

Derivational Affixes as Roots (Phasal Spellout meets English Stress Shift)¹

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0. Introduction

This paper is devoted to the elucidation of a puzzle: under current assumptions, Distributed Morphology (henceforth DM) stalls when confronted with a great classic of English grammar, possibly the most central fact around which the theory of SPE was built, Stress Shift.² English Stress Shift, documented in (1), is the phenomenon whereby stress can be seen to progressively move rightward as affixes are added to a base.

(1)

átom, atómic, atomicity

I claim that two assumptions, both unnecessary, indeed foreign to DM, are responsible for the apparent inability of DM to handle Stress Shift. When those assumptions are discarded and DM is left to draw on the resources of its own conceptual toolbox, not only can it handle Stress Shift, it does a better job of it than previous theories. The two assumptions to be done away with appear in (2).³

(2)

- i. 'derivational' affixes are categorial exponents
- ii. domains of phasal spellout are the same thing as the cycles of SPE

Because of space limitations, the assumptions in (2) will be confronted neither directly nor extensively,⁴ (2i) only briefly in the remainder of this introductory section, and (2ii) in the conclusion. Rather, the argumentation will take a different form: I will offer an account of Stress Shift which, while well within the spirit of DM, is entirely incompatible with (2i) and (2ii). To the extent that this account is convincing, it *ipso facto* carries a refutation of both assumptions in (2).

¹ For valuable comments, I am grateful to audiences at the Root Conference in Stuttgart (May 2009), the University of Tromsø (April 2010), the University of Orléans (July 2010), and to the participants in my seminar at Université Paris-Diderot (Spring 2010), Radwa Fathy, Noam Faust, Xiao Liang Huang, Nicola Lampitelli, and Solange Pawou Molu. The influence of the seminal and inspiring work of Lisa Selkirk (Selkirk, 1982) and Paul Kiparsky (Kiparsky, 1982) will be felt throughout this paper.

² For background directly relevant to the interface issues dealt with here, cf. Embick & Marantz (2008), Embick (2010), Piggott & Newell (2008), and references therein.

³ (2ii), in fact, follows from (2i) in an obvious sense, but that relationship is not further explored in the context of this paper.

⁴ For a direct and extensive discussion, cf. Lowenstamm (in preparation).

Exponence is the relationship between a phonological string and the set of features it signals. While there is a vast and sophisticated literature on *types* of exponence (zero exponence, cumulative exponence, parasitic exponence, etc.), many of the fundamental initial assessments that define problems in this area rest on gut feeling plausibility, most notably as regards exactly what a particular string actually signals. For instance, based on the Spanish inflectional sample in (3), most investigators would agree without much debate that <o> and <a> signal gender, while <s> signals plural.

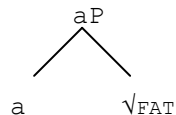
(3)

- | | |
|-----------------------|-------------------------|
| a. perro 'dog' | c. perros 'dogs' |
| b. perra 'female dog' | d. perras 'female dogs' |

There seems to be a comparably confident consensus around the exponence of categories. Thus, <ian> in *reptilian* is reputed to signal adjectivalness, <ory> nounness in *promontory*, etc. Yet, in sharp contrast with the gender and number exponents in (3), such 'categorical exponent' strings often carry much more information than would be necessary for the strict expression of the morphosyntactic features they supposedly signal. This is clear for instance with <ful> or <less>. Moreover, the categorial connection of some of those strings is often ambiguous. Thus, while <ian> signals adjectivalness in *reptilian* as we just saw, it also 'signals' nounness in *librarian*; similarly, <ory> can signal adjectivalness in *rotatory*, the fact that it was seen to signal nounness in *promontory* notwithstanding, etc.

The reasoning behind the idea that categories receive expression seems to have been something like this: a) *atom* is not an adjective, b) *atomic* is an adjective, c) therefore <ic> signals adjectivalness (and, in this case, <∅> signals nounness). Perhaps, for a word based theory, this is as good a starting point as any. But things are rather different with √&c theories.⁵ In such theories, roots are selected by a category defining head, as shown in (4) with the example of the selection of root √FAT by adjectival head a.

(4)



In the scheme in (4), the presence of *a* is the necessary and sufficient condition for string <fat> to be the exponent of an adjective. This has the potential of completely reversing the perspective on say, a sample such as (5).

(5)

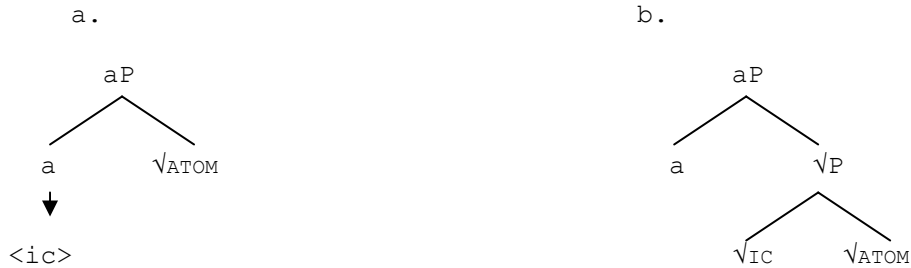
foppish, sexy, courageous, obamesque, atomic, brutal, golden, fat

In most accounts, *fat* would be viewed as the odd man out because it is unsuffixed (or ∅ suffixed). By contrast, from the point of view of a √&c theory, *fat* must be viewed as the archetypal adjective as its makeup involves nothing but what such theories explicitly define as the necessary and sufficient ingredients of adjectivalness. In the rest of this paper, I will pursue the hypothesis that categories have indeed no exponents. Thus, the view I will put forth differs as follows from the classic take represented in (6a) where <ic> is the spellout of *a*: while I endorse the

⁵ For short, I call √&c (root and category) theories those theories, Borer's (Borer 2005a, 2005b) as well as DM, that a) subscribe to the view that roots undergo categorization as the consequence of their selection by a category defining head, *a*, *n*, or *v*, and b) explore the consequences of this idea in the context of a theory of word formation countenancing no active lexicon. Cf. Williams (2007) for a forceful rejection of the idea that there is no such thing as an active lexicon, and Borer (1998) for an overview of issues connected with the nature of morphological operations.

view that *atomic* owes its adjectivalness to *a*, I reject the view that <ic> signals *a*. Rather, I will claim that <ic> is itself a root, viz. $\sqrt{\text{ic}}$. This alternative is represented in (6b).

(6)



Saying that nothing commits $\sqrt{\text{ic}}$ theories to the view that affixes signal categories hardly entails that affixes make no contribution of their own. For instance, there is a clear difference in meaning between adjectives such as *siltic* and *siltous* whereby the presence of silt in a geological layer will be seen as more fundamentally characteristic of that layer if the layer is said to be *siltic* than *siltous*.⁶ But how much of that contribution is bound to the adjectivalness of *siltic* or *siltous*? Not much, evidently. Consider the ingredients involved: *a*, <ic> and <ous>, and $\sqrt{\text{SILT}}$. If the intuition that <ic> and <ous> behave as operators of restriction on $\sqrt{\text{SILT}}$ is correct, then the scope relations of the relevant ingredients are as in (7a), not as in (7b).

(7)



In fact, it is not even crucial for the restriction operation performed by <ic> and described in (7a) to hold, that it be implemented as an adjective.⁷

Note, more generally, that if derivational affixes signal categories as claimed by most, it is a mystery why their performance as exponents is marred by such rampant ambivalence as exemplified in the sample in (8). But on the view that they are not categorial exponents, the mystery vanishes: why *should* they be unambiguous with respect to category?

⁶ This resource was put to systematic use by Guyton de Morveau et al. (1787).

⁷ A sense of the proliferation of nouns ending in <ic> alongside homophonous adjectives (the *basics* or *honorifics* type) can be gathered from a cautionary note by John Geissman, Vice-President of the Geological Society of America (Geissman, date unknown):

An increasing number of GSA members lament the general deterioration in the quality and clarity of writing by earth scientists(...) Insofar as it is one of the duties or prerogatives of editors to educate potential or eventual authors, when necessary or appropriate, we offer this commentary as some of our suggestions to authors(...)

- *We may say volcanics, clastics, metamorphics, (...), and granitics to each other in the field, but it is quite improper grammatically to add an *s* to an adjective to make a plural noun. It may be tedious or repetitious to read, but it is correct and unambiguous to write volcanic rocks, clastic rocks, (...), and granitic rocks(...)*

(8)

Exponent	Noun	Adjective
able	constable	endurable
al	mammal	normal
an	librarian	reptilian
ant	defendant	defiant
ary	functionary	legendary
ate	consulate	intricate
ible	crucible	credible
ic	tunic	magic
ive	incentive	auditive
ory	promontory	rotatory
ous	focus	mucous
esque	arabesque	grotesque
y	parsimony	airy
ish	rubbish	foppish
en	warden	golden
ful	handful	colorful

The rest of this paper is devoted to showing that the dissociation of category and affix advocated in (6b) paves the way for a successful account of Stress Shift in English. It comprises three sections, a conclusion, and a short appendix. In the first section, I establish that current versions of DM cannot handle Stress Shift. In section 2, I develop a DM compatible alternative. In a third section, the alternative is put to the test of an old riddle of English grammar: why does affix *+al* attach to *X-ment* type nouns if *X* is not a verb (*segment/segmental*), but not if *X* is a verb (*employment/*employmental*)? Why is it not just the opposite? It is shown that this apparently puzzling state of affairs in fact follows as a prediction of my proposal. In the conclusion, I return to the difference between phase and cycle. The appendix briefly deals with a generalization put forth in Fabb (1988).

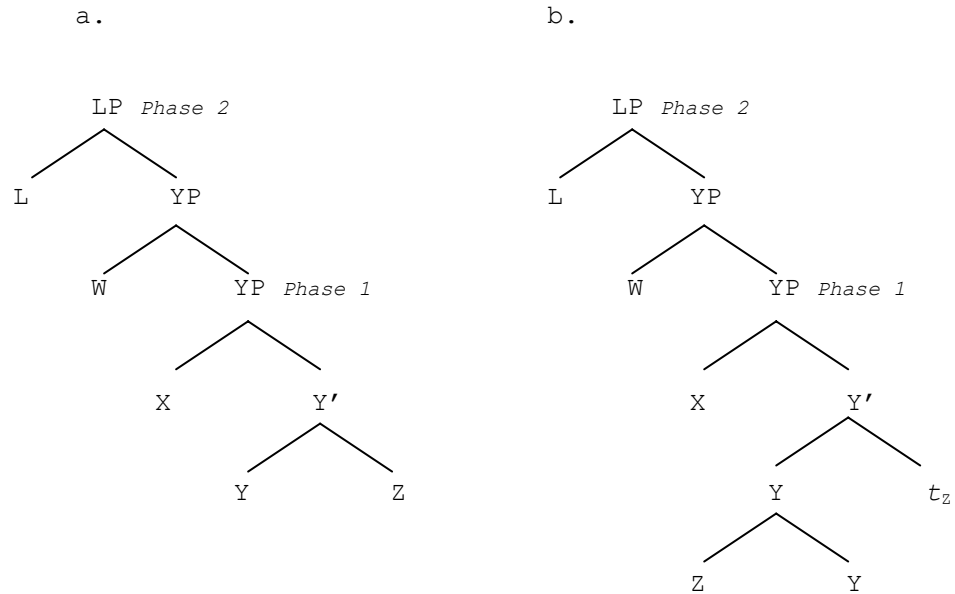
1. *Stalling*

1.1. *Phase Impenetrability, Head Movement, and Phasal Spellout*

In this preliminary subsection, I am concerned with two technical aspects of Phase Theory and how they crucially interact with Spellout: Phase Impenetrability, and Head Movement. With most investigators, I assume the following.

At a given phase, the complement of the phase head is spelled out. Thus, *Z* in (9a) will be spelled out at Phase 1, but not *X* and *Y*. Moreover, by Phase Impenetrability, the spellout of the complement of a phase head cannot be influenced by material located in a superordinate phase. Thus, *L* can play no role in the spellout of *Z*. On the other hand, phase edge material (the phase head itself, its specifier and possible adjuncts) can be accessed from the next higher phase. Accordingly, the spellout of *Y*, *X*, and *W* can take into account material contained in *L*. As Marvin (2003) correctly notes, Head Movement can potentially interfere in undesirable fashion with Phase Impenetrability as just defined. For instance, in (9b), *Z* has undergone Head Movement, left-adjoined to *Y*, and consequently been removed from the scope of *Y* and brought into the scope of *L*. Two consequences follow: a) *Z* can no longer be spelled out at Phase 1, b) its spellout can be influenced by *L*.

(9)



In order to make sure that repeated Head Movement will not totally bleed the combined effects of Phase Impenetrability and Spellout, actually rendering the former vacuous with respect to the latter, Marvin (2003) proposes that Z continue to be viewed as belonging to the domain of Y, even if it has undergone Head Movement and left-adjoined to Y, as in (9b). This move is clearly unfortunate as it now empties the intended combined effects of Head Movement and Phasal Spellout of any empirical content: Head Movement and Phasal Spellout stand in an asymmetrical relationship of potential bleeding whereby the former can potentially bleed the latter.⁸ Either it bleeds it, in which case Bleeding is expected to obtain and Spellout is thwarted, or it doesn't (Counterbleeding) and Spellout can take place, but you can't have both Bleeding and the effects of Counterbleeding.

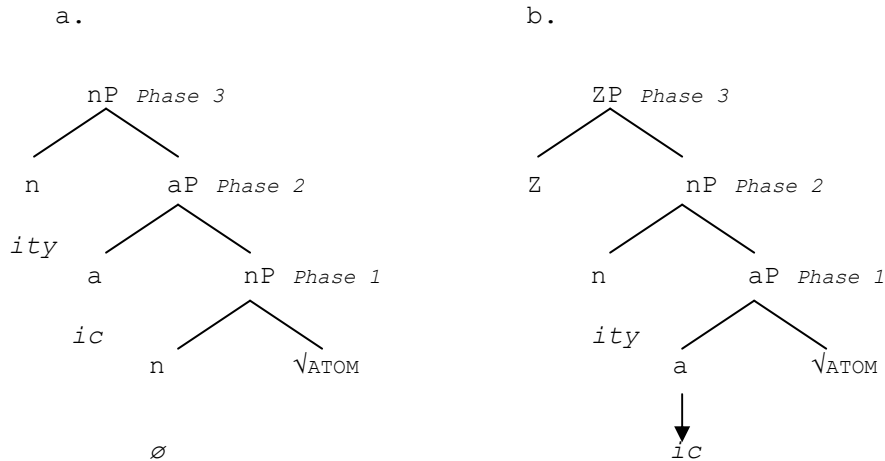
While the next subsection establishes that Stress Shift stalls, it is shown in the following subsection that the operation of Head Movement is an entirely orthogonal issue.

1.2. Stress Shift stalls

Consider *átom*, *atómic*, *atomicity* where stress moves forward as affixes, first +ic, then +ity, are added to *atom*. For the sake of completeness, two possible analyses of *atomicity* will be considered, and it will be shown that, under either analysis, the phasal scenario blocks the derivation of the correct output, viz. main stress on the antepenult. The two analyses differ with respect to the <atomic> substring: under one (10a), *atomic* is a denominal adjective; under the alternative (10b), *atomic*, this time construed as a deradical adjective, directly results from the merger of $\sqrt{\text{ATOM}}$ with little a. Z in (10b) is a phase head merely brought in to provide context.

⁸ Cf. Kenstowicz and Kisseberth (1977) for discussion of Bleeding.

(10)



Suppose, following Marvin (2003), that phase heads trigger the spellout of their complement. In that case, both in (10a) and (10b), the root will spell out. [$\bar{A}D\bar{e}m$] will result, with initial stress frozen there, and no possibility of moving it forward at a further phase, hence * $[\bar{A}D\bar{e}m\dot{i}k\dot{i}D\dot{i}]$.⁹ Suppose alternatively, following Embick (2008), that phase heads trigger the spellout of their cyclic/phasal complement only. (10a) and (10b) now produced distinct outputs, both ungrammatical. The complement of Phase 1 in (10a) containing no cyclic/phasal material, spellout only takes place at phase 2, and stress is frozen on [$\bar{A}D\bar{e}m$] again. Again, * $[\bar{A}D\bar{e}m\dot{i}k\dot{i}D\dot{i}]$ will ultimately result. Under the alternative view in (10b), spellout is delayed until Phase 2 for the same reason as in (10a). When it takes place, $[\text{e}^h\bar{O}m\dot{i}k]$ results, with stress frozen on the penultimate syllable. This time, * $[\text{e}^h\bar{O}m\dot{i}k\dot{i}D\dot{i}]$ is the outcome. Both sets of outputs are summed up in (11).

(11)

	a.	b.
	[_{aP} a [_{nP} n √ _{ATOM}]]	[_{aP} a √ _{ATOM}]]
Marvin (2003)	* $[\bar{A}D\bar{e}m\dot{i}k\dot{i}D\dot{i}]$	* $[\bar{A}D\bar{e}m\dot{i}k\dot{i}D\dot{i}]$
Embick (2008)	* $[\bar{A}D\bar{e}m\dot{i}k\dot{i}D\dot{i}]$	* $[\text{e}^h\bar{O}m\dot{i}k\dot{i}D\dot{i}]$

As the derivation of *atomicity* along the lines of what precedes increasingly looks like a slipknot that binds closer the more it is drawn, I will attempt to loosen the noose by shifting the perspective, thereby raising the stakes to some extent. That is, I will try to understand why Stress Shift blocks by means of a comparative discussion of *atomicity* with another staller, viz. *atomicness*. Head Movement will come out exculpated.

1.3. Head Movement is out of the loop

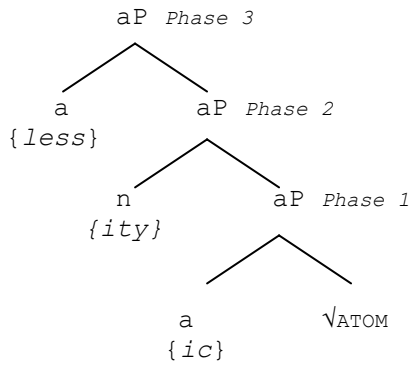
Here, I consider the derivations of *atomicity* and *atomicness*, and I show that, paradoxically, each derivation requires a generalization to be true, which the other requires to be false, viz.

(12)

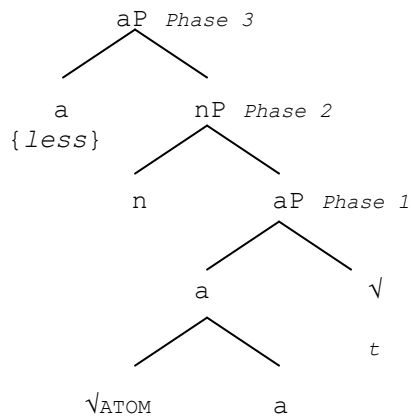
- i. Head Movement should be let bleed spellout
- ii. Head movement should not be let bleed spellout

⁹ For the sake of clarity, a discussion of the patterns of vowel reduction and velar softening (both of which would only make the point even more dramatic), has been left out.

Let us see how Head Movement might be invoked in order to rescue the derivation of *atomicity* from an input such as (13).¹⁰
 (13)



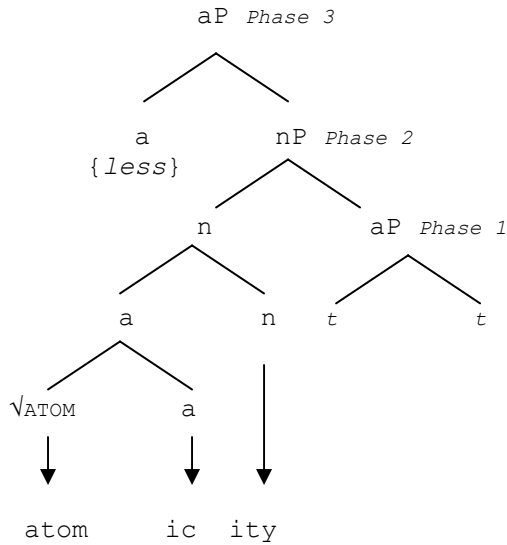
Suppose Head Movement left adjoined the root to *a*, as shown in (14). The root, now having joined the edge of Phase 1, can only be spelled out at Phase 2.
 (14)



But, in order to see how a desirable scenario would proceed, let us just allow Head Movement to take place *again*, and left-adjoin the contents of aP to *n*, the head of Phase 2, as shown in (15): Head Movement has now removed aP from the complement of Phase 2 and into the latter's edge, thus delaying spellout until Phase 3. At that point, i.e. at Phase 3, the ingredients of *atomicity* can be spelled out without any of its pieces having already been frozen by spellout at earlier phases.

¹⁰ For easier identification of the various positions in the structure, the sites of eventual insertion of vocabulary items have been filled in with the items themselves, the curly brackets denoting the anticipatory nature of this mention.

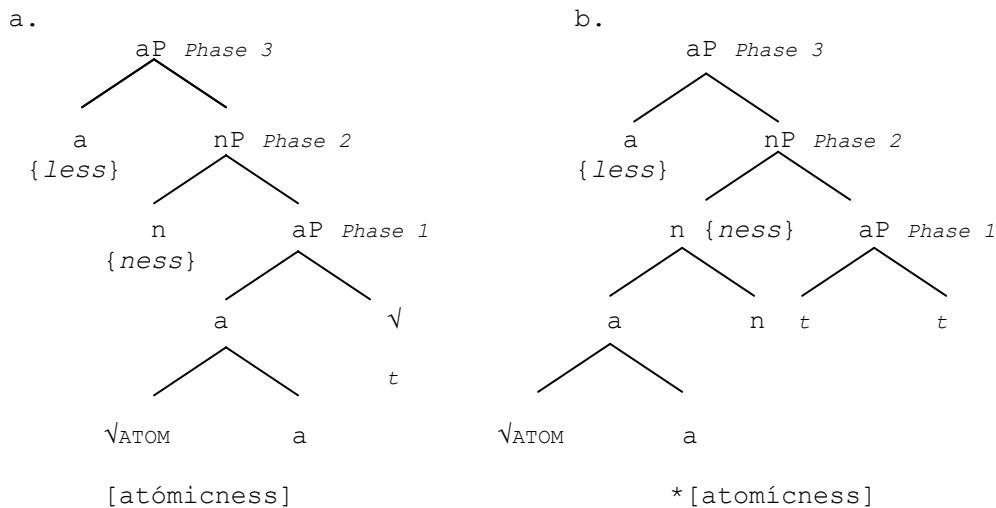
(15)



Clearly, in this case, the correct result is attained when Head Movement is allowed to proceed unimpeded, and left-adjoined structure is duly treated as edge material for purposes of spellout.

But tampering with Phasal Spellout, in effect letting Head Movement bleed it, as was just done, will not help even a little bit in view of the need to derive not just *atomicity*, but *atomicness* as well. In order to derive *atomicness*, left-adjunction of aP to n (16a), the very same scenario with double Head Movement which successfully delayed spellout of the ingredients of *atomicity* until Phase 3, now appears to be precisely what has to be avoided, lest **atomicness* result, (16b).

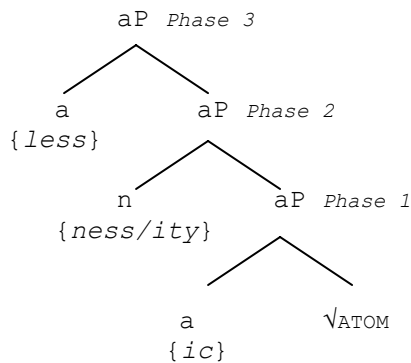
(16)



That is, the <atomic> substring of <atomicness> MUST be spelled out at Phase 2 (16a) - no later - to ensure that <atomicness> firmly bears stress in the same place as *atómic*.

As we can see, the set of decisions that bring about the success of one derivation stand in the way of the other, and vice versa. Of course, the paradox arises not because of Head Movement, and vice versa. Of course, the paradox arises not because of Head Movement, but because the respective inputs to *atomicness* and *atomicity* are not distinct: in both cases, the input is (13), repeated in (17).

(17)



The next subsection is a brief elaboration of the need for more flexibility than is afforded by inputs exclusively defined in categorial terms, and then subjected to too crude a version of Late Insertion.

1.4. Backing up a bit

Much of the work on English Stress Movement is informed by two assumptions, most influentially propounded in Chomsky & Halle (1968) and subsequent elaborations.

First, the view that the structure of a complex word such as *atomicity* is as in (18), or some version of (18), whereby the noun *atomicity* 'contains' the adjective *atomic*, and, perhaps, the adjective *atomic* 'contains' the noun *atom*.¹¹

(18)

[_N ity [_{Adj} ic [_N atom]]]

So with *atomicness*, represented in (18).

[_N ness [_{Adj} ic [_N atom]]]

The second assumption has to do with the proper treatment of the differential behavior of the two classes of affixes that so strikingly pervade the accentual pattern of the language. In pre-Phasal Spellout theories, the differential impact on stress of the various affixes is encoded in a variety of ways: by means of different boundaries, by assigning affixes to different lexical strata, etc. But, to the best of my knowledge, all authors assume that the manner of attachment or location of affixes are properties of the affixes themselves: again, some attach close; some don't; some are cyclic; others are not, etc. For instance, consider adjectives such as *governmental*, *objectionable*, *leaderless*, and *representational*. While their makeup is the same as regards the categories involved and their hierarchical arrangement, each adjective represents a different configuration of cyclic and non-cyclic domains, where the cyclic or non-cyclic character of a particular domain is directly linked to the specific affix heading that domain.¹² Here, Distributed Morphology MUST make a different assumption. Indeed, in a framework endorsing Derivation by Phase and Late Insertion, such richness of information as is packed in (20a) can not be available. For, by the time spellout takes place, all four adjectives have exactly the same structure, viz. (20b).

¹¹ √c theories do not necessarily endorse the second part of the conjunct here, but I leave it as such for the sake of the argument.

¹² The domain of cyclic affixes has been noted by large, boldface square brackets in (a).

(20)

a.

[[[govern_v] ment_N] al_{Adj}]
 [[[object_v] ion_N] able_{Adj}]
 [[[lead_v] er_N] less_{Adj}]
 [[[[represent_v] ation_N] ary_{Adj}]

b.

[_a [_n [_v √]]]

At the risk of belaboring the obvious: in pre-Phasal Spellout theories, domains of phonological interpretation (cycles) are projected from properties of affixes. In DM, in sharp contrast, domains of phonological interpretation (phases) are defined in strictly categorial fashion, and irrespective of what particular Vocabulary Item may eventually ornate a given category.

Since discriminations of the kind illustrated in (20a) are undeniably crucial (however they may be handled), the challenge to DM includes – to return to the crucial data of the previous section – two facets, not just one: a) to be able to crank out *atomicity*, **at all**; but also b) to find an alternative way of building into the grammar a distinction such that **both** *atomicity* **and** *atomicness* be derived. In the next section, I offer just such an alternative. As announced, it rests on a radical elaboration of the divorce between category and ‘affix’.

2. An alternative

The alternative is (21).

(21)

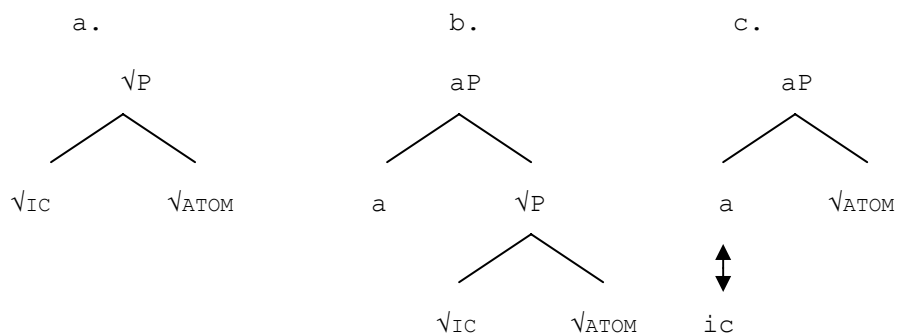
Affixes are roots

Because *atom*, *atomic*, and *atomicity* have figured prominently in the previous section, I begin the exposition of my proposal with the same data.

2.1. Affixes as roots: a first pass

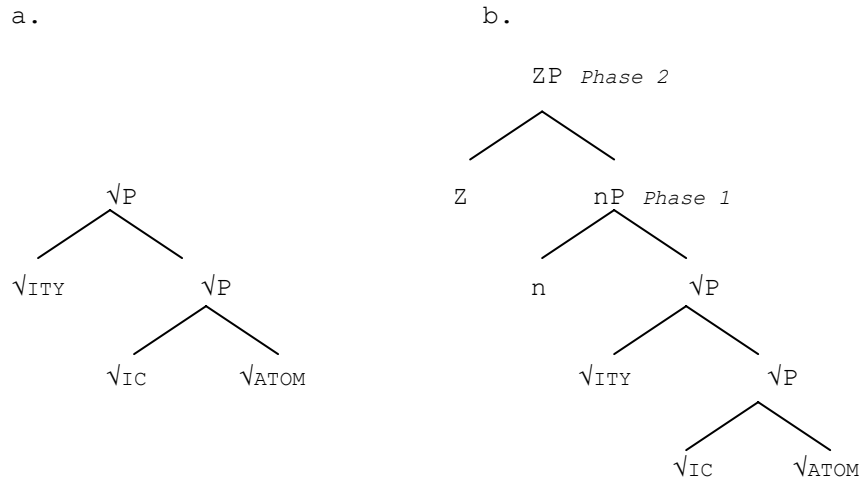
For the sake of comparison, I represent my proposal for *atomic* in (22a,b), along with the more classical take of mainstream √&c work in (22c).

(22)



In (22a), two roots √IC and √ATOM have merged, leading to the formation of a complex root, √P. Further mergers must take place. For instance, the complex root can merge with a category-defining place, say *a*, as in (22b), leading up to the formation of an adjective, *atomic*. Alternatively, the complex root can merge with another root, say √ITY, and the even more complex root in (23a) is formed. If that root, in turn, merges with a category-defining head, *n* in (23b), a noun is formed, *atomicity*.

(23)



It can readily be seen that no ingredient of the complex root will undergo spellout until merger with *n*. When spellout takes place at Phase 1, the rules of English phonology kick in, and apply cyclically on each root. All roots are cyclic domains, though as we will soon see, it is a consequence of the system proposed in this paper that cyclic phonology, in any derivation, will be exclusively observable at the first phase, and nowhere else.

Before I offer a more systematic and detailed presentation of root types and what makes roots stick, in the next subsection, the reader may note what my proposal, (24b), shares and does not share with the classic view (24a).
(24)

- a. classic view: [N ity [Adj ic [N atom]]]
- b. proposal: [n[√ ity [√ ic [√ atom]]]]

The embedding in (24b) parallels that in (24a) minus the intermediate categorial labels present in (24a). That is, I claim that the radical material of *atomicity* contains the radical material of *atomic*, and that the radical material of *atomic* contains the radical material of *atom*; not that the noun *atomicity* contains the adjective *atomic*, or that the adjective *atomic* contains the noun *atom*. Just enough, in other words, to capture lexical relatedness, no more. This appears to fit with an important observation of √&c inspired work, namely that configurations involving a local relationship with the root are often assigned non-compositional meaning. The data in (25) shows that non-compositionality is indeed rampant where +ic, +al, and +ity are involved. This follows from my proposal, though not from (24a).
(25)

	atomic	atomicity
composition	compositional	
globe	global	globality
	final	finality
mode	modal	modality
form	formal	formality
virtue	virtual	
feud	feudal	
class	classic	
tone	tonal	tonality
fundament	fundamental	

consequence	inconsequential	
congression	congressional	
	equal	equality
emotion	emotional	
margin	marginal	marginality
fate	fatal	fatality
semen	seminal	
orient	oriental	
	bestial	bestiality
substance	substantial	
function	functional	functionality
	moral	morality
	liberal	liberality
	mental	mentality
	oral	orality
origin	original	originality
person	personal	personality
	principal	principality
province	provincial	
sentiment	sentimental	
	superficial	superficiality
	technical	technicality
neuter	neutral	
convention	conventional	
universe	universal	
verb	verbal	
	vital	vitality
artist	artistic	
meter	metric	

In the next subsection, I turn to nuts and bolts.

2.2. Free roots, bound roots and what makes them stick

Affixes are usually called 'bound' morphemes. If affixes are roots, as I claim, they must be 'bound' roots. I propose to capture the difference between bound and free roots as in (26).

(26)

- i. some roots can project to the phrasal level on their own, e.g. $\sqrt{\text{BOTTLE}}$, $\sqrt{\text{RUG}}$
- ii. other roots, e.g. $\sqrt{\text{VAL}}$, $\sqrt{\text{MENT}}$, $\sqrt{\text{NESS}}$, etc., can not project to the phrasal level without the help of a complement

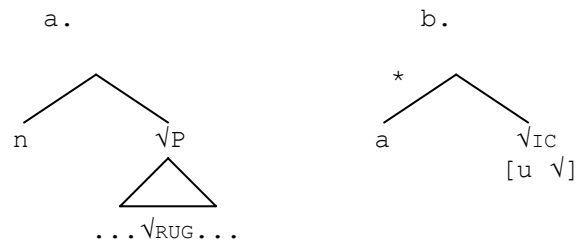
The boundedness of a root will be captured as follows: a bound root bears an uninterpretable feature which it seeks to check by merging with a complement. Not until the uninterpretable feature has been checked, can the bound root project at the phrasal level, and merge with a category-defining head. Two roots appear in (27), one is free, (27a); (27b) the other, is burdened with an uninterpretable feature, [u $\sqrt{\text{ }}$].

(27)

- | | |
|---------------------|------------------------|
| a. | b. |
| $\sqrt{\text{RUG}}$ | $\sqrt{\text{IC}}$ |
| | [u $\sqrt{\text{ }}$] |

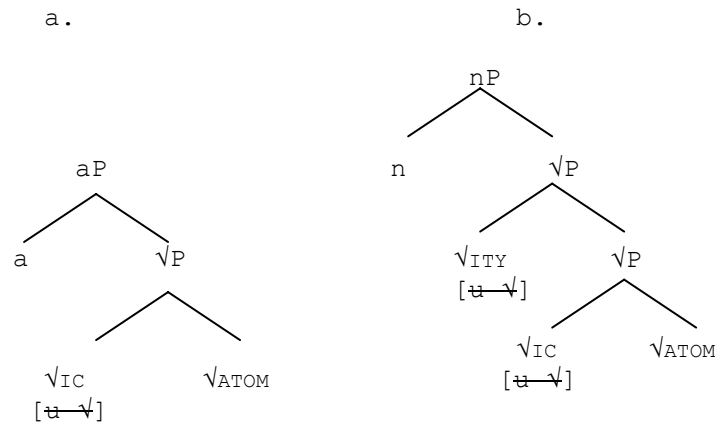
$\sqrt{\text{RUG}}$ as such is fit for phrasal status, hence for merger with a category-defining head, as shown in (28a). $\sqrt{\text{IC}}$ alone cannot undergo merger with a category-defining head as long as it has not rid itself of its uninterpretable feature (28b).

(28)



On the other hand, when the uninterpretable feature has been checked owing to the presence of an appropriate complement, phrasal status is attained, and merger with a category-defining head can take place, (29a). However merger with a category-defining head is not the only option, at that point. Indeed, [_{VP} √IC √ATOM] can alternatively merge with another 'bound root' also in need of checking its uninterpretable feature, for instance [_{VP} √ITY], as shown in (29b). In turn, [_{VP} √ITY [_{VP} √IC √ATOM]] will merge with a category-defining head, say *n*.

(29)



The reader will have noticed that the affixes discussed in this subsection are all typical stress shifters, the Class 1 affixes of Siegel (1974), or the Level 1 affixes of Kiparsky (1982). In my proposal, they are [u √] affixes. What is the difference? The difference lies in the source of the label. The usefulness of recognizing Class 1 affixes is the possibility it affords to capture their impact on the stress pattern of the language. But, at the same time, much of the evidence on which membership in that class is decided comes from the accentual system of English itself. As a result the distinction between Class 1 and Class 2 incorporates a measure of circularity. By contrast, the proposal put forth here, while it also aims at capturing significant generalizations about stress, rests on considerations that have nothing to do with stress, namely the selectional behavior of affixes: an affix (strictly speaking a root) carries a [u √] feature because it selects roots. That +al, +ic, and +ity select roots can be determined by inspection of a sample such as (30).

(30)

vagal, drastic, calamity

That the characterization of the selectional targets of +al, +ic, and +ity was carried out in total independence of stress facts can be verified by means of a comparison with French: inspection of the sample in (31) indicates that French +al, +ique, and +ité also select roots. Of course, the stress system of the language, exceptionlessly final, could not

possibly have provided any clue as it is indifferent to affixation type, or even affixation at all.

(31)

vagal, drastique, calamité

A more detailed comparison with Lexical Phonology will be offered in 2.4 and 2.5. In the next subsection, I turn to the place of Class/Level 2 affixes in a system such as advocated here where affixes are construed as roots.

2.3 Another type of bound root (Class/Level 2 affixes)

Any theory must specify the relationship between the following characteristics of Class/Level 2 affixes in regard of the accentual system:

(32)

- i. they attach outside Class/Level 1 affixes
- ii. they have no impact on the stress pattern of their complement

I propose that Class 2, or Level 2 affixes, select xP's. Accordingly, their uninterpretable feature is [u xP].

In addition, I accept (33).

(33)

Categories head roots, not vice versa

(33) merely reflects the canonical ordering of projections whereby it is the fate of roots to become categorized (34a), whereas it is not the fate of categories to be turned into roots phrases (34b).

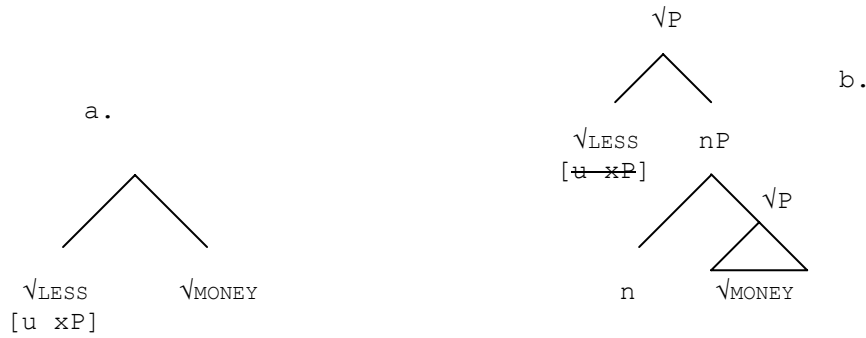
(34)



The inclusion of (33) hardly adds to the cost of my account, as (33) or something to the same effect has to be part of any $\sqrt{\&c}$ theory. On the other hand, as the reader will note, it installs a tension at the heart of my proposal to the extent that (33) appears to rule against the claim that an entire class of roots - Class 2 or Level 2 affixes - are specified, as was just suggested, as selecting little xP's.

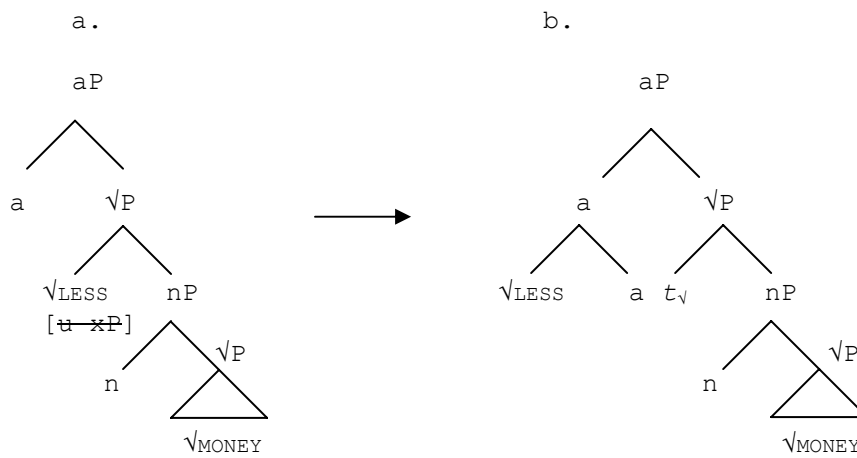
Take the example of *moneyless*, for instance. (34a) is ruled out by the fact that the putative merger of $\sqrt{\text{LESS}}$ and $\sqrt{\text{MONEY}}$ does not lead up to the elimination of the uninterpretable feature of the head root, thus correctly capturing the fact that *-less* is non-cohesive. But note that when $\sqrt{\text{LESS}}$ successfully checks its uninterpretable feature by merging with the little noun *money* (34b), a configuration is created which directly runs counter to (33), with a root now heading a category.

(34)



I submit that the resolution of the tension inherent in (34b) proceeds as in (35): upon merger with a category-defining head (35a), here *a*, $\sqrt{\text{LESS}}$ left-adjoins to it (35b).

(35)



This move is desirable on two counts: a) $\sqrt{\text{LESS}}$, having been removed from the scope of spellout at *aP*, will be stressed separately from *money*, b) *moneyless* is entirely compositional, as expected in view of the non-local relationship between the two roots involved.¹³

As a preliminary summary, it can be noted that roots and categories are arranged as in (36), the structure corresponding to e.g. *atomicitylessness*.

¹³ This captures the basic insights of Kaye (1995) with respect to the distinction he draws between *analytic* and *non-analytic* domains.

have made possible. At the same time, it also clear that the relevant theories would have lost much of their content, had they stipulated that an affix could be cyclic, non-cyclic, or both, or Level 1, Level 2, or both. And yet, the sort of flexibility just sketched out seems to be called for in a number of other cases, as well, as shown by Mark Aronoff.

Aronoff (1976) makes a number of extremely interesting observations regarding the ambiguous behavior of able/ible.¹⁴ He notes that a number of -able adjectives can be stressed in more than one way, to wit (37).

(37)

a.	b.
cómparable	compárable
réparable	repá(i)rable
réfutable	refútable
préférable	preférable
dísputable	dispútable

The adjectives in (37a) are stressed according to a classic generalization (Halle 1973) whereby the affix is ignored on account of its short vowel, and then the Primary Stress Rule affects a heavy penult (*refrángible*), or the antepenult in case the penult is light (*córrigible*). By contrast, the adjectives in (37b) directly contravene this generalization. Rather, they are stressed exactly as the verbs from which they are presumably derived. Aronoff observes that the optional patterns evidenced in (37) would follow if the affix were preceded by a + boundary in (37a), e.g. compar+able, but by a # boundary in (37b), e.g. compar#able.

Moreover, as Aronoff notes, *cómparable* and *compárable* do not mean exactly the same thing: compare#able (37b) is entirely compositional, whereas compare+able (37a) can also mean 'equivalent'. Hence the contrast in (38).

(38)

- a. This is the cómparable model in our line
 b. *This is the compárable model in our line

Further, Aronoff notes that the patterns of allomorphy in (39) are untypical: -able normally patterns like -ion, -ive, -ory, and -or with respect to allomorph selection, with the difference that -able optionally selects marked allomorphs. Indeed, -able can also select full-blown verbs, as shown in (39c). Again, this can be readily accounted if the affix is separated from its complement by a + boundary in (39b), but by a # boundary in (39c).

(39)

a.	b.	c.
circumscribe	circumscriptible	circumscribable
extend	extensible	extendable
defend	defensible	defendable
perceive	perceptible	perceivable
divide	divisible	dividable
deride	derisible	deridable

As it turns out, as Aronoff shows, this correlates in striking fashion with another generalization due to Ross (1974, 1979): ible/able adjectives "with no lexical base" (= deradical) frequently allow prepositional complementation. This is in contradistinction with the behavior of

¹⁴ The discussion of -able/ible conducted here is entirely drawn from Aronoff (1976).

productively derived deverbal formations which are much stricter in that respect (cf. Aronoff 1976).

(40)

- a. I am amenable to a change in plans
- b. He is eligible for reappointment

In the light of this last observation, it is significant that, when put to the test of whether they tolerate prepositional complements, the sample in (39) clearly shows how the adjectives in (39b) pattern like deradicals such as *amenable* or *eligible*, in sharp contrast with those in (39c):

(41)

- a. divisible into three parts
- b. *dividable into three parts

As well, the adjectives in (39b), unlike those in (39c), have non-compositional meaning, as can be seen in (42).

(42)

- a. There is a flaw in the grain, but it's imperceptible
- b. *There is a flaw in the grain, but it's unperceivable

To sum up, Aronoff's observations on the ambiguous behavior of *-able* strongly highlight the need to recognize two modes of attachment for that affix: *+able* and *#able*. In pre $\sqrt{\&c}$ theories, this has the status of a paradox. In the next subsection, I show how my proposal makes room for such an ambiguous mode of attachment.

2.5. The third kind of root

One of the threads running through the proposals put forth so far has been that the distinction between Level 1 and Level 2 affixes is not a raw fact to be captured by stipulation. Rather, the distinction is entirely derivative from an independent phenomenology, namely the selectional targets of bound roots: root selectors, e.g. $\sqrt{\text{IC}}$, $\sqrt{\text{ITY}}$, $\sqrt{\text{AL}}$, etc., correspond to Level 1 affixes, while xP selectors, $\sqrt{\text{NESS}}$, $\sqrt{\text{LESS}}$, $\sqrt{\text{FUL}}$, etc., correspond to Level 2 affixes.

A prediction ensues: if another type of selectional behavior than has been recognized up to this point (selecting roots vs. selecting xP's) can be identified, that third type will motivate a principled tripartite nomenclature of bound roots. Hopefully, it will shed some light on the interaction between affixes, presumably affording insights not available under the excessively rigid, classic, two-pronged Level 1/Level 2 (or cyclic/non-cyclic) distinction.

Such a third type indeed exists, the universal selector. It selects BOTH roots AND xP's. *-ment*, *-able*, *-ize* are examples. *-able* was discussed above, and it is clear how Aronoff's observations directly translate into a $\sqrt{\&c}$ framework. *-ment*, the topic of the next section, is another example of universal selector. That *-ment* selects both roots and vP's can be seen from the sample in (43). In (43), I have deliberately restricted the range of examples to cases where the complement of *-ment* can only be a root, or a verb (the argumental apparatus contributed by the prefixes being the guarantor of full-blown verbhood).

(43)

$\sqrt{\quad}$	vP
liga-ment	an=nul-ment
monu-ment	be=little-ment
medica-ment	en=throne-ment

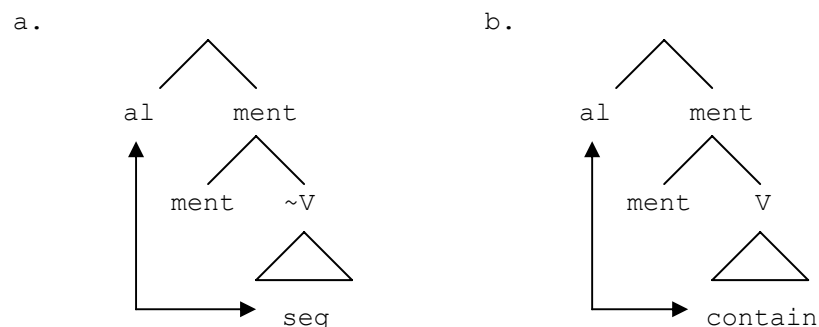
frag-ment	dis=courage-ment
instru-ment	ap=praise-ment
seg-ment	de=fraud-ment
supple-ment	en=force-ment

In the next section, I show how the intricate and apparently paradoxical selectional restrictions controlling the distribution of *-ment*, are actually predicted by my proposal.

3. A case study: ornamental vs. *belittlement, and the morass that lies in between

Aronoff (1976), Fabb (1988), and others, note that *+al* readily attaches to nouns ending in *+ment*, to wit *instrument/instrumental*, *segment/segmental*, etc. However, *+al* resists attaching to an *X+ment* noun if *X* is a verb, thus, **contain-ment+al*, **attach-ment+al*, **pay-ment+al*, etc. This generalization is a very serious challenge to the locality proviso of 'syntactic morphology' inasmuch as successful selection of a complement by *+al* would require *+al* to have access, across +ment, to properties of what the latter has attached to, viz. a verb or something else. The non-local character of the alleged dependency is illustrated in (44). Again, in order to attach to *+ment*, *+al* has to check what lies below +ment: if it is a non-verb, say *seg* in (44a), a well-formed object results, *segmental*; on the other hand, if it *is* a verb, say *contain* in (44b), an ungrammatical adjective, **containment+al*, is derived.

(44)

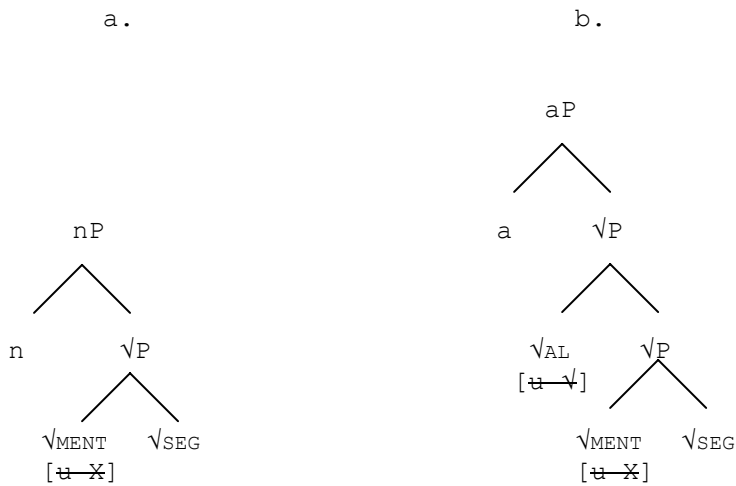


In pre- \sqrt{c} frameworks, the relationship can be construed as non-local or bottom-to-top. Thus, Aronoff (1976) - quite plausibly - sees the restriction under discussion as requiring inspection of the internal constituent structure of the complement of $\langle al \rangle$, while Fabb (1998) or Plag (2003) explicitly contemplate the option of having the complement select its own head. Neither option is available in a minimalist framework.

Within the confines of the proposal advocated here, the solution is straightforward, as will be shown by means of a comparative discussion of the successful derivation of *segment+al*, vs. the unsuccessful derivation of **belittlement+al*.

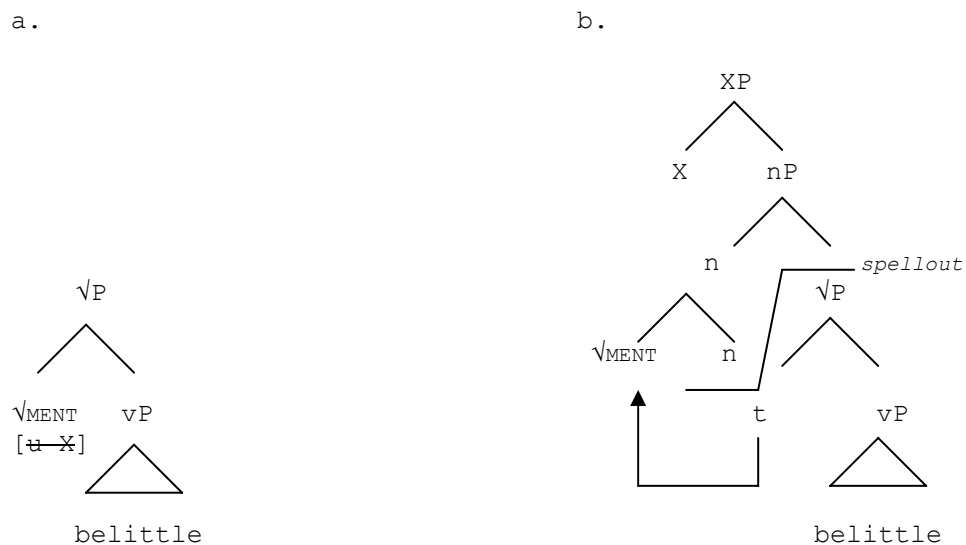
When \sqrt{MENT} heads \sqrt{SEG} , a \sqrt{P} is formed. Subsequent merger with *n* turns the whole into an nP (45a). But another option, demonstrated in (45b), is available. The complex object [\sqrt{P} SEGMENT], by virtue of being a root, can itself be selected by \sqrt{AL} . In such a case, an even more complex root is formed, [\sqrt{P} SEGMENTAL]. Upon merger with *a*, an adjective is formed, *segmental*.

(45)



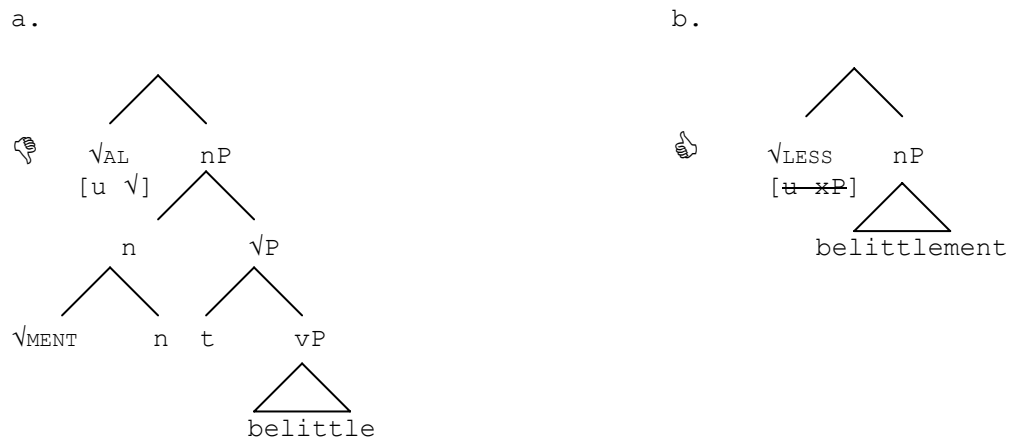
Where and why does the derivation of **belittlemental* crash? First, \checkmark_{MENT} merges with vP *belittle* (46a). While this is in accordance with its underspecified uninterpretable feature which allows it to select both a root or an xP, it gives rise to the sort of tension discussed in connection with (33) whereby a \checkmark heads an xP in violation of the canonical ordering of projections assumed earlier. Further merger with nP (46b) offers the required escape hatch, allowing \checkmark_{MENT} to move up to the head of nP, thereby ceasing to head an xP.

(46)



Two consequences follow. First, having moved up to the head of nP (46b), \checkmark_{MENT} has now been removed from the scope of spellout of the nP phase. It will be spelled out separately. Second, \checkmark_{MENT} now firmly tucked into the head of nP can no longer be selected as *such*: further selection can only specify the nP which now hosts \checkmark_{MENT} . This will be the exclusive privilege of an xP selector, for instance \checkmark_{LESS} (47b), hence *belittlementless*. By contrast, on account of the uninterpretable feature they carry, \checkmark_{AL} or other \checkmark selectors such as \checkmark_{IC} or \checkmark_{OUS} , will never even be considered for merger with nP *belittlement* (47a).

(47)



What recommends this analysis of the ungrammaticality of **belittlemental* is the way in which it captures the fact that the verbhood of *belittle* impacts the behavior of a non-adjacent object such as $\sqrt{\text{AL}}$: the fact that *belittle* is a vP, while it does not preclude its selection by $\sqrt{\text{MENT}}$, ultimately forces $\sqrt{\text{MENT}}$ into a position such that it can no longer be selected by $\sqrt{\text{AL}}$, or any other Level 1 or cyclic suffix. As a result, selection can be kept both strictly local and strictly unidirectional (a head selects its complement, not vice versa).

Next, the question arises of the grammaticality of *governmental*, and whether it is really unexpected. The problem is usually posed as in Aronoff (1976), viz. *-al* attaches to Xment, but not if X is a verb. This is illustrated in (48a,b), along with the puzzling exceptions in (48c).

a.

Xment	X is not a verb	↔	Xment-al is viable
ornament	orn		ornamental
regiment	reg(i)		regimental
segment	seg		segmental

b.

Xment	X is a verb	↔	Xment-al is not viable
employment	employ		*employmental
discernment	discern		*discernmental
agreement	agree		*agreemental
basement	base		*basemental
shipment	ship		*shipmental

c.

Xment	X is a verb	Why is Xment-al viable ?
government	govern	governmental
development	develop	developmental
judgement	judge	judgemental

What does the system advocated here have to say about the evidence in (48) ? Let us examine it block by block.

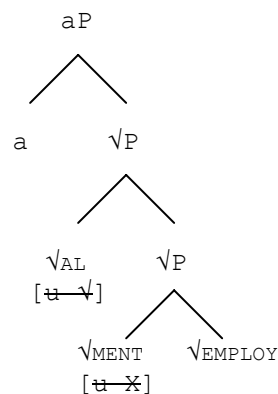
First, (48a). *ornamental*, *regimental*, and *segmental* are unproblematic: <orn>, <reg(i)>, and <seg> are not xP's, or a corresponding noun, verb, or adjective would exist. Therefore, <orn>, <reg(i)>, and <seg> are roots. Accordingly, the analysis of *ornamental*, *regimental*, and *segmental* is straightforward, i.e. a complex root eventually merged with a category assigning head. The analysis of *segmental* appears formulaically in (49), though the reader can go back to (45b) for the corresponding diagram.

(49) [a [_{VP} √_{AL} [_{u→v}] [_{VP} √_{MENT} [_{u→x}] [√_{SEG}]]]]

Apparently more problematic, is the case of the adjectives in (48b), such as **employmental*, **discernmental*, etc. Here, my proposal can assess them in clear fashion, although – as we will soon see – the assessment does not lead up to the outright elimination of *employmental* (a good thing too, as we will see). The assessment is: in order for *employmental* to be ungrammatical, <employ> must have been a vP. If <employ> in *employmental* is a vP, the derivation will crash exactly for the same reasons as that of **belittlemental* (47a): the merger of √_{AL} with an nP makes it impossible for √_{AL} to check its uninterpretable feature.

(50) [a [_{VP} √_{AL} [_{u v}] [_{nP} √_{MENT} n [_{VP} t_{√_{MENT}} [_{u→x}] [_{VP} v √_{EMPLOY}]]]]

Of course, the reason *employmental* is not ruled out altogether is, that it's not the case that <employ> could EXCLUSIVELY have been a vP. Nothing indeed rules out the possibility of <employ> being √_{EMPLOY}, as Acquaviva (2009) points out. In this case, successive mergers could give rise to the legitimate object in (51), and *employmental* should be entirely well-formed. We return to this momentarily.



The 'three exceptions' of the third block, *judgemental*, *developmental*, and *governmental*, are unambiguously assessed as well-formed adjectives, with an analysis which is exactly that of *segmental* (45b) or, for that matter, *employmental* (51). Hence the conundrum in (52).

- i. there **is** a source for items reputed ungrammatical such as *employmental*; how can they be ungrammatical ?!
- ii. the same source yields three perfectly grammatical 'exceptions'; why aren't they vastly more numerous ?

I submit that the answer to both questions can only come from a thorough reconsideration of the data. Indeed, the data in (48) is typically the corpus of a word-based theory. For a word-based theory, it is important whether *employmental* or *discernmental* exist, or not. But, the question I am

asking is not at all rooted in a word-based theory. For clarity, that question is reformulated in (53).
(53)

Does $\sqrt{\text{AL}}$ merge with a complex root headed by $\sqrt{\text{MENT}}$?

The existence of adjectives such as *employmental* or *discernmental* would directly answer the question, but their absence does not. For, in a theory such as DM, there are two possible sources for the non-existence of a 'word'. One is its non-generation by the system. The other, is its idiosyncratic absence from the Encyclopedia. This can be illustrated by means of the two examples in (54).
(54)

- a. blueberry
- b. cranberry

Three roots are involved in the sample in (54): $\sqrt{\text{BLUE}}$, $\sqrt{\text{CRAN}}$ and $\sqrt{\text{BERRY}}$. All three are perfectly good roots, but only [_a a $\sqrt{\text{BLUE}}$] and [_n n $\sqrt{\text{BERRY}}$] are recorded in the Encyclopedia. If we extend this view to complex roots of the type proposed here, we can make sense of accidental gaps such as in (55b).
(55)

- | | | |
|----------|---------|-----------|
| a. atom | atomic | atomicity |
| b. motor | *motric | motricity |

**motric* is not attested as an adjective, but its absence need not be interpreted as meaning that $\sqrt{\text{IC}}$ fails to select $\sqrt{\text{MOTOR}}$. On the contrary, the existence of *motricity* shows that $\sqrt{\text{IC}}$ does select $\sqrt{\text{MOTOR}}$. But, [_{a/n} a/n [_{vP} [_v $\sqrt{\text{IC}}$ [_v $\sqrt{\text{MOTOR}}$]]] itself, much as root $\sqrt{\text{CRAN}}$, is simply not recorded in the Encyclopedia.

It is in just this sense that the absence of *employmental*, *discernmental*, and the like falls short of being the negative answer to (53). In fact, attestations of sequences of type $\langle \sqrt{\text{X}} + \sqrt{\text{MENT}} + \sqrt{\text{VAL}} \rangle$, where there exists a verb [_v $\sqrt{\text{X}}$], are... all over the place ! The context to look for them is (56).
(56)

[_{ADV} _ ly]

Idioms such as (57) are a rich source of information, in this respect.
(57)

- a. informally/loosely/professionally speaking...
- b. John is vertically/romantically/rythmically challenged

(58)

We aim to parent attachmentally and generally seem to do so.

(59)

Stupid jerk who continually forgets to include a specified attachment within an email. Don't be alarmed if Bob had to send you that spread sheet a few times, he's a little attachmentally challenged.

(60)

On behalf of accomplishmentally-challenged Americans everywhere...

(61)

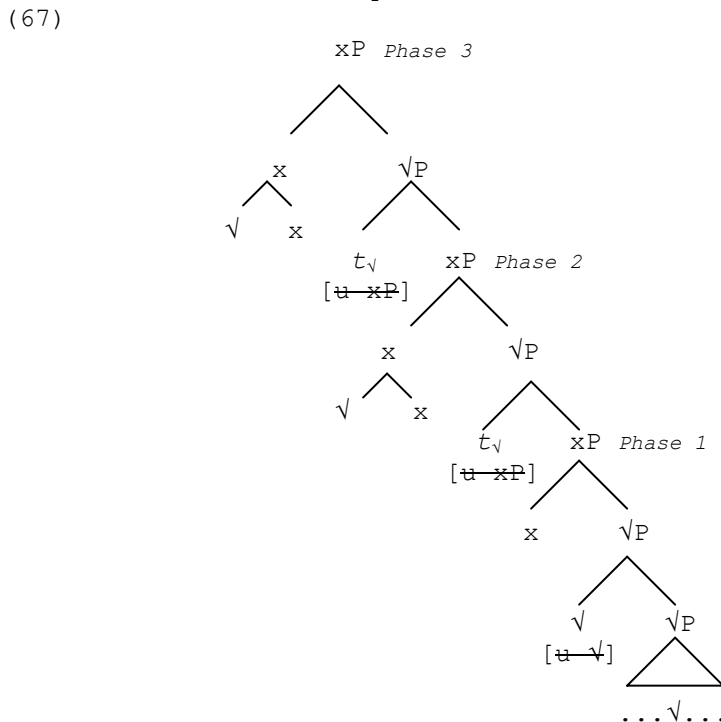
But it isn't just celebrity couples who are accoutrementally mismatched.

- (62) GLITTER CAMP will be a place for the adornmentally-challenged to get gussied up with glitter.
- (63) ... I mean imagine, if there ever came a time to ... change any contents, like amendmentally speaking, it would like totally ... suck to have to ...
- (64) Although the terms and reasons for the imposition of the "Defermental-Probationary Contract" are unclear, Dyson's argument appears to challenge the legality of his present confinement.
- (65) Here are some links to get your ass back in the saddle employmentally speaking
- (66) What should we do if Obama is elected and does not support Israel... deploymentally, financially, or otherwise ?

4. Concluding remarks

In this concluding section, I return to the consequences of my proposal for the place of cyclic domains in the system and their relationship to mechanisms of phasal spellout.

Roots are arranged into two blocks as proposed at the end of subsection 2.3., and repeated in (67) for convenience.



The careful reader will have noticed that roots are arranged in two blocks. The first block at the bottom, call it the radical core, is the complement of Phase 1. It consists exclusively of roots which will bunch up in the way described earlier.

The second block, is the rest. Because of the prohibition against a root heading a category and the ensuing left-adjunction of $\sqrt{}$ to the next

higher categorial head exemplified in (67), it is organized in mille-feuille fashion, with alternating radical and categorial layers.

This makes it possible to revisit cyclicity in fundamental fashion. Cyclicity can now be redefined as in (68).

(68)

- i. Roots are the domains of application of phonological rules
- ii. Rules apply on the most deeply embedded root, then reapply on the domain defined by the next adjacent higher root, and so forth

It follows from the organization in (67) that cyclic phonology will be limited to Phase 1. Indeed, adjacent roots can only be found at Phase 1, as any root located above Phase 1 will end up being mille-feuilled between two categorial layers. Consequently, no root needs to be viewed as cyclic (or non-cyclic) as such. Indeed, there is no sense in which $\sqrt{\text{ATOM}}$, $\sqrt{\text{IC}}$, $\sqrt{\text{NESS}}$, $\sqrt{\text{MENT}}$, or any of the roots that have been quoted so far, differ from each other in their intrinsic ability to trigger the application of cyclic rules. Rather, the cyclicity of an affix can be derived from the position into which its uninterpretable feature will cause it to be located, either in the radical core, above in the mille-feuilles, or in either place.

W [$\sqrt{\dots X \dots [\sqrt{\dots Y \dots}]}$] Z

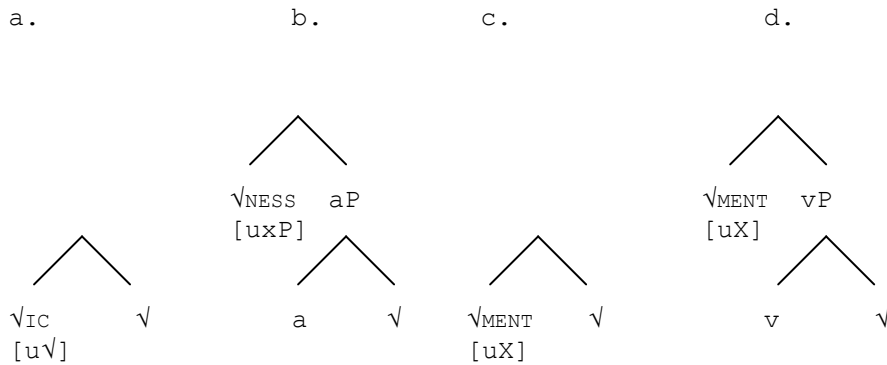
Stipulating which affixes are cyclic or non-cyclic can be dispensed with altogether. Their behavior in this respect depends on their structural position, and their structural position directly reflects their selectional behavior. Of course, this is especially striking in the case of universal selectors which can appear anywhere. For a synoptic view, the entire gamut of selectional patterns for English is summed up in (69) along with corresponding positional examples in (70).¹⁵

(69)

Feature	Relationship To a root	Involvement in cyclic phonology	Example
[$u\sqrt{}$]	always local	always	(70a)
[uxP]	never local	never	(70b)
[uX]	a) possibly local	yes, in such case	(70c)
	b) possibly non-local	no, in such case	(70d)

¹⁵ Affixes are reputed to be a closed class. While the class is not totally closed judging from the numerous borrowings of derivational affixes from Romance and Slavic by languages such as English and Yiddish respectively, it is true that borrowing and creation remain limited. In the context of the proposal made in this paper, a rationalization for the difference between open and closed classes is available: free roots can be borrowed instantly, but bound roots are significantly more complex objects inasmuch as a decision is required as to the associated uninterpretable feature they will necessarily carry, be it readily borrowed from the source language or assigned by the borrowing language.

(70)



5. Appendix

In a much quoted article, Fabb (1988) puts forth a number of generalizations about English affixation. Most of Fabb's generalizations are incompatible with the proposals contained in this paper, and they obviously deserve to be addressed more extensively than is possible in the context of a brief appendix. One example only will be discussed here in an attempt to sort out the issues involved.

Fabb claims that <ism> never attaches to an already suffixed base. The existence of *radicalism* constitutes no ground for a comparison between his and my account, for Fabb's account is couched within a word-based theory and <radic> is certainly not a word. Nevertheless, Fabb's contention that <ism> will not attach to a suffixed base is an impossible generalization in the context of the proposals articulated here. Indeed, <ism>, strictly speaking $\sqrt{\text{ISM}}$, is an xP selector (or a non-cyclic or Level 2 affix). As such, it must be oblivious to the internal composition of the $\sqrt{\text{P}}$ that lies below the little x it will merge with. Thus, Fabb's generalization is either accidental (if true), or false. As it turns out, it is false as evidenced by nouns such as *gangsterism*, *tricksterism*, *pornsterism*, and other formations along the same pattern.

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