 affixes *at the same time*

(11) a. wom(b)ólogy, wom(b)ésque  
 b. gan(g)ógraphy, gan(g)ése  
 c. kin(g)ólogy, kin(g)ée

- We see the same pattern with regards to sonorant syllabification

(12) puzz[ɹ]ólogy, puzz[ɹ]ése, butt[ɹ]ógraphy, butt[ɹ]ée...

cf. (Marvin 2002)

(13) a. [[[twinkl]<sub>v</sub>ing]<sub>n</sub> →  
 b. [twink.ling]<sub>ω</sub> 'a short moment'

(14) a. [[[twinkl]<sub>v</sub>∅]<sub>v</sub>ing]<sub>n</sub> →  
 b. [[twink[ɹ]]<sub>ω</sub>ing]<sub>ω</sub> 'act of twinkling'

#### 4.2 The 2 kinds of Level 2 affix

- English stress patterns are based on a lexically-specified pattern of **extrametricality**
- The final rhymes of nouns and derived adjectives are ignored for the purposes of the (trochaic) stress algorithm. (Hayes 1982)
- Note that Hayes (1982) attributes the extrametricality in derived adjectives to extrametricality of the affixes. This type of non-modular morpho-phonological rule is unnecessary.

(15) a. ré<ord> (noun) (vs. recórd (verb))  
 b. perús<al>, sénsu<al> (vs. illícit, divíne)

- If we take all of the level 2 affixes not in the *-ology* list (from Lieber 1992, Mohanan 1986, Halle & Vergnaud 1987, Fabb 1988) extrametricality of the final overt vowel and all the follows it leaves nothing to be footed.
- No feet means there is nothing to stress (this analysis builds on Hayes 1982).

(16) *-n<ess>, -m<ent>, -h<ood>, -l<ess>, -f<ul>, -<y>(adj), -l<y>, -<al>, -<ing>, -<ed>, -<er>, -s<ome>, -<en>, -<age>, -<ish>, -<ist>, -<ism>, ab<le>*<sup>1</sup>

- *-able* retains a syllable, but we know English has a word minimality requirement. Stress domains must be minimally bi-moraic.
- *-ology, ography, -ee, -ese*<sup>2</sup> are all large enough to be footed even given extrametricality.
- Final long vowels will not be extrametrical as their melody is doubly linked (geminate integrity)

(17) *-(ólo)g<y>, (ógra)ph<y>, -(éé), -(é)<se>*

- English stress (ignoring for now the affixes that are strong or weak retractors (Liberman & Prince 1977) falls on the rightmost foot in the word.
- Big Level 2 affixes add a foot to the word, and therefore attract stress

(18) a. [[[gang]<sub>v</sub>∅]<sub>v</sub>ing]<sub>n</sub> →  
 b. [[[gáng]<sub>ω</sub><ing>]<sub>ω</sub>

(19) a. [[[gang]<sub>v</sub>∅]<sub>n</sub>ology]<sub>n</sub> →  
 b. [[[gàng]<sub>ω</sub>(ólo)g<y>]<sub>ω</sub>

<sup>1</sup> One exception here is *-like* whose diphthong should attract stress.

<sup>2</sup> *-esque* is not of the correct phonological size to be in this list, but its incorporation in to English through the borrowing of French vocabulary (ex. *grotesque*) would explain its lexical stress.

- Phonological rules apply when their environment is met / altered.
- Main stress is sensitive to the word domain. The addition of a foot will induce re-application of the rule.
- In (18) there is no ‘freezing’ of the previous cycle, there is just no motivation to re-apply the Main Stress Rule. (Kiparsky 1979 (as quoted in Hayes 1982)): metrical structure is retained as long as it is not affected by refooting.

## 5. Outer Affixes, Phonological Domains, and Peripherality

5.1 The problem of outer Level 1 affixes.

(20(1))a. [[[[[govern]<sub>v</sub>∅]<sub>v</sub>ment]<sub>n</sub>less]<sub>a</sub>ness]<sub>a</sub> →  
 b. [[[[[góvern]<sub>ω</sub>ment]<sub>ω</sub>less]<sub>ω</sub>ness]<sub>ω</sub>

(21(2))a. [[[govern]<sub>v</sub>∅]<sub>v</sub>ment]<sub>n</sub>al]<sub>a</sub> →  
 b. [gòvernémental]<sub>ω</sub>

- (21b) is not the structure of governmental. Kaye is correct about the domains, but not because of selective spell-out.
- Note that all Level 1 affixes begin with a vowel
- *-al, -ic, -(at)ion, -ous, -astic, -y(noun), -an, -ant, -ance, -ity, ive*
- (and the Level 1 stress retractors) *ate, -ade, -ote, -ene, -use, -ide, -ize, -ify, -ary, -ory, ite, -oid, ative*
- **Proposal:** Initial vowels of Level 1 affixes are floating.

- Floating vowels will link to the Final Empty Nucleus (FEN) within a preceding domain.
- Affixes merging into the phonological domain of their host is not uncommon (ex. infixation)

(22) Phonological Merger [X [.....PWd]] → [X [.. X....PWd]], where X is an affix. (Newell & Piggott 2014)

(23) Derivation of *governmental*

- a. [[govern]<sub>v</sub> ∅ ]<sub>v</sub> → [(góvern)]<sub>ω</sub>
- b. [[[govern]<sub>v</sub> ∅ ]<sub>v</sub> ment]<sub>n</sub> → [[(góvern)]<sub>ω</sub> m<ent>]<sub>ω</sub>
- b. [[[govern]<sub>v</sub> ∅ ]<sub>v</sub> ment]<sub>n</sub> al]<sub>a</sub> →  
 [[(gòvern)]<sub>ω</sub> (mén)t<al>]<sub>ω</sub> al]<sub>ω</sub>

(24) a. CVCVCVCV-CVCVCV- CV →  
 | | | | | | | | | | | | | |  
 g o v e r ∅ n ∅ m e n ∅ t ∅ a l ∅

b. CVCVCVCV-CVCVCVCV  
 | | | | | | | | | | | | | |  
 g o v e r ∅ n ∅ m e n ∅ t a l ∅

- The ‘-’ in (24) and (26) represent spell-out domains, not morpho-phonological objects.
- Linking of the vowel to the FEN causes the fusion of the phonological domains of the affixes. This causes (i) the final rhyme of *-ment* to lose its status as extrametrical, and (ii) the consequent footing of (*men*)

(25) Peripherality condition:  
 [X]<sub>[+ex]</sub> → [-ex] / \_\_\_Y]<sub>D</sub>  
 Where Y ≠ ∅ and D is the domain of stress rules  
 (Hayes 1982:270)

5.2 The problem of outer Level 2 affixes

- Level 2 affixes do not have initial underlying floating vowels
- They will never merge phonologically with the preceding domain

(25) Derivation of *governmentless*

- a. [[govern]<sub>v</sub> ∅ ]<sub>v</sub> → [(góvern)]<sub>ω</sub>
- b. [[[govern]<sub>v</sub> ∅ ]<sub>v</sub> ment]<sub>n</sub> → [[(góvern)]<sub>ω</sub> m<ent>]<sub>ω</sub>
- b. [[[govern]<sub>v</sub> ∅ ]<sub>v</sub> ment]<sub>n</sub> less]<sub>a</sub> →  
 [[(gòvern)]<sub>ω</sub> m<ent>]<sub>ω</sub> l<ess>]<sub>ω</sub>

(26) a. CVCVCVCV-CVCVCV- CVCV  
 | | | | | | | | | | | | | |  
 g o v e r ∅ n ∅ m e n ∅ t ∅ l e s ∅

- The domain of stress rules is the word.
- Here we have non-peripheral extrametricality<sup>3</sup>

(27) Revised Peripherality condition:  
 [X]<sub>[+ex]</sub> → [-ex] / \_\_\_Y]<sub>D</sub>  
**Where D is the cycle/phase**

<sup>3</sup> See Newell & Piggott (2014) for evidence from Ojibwe for multiple, non-interacting foot domains within a single word/domain for stress assignment.

- We know that the domain between *-ment* and *-less* is there because non-repaired word-internal sequences like ntl are disallowed in English (Giegerich 1999).
- There is also no re-syllabification to create complex onsets across Level 2 boundaries (ex. *hope.less*, *\*ho.pless*)
- Here both m<ent> and l<ess> are extrametrical. As *-less* does not merge phonologically with *-ment* (it has not floating V), these two cycles do not interact, the extrametricality determined on a previous cycle is not modified
- Neither affix gets footed, consonant clusters are not repaired, and stress is not pulled to the right.

**6. Conclusion: The Morpho-Syntax determines cyclic domains, the Phonology masks them.**

- Spell-out must occur upon the merger of each category-defining head
  - This accounts for the Level 1 behaviour of Level 2 affixes being restricted to the domain of root-attachment
  - This explains the special status of the first cycle for allophony
- Level 1 affixes undergo Phonological Merger into the domain to their left due to the status of their initial vowels as floating.
  - This accounts for their consistent phonological behaviour regardless of attachment site
  - This accounts for the stress lapses as in (5). Re-footing is restricted to the domain of the affix with which the floating vowel merges.

- Extrametricality is independently necessary to account for English stress.
  - Its relativization to cycles/phases does not contradict the data that motivated the Peripherality Condition (outer Level 1 affixation)
  - It is lexically specified: Level 1 *-al* is extrametrical, but Level 1 *-ic* is not.
- The distinction between outer Level 1 and 2 affixes can *only be phonological*.
  - The behaviour of root-attached morphemes is uniform.
  - The behaviour of outer affixes is divergent phonologically, but not semantically.
  - The divergent behaviour is due to both (i) floating vowels, and (i) phonological size

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