6

The category of roots

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6.1 Introduction

Consider, as our starting point, the paradigm in (1):

(1) a. *formable; sortable; faceable; coastable; primable; palatable*
b. *formal; sortal; facial; coastal; primal; palatal*

In (1), the Content of, e.g., *coastal* is related to the nominal Content of *coast*, but *coastable* is Content-related to the verbal Content of *coast*. Nor is this a coincidence. Rather, whenever compositional, *able* derivatives are related to the verbal Content, while compositional *-al* derivatives are related to the nominal Content. But if *coast* is a root, i.e., √COAST, then where could this categorial correspondence possibly come from? Specifically, if the representation for (1a–b) is as in (2), the nominal vs. verbal source Content correlation would go entirely *unmarked:*[1]

(2) a. √COAST – *able*
b. √COAST – *al*

Within classical accounts of English word formation, it is typically assumed that, e.g., *-al* indeed only merges with nouns, and that *coast*, in the context of *coastal*, is somehow nominalized. This is either because *coast* is listed as an N to begin with, or because it is derived from some other listed instantiation of *coast*, (e.g., the listed $coast_V$). In the latter case, the derivation must involves a silent N affix, effectively a phonologically null variant of *-ation* or *-age*. Similarly, *-able* only merges with to verbs, and *coast*, in the context of *coastable*, is somehow verbalized, either because it is listed as such (and thus nominal *coast* is derived from it), or is rendered verbal by means of a silent V affix merging with a listed N entry. That type of account, we note, certainly captures the Content-relatedness of $coast_V$ and *coastable* vs. $coast_N$

[1] And where Content is perceived as substantive, conceptual meaning, roughly Frege's *Sinn*, and throughout notated with italic capitals (e.g., *BALL*).

and *coastal*. However, as is immediately evident, it does so at the cost of postulating multiple null categorizers with distinct, and otherwise difficult to prove, formal properties. Typically, we find that categorizing affixes project a specific category and select a specific category, and cases of phonologically realized homophony, within the derivational domain, are rather rare. In contrast, phonologically unrealized categorizers (henceforth zero-categorizers) are ambiguous (at the very least) between N and V, and select (at the very least) either V or N. But why should that be so?[2]

The conceptual objection above, as it turns out, is only one of numerous empirical and theoretical problems otherwise facing the claim that English has zero categorizers, a matter I return to in sections 6.3 and 6.4 below. Before doing so, however, let us consider an alternative which dispenses with zero categorizers, and which has independent empirical as well as conceptual advantages.

Note now that categorial selection, as typically conceived, is fundamentally a matching system, and as such, has a redundancy built into it by definition. The categorial statements that would be required, for, e.g., *coastal* (or *governmental*, for that matter) as well as for *will coast* or *coasted* (or *will crystalize*/*crystalized*), would be as in (3)–(4) and consist of first stating the categorial selection properties of *-al* and T (the latter a segment of an Extended verbal Projection), and second, of stating independently the categorial properties of their potential complements, however derived (note that by assumption *government* is already N and *crystalize* is already V due to prior operations):

(3) a. *-al* projects A
-al must merge with N

b. *will* projects T, T a segment of {Ex[V]}
{Ex[V]} must merge with V

(4) √COAST → N (*somehow*)
$[_N$[govern]ment]

√COAST → V (*somehow*)
$[_V$[crystal]ize]

(See fn. 3 for a note on the notations here and directly below.)

The alternative to such redundancy is to assume that the categorial properties of roots emerge in the context of a particular structure, and as a result of that structure. More concretely, suppose we conceive of the functional vocabulary as a set of operators which effectively divide the syntactic space, with each formal functor defining not only its own inherent space, but also that of its complement. By way of illustration from the visual domain, consider the collection of black markings in (5a). We can conceive of that collection of dots as *projecting* the delineated space defined by (an extension of) its outside boundaries and as such identical to (5b). In

[2] English *-ing* may project V, N, and A, but only merges with V. Similarly, in English (and universally) some affixes typically are ambiguous between A and N, but merge with an identical base (e.g., $American_{N,A}$; $Israeli_{N,A}$; $Marxist_{N,A}$; vs., e.g., $Japanese_{A,*N}$). English *-al* is, to the best of my knowledge, the only case of true 'homophony' for phonologically realized affixes, merging with N to project A, and merging with V to project N.

turn, (5a) can also be said to *define* a *complement space* in the most concrete sense of *complement*, i.e., that which is delineated *within* the projecting structure and which is not black. The delineated white space under consideration crucially has no properties beyond those defined by the black markings, however otherwise determined. Specifically, that inner space is *not* a *BALL,* as such, although an object that does have the inherent properties of a *BALL*, such as the *BALL* in (5c), could, of course, fit into that space. What could not, however, fit into that space is anything that has inherently defined properties which are incompatible with those of *BALL*—i.e., that space cannot accommodate a *NON-BALL*, one instantiation of which is, presumably, the *CUBE* in (5d).

(5) a.  b.  c.  d. 

Insofar as we can refer to (5c) as a *BALL*, we can now think about the space defined by the markings in (5a) as *BALL-equivalent*. The shape in (5d), however, is neither *BALL* nor *BALL-equivalent*. Crucially, the *BALL-equivalent* space in (5a) is not identical to the space defined by the outer shape in (5a), in turn identical to (5b). Neither, note, could fit into that *BALL-equivalent* space. By similar logic, while the complement space (5a) is *BALL*-equivalent, the complement space defined by (6a) is *TRIANGLE*-equivalent, insofar as it would fit the shape in (6b), but not, e.g., the shapes in (5a–d):

(6) a.  b. 

We can now extend this picture to syntactic category labels. Consider, for instance, the verbal Extended Projection (ExP) which, by assumption, defines its categorial complement space (CCS) as V-equivalent. We can now view the verbal Extended Projection a set ({Ex [V]}) consisting of all functional nodes which define their CCS as V-equivalent. T, to exemplify, defines its CCS as V-equivalent, and is thus a segment of the verbal Extended Projection (ExP-segment), or, more specifically, a member of {Ex [V]}.[3] Now, insofar as the CCS of {Ex[V]} is V-equivalent, it

[3] A note is in order here about notation. {Ex[V]} stands for the set of (non-categorial) nodes that define V as their Categorial Complement Space, or, in more familiar terms, the Verbal Extended Projection. The segments of {Ex[V} (its *ExP-segments*) are, e.g., T, Asp, Modal, etc. Similarly, of course, {Ex[N]} or {Ex[A]}. On the other hand Categorizers, to spell out as *-ation* or *-ate*, are not ExP-segments, but are (partially) formally equivalent to an extended projection as a whole. Such categorizers, or C-functors, are notated as, e.g., $C_{N[V]}$, where C stands for a categorial functor, N for the categorial value it projects, and [V] for the categorial value of its CCS. By assumption, C is a semantically bleached functor, unless otherwise specified, and thus, e.g., $C_{N[V]}$ to spell out as /$_{\pi}$*ation, al, ance*/, but $ER_{N[V]}$ to spell out /$_{\pi}$*er*/ or $ABLE_{V[A]}$, resulting not only in the syntactic structures corresponding, respectively, to $C_{N[V]}$ or $C_{V[A]}$, but also whatever semantic value is associated with ER or ABLE respectively. Finally, /$_{\pi}$*xyz*/ is a shorthand for phonological realization. Actual phonological representations are not attempted.

will exclude anything which is not V-equivalent, but would allow, equally happily, both items which already *are* V (e.g., *crystalize*) or items which fail to have any categorial properties altogether, i.e., category-less roots. Similar rationale applies to the functor to be realized as *-al*$_A$*:* it projects A, and defines an N-equivalent CCS ($C_{A[N]}$). The statements in (3)–(4) could now be dispensed with, and replaced with the statements in (7), in turn formally equivalent, within the terminology used here, to (8):

(7) a. *-al* projects A
The (Categorial) Complement Space of *-al* is N-equivalent.

b. *will* projects T, T an ExP-segment of {Ex[V]}
The (Categorial) Complement Space of {Ex[V]}, is V-equivalent.

(8) a. $C_{A[N]}$
$C_{A[N]} \rightarrow /_\pi$*al, ic, ous*/

b. $T \in \{Ex[V]\}$
$WILL_T \rightarrow /_\pi$*will*/

Returning to √COAST and √FACE, we may now say that when they merge with what spells out as /$_\pi$*al*/ or /$_\pi$*the*/ respectively, they are N-equivalent, but when they merge with /$_\pi$*able*/ or with /$_\pi$*will*/, they are V-equivalent. Importantly, roots are not *assigned* a category as such, nor does a categorial conversion operation of any sort take place. Rather, they become N-equivalent or V-equivalent because the categorial space has been divided by a functor, and the 'space' into which these roots have been 'poured' so to speak, defines an N- or a V-equivalent space respectively. Importantly, with the exception of the inherent categorial properties of C-functors, the system, as a whole, has no inherent categorial properties, but only properties of equivalence. Thus while we can think of the label projected by e.g., $C_{N[V]\text{-}/\pi\text{-}ation/}$ as N, the category of its CCS is not in not in actuality V, but rather equivalent to V, and hence C=V.

Illustrations of categorial space division in distinct contexts are in (9)–(10). Note that across the board, roots, by assumption inherently category-less, and derived forms, which by assumption are already categorized by an otherwise existing C-functor (e.g., *ship* or *ize*), merge in identical structures:

(9) a. $[_T$ $WILL_T$ $[_{C=V}{}^{\pi}\sqrt{COAST}]$ … → *will coast*
b. $[_T$ PST_T $[_{C=V}{}^{\pi}\sqrt{COAST}]$ … → *coasted*
c. $[_A$ $ABLE_{A[V]}$ $[_{C=V}{}^{\pi}\sqrt{COAST}]$ … → *coastable*
d. $[_{\#/Q}$ $MUCH_{\#}$ $[_{C=N}{}^{\pi}\sqrt{COAST}]$ … → (too) *much coast*
e. $[_{CL}$ DIV_{CL} $[_{C=N}{}^{\pi}\sqrt{COAST}]$ … → *coasts*
f. $[_A$ $C_{A[N]]}$ $[_{C=N}{}^{\pi}\sqrt{COAST}]$ … → *coastal*

Finally, in Borer (2005a–b, 2013), I argue that ExP-segments consist of pairs in which semantic functions (e.g., WILL, MUCH, PST) bind an empty variable head. For ease of exposition, and as the matter is by and large orthogonal for the topic under consideration here, a more traditional execution is opted for in the text.

(10) a. $[_{T}$ WILL$_{T}$ $[_{C=V}$ crystalize$_{V}]$ … → *will crystalize*
b. $[_{T}$ PST$_{T}$ $[_{C=V}$ crystalize$_{V}]$ … → *crystalized*
c. $[_{A}$ ABLE$_{A[V]}$ $[_{C=V}$ crystalize$_{V}]$ … → *crystalizable*
d. $[_{\#/Q}$ MUCH$_{\#}$ $[_{C=N}$ government$_{N}]$ … → (too) *much government*
e. $[_{CL}$ DIV$_{CL}$ $[_{C=N}$ government$_{N}]$ … → *governments*
f. $[_{A}$ C$_{A[N]}]$ $[_{C=N}$ government$_{N}]$ … → *governmental*

A point of clarification is in order before proceeding. In Borer (2013) I argue in some detail that roots are (pure) phonological indices. The notation $^{\pi}\sqrt{\text{XYZ}}$, when used, is in reference, specifically, to that conception of roots. √XYZ, absent the $^{\pi}$ superscript, is in reference to a more general notion of roots, e.g., as in Distributed Morphology, where opinions on the phonological properties of roots vary. The significance of phonological faithfulness, as preserved through this view of roots may not be at the core of this particular article, but the central ways in which it informs the author's views should become evident enough.

Some consequences of the representations in (9)–(10) are worth pointing out. Note first that all roots are category-equivalent once they have merged with any functor. Therefore, although roots have no categorial properties on their own, in most, if not all structural contexts they do acquire categorial equivalence. As a result, there is no need to introduce into our syntactic vocabulary category-less terminals.[4] A second consequence of significance is that both $[_{C=N}\ ^{\pi}\sqrt{\text{COAST}}]$ and $[_{C=V}\ ^{\pi}\sqrt{\text{COAST}}]$ represent a single, non-branching terminal, and crucially, the emergence of a categorial context for roots has been accomplished without increasing the derivational complexity of these forms relative to some bare root 'source' (i.e., making the categorized form more complex than the root), and without deriving any one categorial instantiation of the root from another. Similarly, note that constituting CCS (e.g., of *-al* or *-ation*) does not add any complexity to *government* or *crystalize*, although these are, already, presumably complex, representing a previous operation which merged e.g., the root $^{\pi}\sqrt{\text{GOVERN}}$ with /$_{\pi}$*ment*/ the latter the realization of C$_{N[V]}$.

6.2 Contextual categorization: Evidence and competing accounts

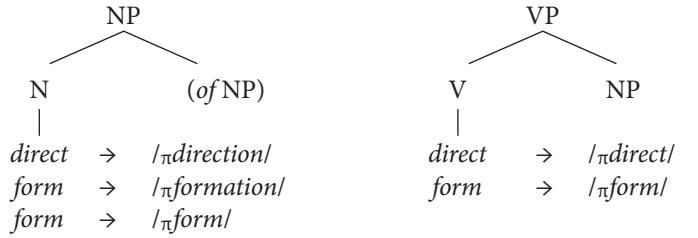
6.2.1 Chomsky (1970)

The model of categorization outlined directly above is very simple and straightforward. In this and the next few sections, I will undertake to compare it to other categorization models so as to highlight its advantages, as well as to provide further evidence for it.

[4] Roots may merge with roots, to give rise, specifically, to compounds. See Borer (2013) for some discussion of categorization in those contexts. See also section 6.3 below.

It is appropriate to start this discussion by highlighting the difference between the contextual categorization adopted here and the contextual categorization model put forth in Chomsky (1970) (and see also Ouhalla 1991, Picallo 1991, and Marantz 1997). Quite similarly to the account directly above, in Chomsky's (1970) a category-less item, possibly a root, is inserted into the syntactic structure, and it is the syntactic structure that determines its category. Thus *direct*, by assumption a category-neutral item, when inserted in a verbal context, gives rise to a verb and the subsequent 'verbal' instantiation of the root properties (e.g., obligatory subject, possible direct object). On the other hand, in a nominal context, *direct* would give rise to a noun and the subsequent 'nominal' instantiation of its properties (e.g., optional arguments, *of*-insertion). The account is conceptually akin to the one put forth here, insofar as in both it is the structural context that is responsible for categorial properties, and not the inherent, presumably listed properties of a terminal. That the accounts are nonetheless vastly different, empirically as well as conceptually, becomes evident when we consider the specific relationship between syntax and phonological realization and the structural role (or lack thereof) of functors. Thus for Chomsky, the nominal realization of, e.g., *direct* could be /$_{\pi}$*direction*/ as in (11):

(11)

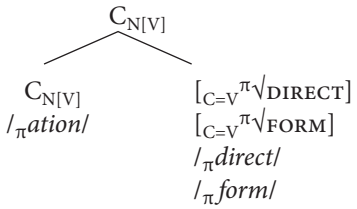


Fundamentally, Chomsky's approach sets aside morphological complexity as a non-syntactic issue, and the fact that /$_{\pi}$*formation*/ as well as /$_{\pi}$*direction*/ are bi-morphemic while /$_{\pi}$*form*/ and /$_{\pi}$*direct*/ are mono-morphemic (prefixing aside) is by assumption syntactically irrelevant. Nor is it relevant (indeed, even acknowledged) that insofar as /$_{\pi}$*form*/ is at least morpho-phonologically a subpart of /$_{\pi}$*formation*/, that subpart corresponds to the verbal, rather than the nominal Content of /$_{\pi}$*form*/. The notion of what is a basic, non-categorial unit, possibly root, in some sense, is thus fundamentally divorced from phonological realization or from derivational history. While it appears rather clear that the notion of lexical item, or possibly *root* in Chomsky (1970) must carry *some* phonological content, morpho-phonological considerations, as such, play no role in its determining its grammatical properties.[5]

[5] To wit, if roots, or listed items, have no phonological content altogether, there is little to ensure that the verbal instantiation of some root would be phonologically similar, in any way, to its nominal instantiation. Little, in other words, to exclude the existence of a category-neutral entry that would be realized as, e.g., *recline* in a verbal context, but as *sofa* in the nominal one.

The perspective advanced here likewise subscribes to the view that roots do not have a category. In fact, it subscribes, even more explicitly, to the view that *roots* are altogether devoid of any syntactic properties. However insofar as Categorial morphology is fundamentally hierarchical, I subscribe to the view that it is per force syntactic. Equally importantly, I assume that structural complexity tallies with morpho-phonological complexity and entails phonological faithfulness. As a consequence, /$_{\pi}$*direction*/ and /$_{\pi}$*formation*/ cannot possibly be phonological instantiations of roots, because they are not mono-morphemic, and rather, represent a complex hierarchical structure, at the very minimum, that of a (derived) R-nominal (in the sense of Grimshaw 1990 and Borer 2013), as in (12):

(12)



Of course, it follows equally directly in both Chomsky's system and in ours that /$_{\pi}$*direction*/ or /$_{\pi}$*formation*/ cannot instantiate a verbal context. However, the rationale for why that is so is distinct. In Chomsky's system, /$_{\pi}$*formation*/ is a phonological spell-out associated specifically with a nominal context, making its non-occurrence in verbal contexts a straightforward matter. Equally straightforwardly, in the system presented here, /$_{\pi}$*formation*/ is the spell-out associated with (12), and presupposes the existence of a distinct phonological representation embedded within it, i.e. /$_{\pi}$*form*/, spelling out the V-equivalent constituent [$_{C=V}$ $^{\pi}\sqrt{\text{FORM}}$]. Matters, however, do become less straightforward when we consider the fact that $^{\pi}\sqrt{\text{FORM}}$ has (at least) two possible nominal instantiations: *formation* which is morpho-phonologically complex, and *form*$_N$, which is not, and where the latter, but not the former, is homophonous with the verbal instantiation of the same root. The ramifications of this matter play a considerable role in the discussion in the remainder of this chapter and in the argument for the contextual notion of categorization outlined here.

6.2.2 Distributed Morphology

Assuming category-less roots and a strict separation between lexical listing and syntactic projection, Marantz (2000 and subsequent work) and the bulk of work within Distributed Morphology propose that categories project as separate nodes (***n, v, a***—so-called little ***n***, little ***v***, little ***a***). Such categorial nodes are part of the functional inventory of the language, and are subject to Vocabulary Insertion (VI), by assumption a post-syntactic procedure which associates a phonological form with functional terminals. For, e.g., ***n***, such phonological form could be *-ation*, or *-er*, or a

phonologically null suffix. Importantly, these categorial nodes may also accomplish additional work. Thus, it won't do to postulate just ***a*** (little ***a***), because clearly the ***a*** that would spell out as /$_{\pi}$*able*/ is distinct from the ***a*** that would spell out as /$_{\pi}$*al*/. Effectively, then, categorial labels are functors, complete with both a category and with some additional syntactico-semantic properties, and at least at times, with a unique spell-out. Crucially, roots as such in this system, even once embedded within the structure, never have a category. To see that this is the case, consider first the structure in (13). The phonological output for this structure may be either (13i) or (13ii), which, for Distributed Morphology, would have an identical structure, and would only differ from each other insofar as for ***n***, VI would insert /*ation*/ in one case, but /$_{\pi}$Ø/ in the other.[6] Beyond this, note that in (13), and regardless of the phonological instantiation of ***n***, √FORM is a (permanently) category-less syntactic terminal, as the category label is associated exclusively with the functional item ***n*** and with the structure which it projects:

(13) [$_{\boldsymbol{n}}$ ***n*** √FORM] i. /$_{\pi}$*form*/
ii. /$_{\pi}$*formation*/

Consider now ***a***, and specifically when instantiated as /$_{\pi}$*al*/. It could merge with the structure in (14), giving rise to (14i) and (14ii):

(14) [$_{\boldsymbol{a}}$ ***a*** [$_{\boldsymbol{n}}$ ***n*** √FORM]] i. /$_{\pi}$*formal*/
ii. /$_{\pi}$*formational*/

But presumably, ***a***-/$_{\pi}$*al*/ can also merge with the root √FORM directly, giving rise to the structure in (15):

(15) [$_{\boldsymbol{a}}$ ***a*** √FORM]] /$_{\pi}$formal/

In (14), ***a*** does not merge with a root, but rather with an already existing categorial structure which is a projection of ***n***, and with ***n*** realized as /$_{\pi}$Ø/. In (15), on the other hand, it merges with the root. Either way, the root itself is not labeled. Rather, what is labeled is always only the structure dominating it.

The category-less status of roots within syntactic structures is a rather important matter for several reasons. We note, first, that contrary to common perception, e.g., little ***n*** does not *assign* a category to √FORM, regardless of whether it is null or not. In (13ii), the constituent ***n*** never corresponds to /$_{\pi}$*form*/. Its minimal instantiation is /$_{\pi}$*ation*/ (if phonologically separable) and its maximal instantiation is /$_{\pi}$*formation*/. Within /$_{\pi}$*formation*/, the part that spells out as /$_{\pi}$*form*/, and which is a distinct constituent, remains category-less. A very similar logic holds for (13i) in which the

[6] -*ation* and Ø$_{N}$, note, are not in competition, contra the competition model of insertion developed in Halle and Marantz (1993). Tacitly, then, such analyses introduce a formal distinction between C-functors and ExP-segments, where competition does hold.

structure is identical, and where the Ø-nature of the affix is syntactically irrelevant—what is ***n*** is *never* the root itself, but rather its categorial sister or the branching constituent that dominates it. Strikingly, then, this is a radically distinct perspective on the instantiation of roots in syntactic structures than that put forth in Chomsky (1970), where 'roots' as such are not syntactic objects, but where every 'root,' in any syntactic context, is inevitably *fully* categorized and where category-less terminals are impossible. Rather, the structures in (13)–(15) amount to the introduction of a novel syntactic primitive, with syntactic properties yet to be determined. For example, if indeed category-less roots are possible syntactic terminals, do they project? Do we expect a Root^{max} distinct from Root^{min} and the sub-phrasal syntax that such projecting structures might give rise to? Alternatively if roots cannot project and must, effectively, instantaneously merge with a category label (i.e., they are definitionally $\text{Root}^{\text{min/max}}$), why should that be?[7]

No less important, in this context, is the status of the merger of a root with any ExP-segment. Within Distributed Morphology, this doesn't seem to happen. Rather, a root must merge with a categorizer before merging with any functional node (in the conventional sense). But why should that be? Why can a root merge directly with ***v*** but never with T or D? Are these conditions on the distribution of roots? Are these conditions on the distribution of functors? If these are conditions on roots, e.g., the need for roots to instantaneously merge with a category label, what does such a requirement follow from? If, on the other hand, these are conditions on functors, e.g., T selects ***v***, D selects ***n*** and so on, and then ***n*** or ***v*** merge with the root, don't such conditions amount, effectively, to a surrogate categorization of the root by T or D, rendering the presence of an additional ***n*** or ***v*** categorizer superfluous?

When compared with (13)–(15), the account developed here likewise postulates an N-projecting C-functor in conjunction with $^{\pi}\sqrt{\text{FORM}}$, to be spelled out as /$_{\pi}$*ation*/. The structure of *formation*, in the account developed here, is nonetheless different from (13) exactly insofar as $^{\pi}\sqrt{\text{FORM}}$, as such, is not a syntactic object. The C-functor eventually to be realized as /$_{\pi}$*ation*/, rather, is an instance of $C_{N[V]}$, which is to say that its CCS is V-equivalent and thus the structure of *formation* would (minimally) be on a par with (9f), where /$_{\pi}$*form*/ instantiates a V-equivalent constituent. In this respect, we note, $C_{N[V]}$-/$_{\pi}$*ation*/ is no different from {Ex[V]}, the set of nodes that define the verbal Extended Projection. T, as a segment of {Ex[V]}, defines a V-equivalent CCS, and thus any root merging with it is V-equivalent, as already illustrated in the structures in (9a–b).

[7] The first approach is pursued by Harley (2009b), who indeed develops a full sub-phrasal syntax for roots. In turn, however, at least one major problem with assuming that roots are permanently uncategorized syntactic objects is the fact that roots never appear to spell out in the absence of a category, a matter already noted rather importantly in Marantz (1996). But if uncategorized roots are licit syntactic objects, it is not clear why they shouldn't be able to spell out as such.

Considerably more crucial, however, are the differing claims concerning the structure of what spells out as /$_{\pi}$*form*/ in (13). In the contextual categorization account outlined here, /$_{\pi}$*form*/ is always mono-morphemic, insofar as it spells out a single, non-branching terminal in all its instantiations. If it is a 'noun', it is because it is embedded in a larger structure that defines it as N-equivalent (e.g., 9d–e). If it is a 'verb', it is because it is embedded in a larger structure that defines a V-equivalent categorial space (e.g., 9a–c). Thus while /$_{\pi}$*formation*/ spells out a bi-morphemic structure consisting of a V-equivalent constituent and a C-functor, /$_{\pi}$*form*/ is a single terminal, crucially with categorial properties that are determined solely within its larger syntactic context.

The reader may now wonder whether it is, in fact, the case that the non-branching nature of /$_{\pi}$*form*/ follow from contextual categorizing. After all, what is to prevent the derivation in (12) from proceeding exactly as it does, with the nominal functor having a V-CCS (i.e., $C_{N[V]}$) but with $C_{N[V]}$ itself being phonologically unrealized, i.e., /$_{\pi}$Ø/? In other words, what, specifically, would block a zero realization of $C_{N[V]}$ alongside /$_{\pi}$*ation*/, a zero realization of $C_{A[N]}$ alongside /$_{\pi}$*al*/, and a zero realization of $C_{V[A/N]}$ alongside /$_{\pi}$*ize*/, making $form_N$ and $form_V$ bi-morphemic in such contexts? Certainly not anything that emerges from contextual categorization as such!

Indeed, zero realizations of C-functors are in principle compatible with contextual categorizing, although, as we note, they are not inevitable. The converse, however, is not so. Absent contextual categorizing (and absent non-combinatorial re-bracketing such as *conversion*), zero realizations of C-functors emerge as the *only* way to derive the categorial properties of otherwise categorially unmarked roots. Ipso facto, should it turn out that zero realizations of C-functors can—and should—be dispensed with, the existence of contextual categorizing becomes inevitable.

The following two sections are devoted to a detailed argumentation against the existence of zero realization for English C-functors. Concretely, I will argue that there are, in English, no zero realizations which are categorially equivalent to *-ation* or *-ize*, or in more traditional terms, no categorial zero affixes. In the absence of zero realizations for C-functors, the structure in (13) could not be assumed to underlie what is, eventually, pronounced as (*the*) *form*, and insofar as *form* does have an instantiation which is N-equivalent, that instantiation would have to be contextually determined. In turn, and insofar as contextual categorization is inevitable for deriving such nominal instantiations of *form,* we must doubt the utility of structures such as those in (13) altogether, or, more generally, the assumption that roots, within structures, are (permanent) category-less terminals, and that categorization is always achieved through the presence of a branching structure and a dedicated categorial node.

6.3 Against English Zero C-functors: Part I

6.3.1 Some general considerations

Before I turn to empirical issues concerning the existence (or lack thereof) of zero instantiations for C-functors, it might be worthwhile highlighting the fact that any model which relies on productive zero realization per force entails a distinction between morpho-phonological complexity and syntactic complexity.[8] The failure of correlation works in both directions. As the tree in (13) already showed, an equally complex syntactic tree may give rise to two outputs, one morpho-phonologically complex (*formation*) and the other morpho-phonologically simple ($form_N$). Similar disassociation occurs in the other direction, where a single realization, regardless of its morpho-phonologically complexity, may correspond to varying degrees of morphosyntactic complexity. To the extent that all framed constituents in (16) could spell out as /$_{\pi}$*form*/, /$_{\pi}$*form*/ may correspond to a single syntactic node, as in (15) or (16c,d), or to the merger of two syntactic nodes, as in (13) or in (16a,b,e). For that matter, it is not clear that it cannot, in principle, correspond to three or four, as in (16h,i). Nor is the problem limited to morpho-phonologically simple constituents. *Formal* may be bi-morphemic, as in (16c) or tri-morphemic, as in (16e), etc. In turn, once morpho-phonological complexity is divorced from (morpho-)syntactic complexity, the result is not only trees of distinct complexity for a simplex morpho-phonological representation, or varying degrees of morpho-phonological complexity for a single syntactic tree, but also the wholesale elimination of any empirically sound and non-circular methods of correlating morphological analysis with structural complexity (subscript for realization):[9]

[8] The claim here is specifically about zero realizations of C-functors, i.e., functors which project a category and which define a CCS, and where, as we shall see, the proliferation of presumed zero realizations is particularly troubling. While a typological universal along such lines might emerge from a deeper scrutiny, the author is certainly not in a position to assert its existence. Nor is the claim made here assumed to carry over, necessarily, to argument structure changing operations, such as, e.g., *break.CAUSE*$_{\emptyset}$, if an otherwise warranted representation, or to the English middle construction (*books sell well*).

Importantly, the claim explicitly does *not* carry over to any realizational properties that might be associated with ExP-segments (e.g., T, D). See Borer (2013) for a detailed motivation of the relevant syntactic, semantic, and phonological distinction between C-functors and ExP-segments, and for the explicit endorsement of the view of 'inflection' as amorphous, in the sense of Anderson (1992).

[9] Specific illustration of such failures, both within Distributive Morphology and within Kiparsky's (1982a, 1997) system will be pointed out as we proceed.

(16) a. [T PST [*v* $v_{Ø}$ √FORM]]

b. [D DEF [*n* $n_{Ø}$ √FORM]]

c. [*v* *v*ize [*a* *a*al √FORM]]

d. [D DEF [*n* *n*ation √FORM]]

e. [*v* *v*ize [*a* *a*al [*n* $n_{Ø}$ √FORM]]]

f. [D DEF [*n* *n*ation [*v* $v_{Ø}$ √FORM]]]

g. [D DEF [*n* *n*ing [*v* $v_{Ø}$ √FORM]]]

h. [*a* *a*al [*n* $n_{Ø}$ [*v* $v_{Ø}$ √FORM]]]

i. [*v* $v_{Ø}$ [*n* $n_{Ø}$ [*v* $v_{Ø}$ √FORM]]]

Having noted the conceptual difficulties for zero categorizers, let us turn our attention to some rather serious empirical problems. In the remainder of this section, I review some problems for zero categorizers as postulated (differently) in Lexical Phonology and Morphology and in Distributed Morphology. The specific explicit arguments put forth by Kiparsky (1982a, 1997) in favor of zero categorizers in English are tackled in section 6.4.

6.3.2 Zero categorizers: The problem of distributional restrictions

Consider now the phonologically unmarked noun–verbs alternations in (17). These include cases in which one might want to consider the 'basic' concept an 'object' as well as cases in which one might want to consider the 'basic' concept an 'action':

(17)

the salute	*to salute*
the form	*to form*
the chair	*to chair*
the floor	*to floor*
the lamp	*to lamp*
the dance	*to dance*
the kiss	*to kiss*
the run	*to run*
the walk	*to walk*
the feed	*to feed*
the show	*to show*

Certainly, and as (17) illustrates, unmarked noun–verb alternations in English are extremely productive. Typically, the assumption is that one of these categorial instantiations is the basic one, and that the other one is derived from it by zero-

affixation (see, for instance, Lexical Phonology and Morphology). To illustrate, the noun *walk* is derived from the verb *walk*, having the representation in (18a), while the verb *chair* is derived from the noun *chair*, having the structure in (18b):

(18) a. $[_{V}$walk $]$ $[_{N}[_{V}$walk $]$ $Ø_{N}$ $]$
b. $[_{N}$chair$]$ $[_{V}[_{N}$chair$]$ $Ø_{V}$ $]$

The representations in (18) involve a number of important assumptions. First, they presuppose the existence of a listed basic lexical item, possibly a Lexeme in the sense of Beard (1995), with a categorial label from which other categorically marked forms may be derived. Second, they assume the existence of (at least) two null categorial suffixes—a nominal one merging with verbs and a verbal one merging with nouns. Finally, they subscribe to the view that, e.g., /$_{\pi}$*walk*/ may correspond to both a mono-morphemic and a bi-morphemic structure.

Within Distributed Morphology, and coupled with the assumption that roots are devoid of category, the relevant representations would, rather, be as in (19a–b), with the Vocabulary Items corresponding to ***n*** and ***v*** realized as /$_{\pi}$Ø/ in both cases:

(19) a. $[_{\boldsymbol{n}}[\sqrt{\text{WALK}}\ ]\ \boldsymbol{n}_{Ø}\ ]$ $[_{\boldsymbol{v}}[\sqrt{\text{WALK}}]\ \boldsymbol{v}_{Ø}\ ]$
b. $[_{\boldsymbol{n}}[\sqrt{\text{CHAIR}}]\ \boldsymbol{n}_{Ø}]$ $[_{\boldsymbol{v}}[\sqrt{\text{CHAIR}}]\ \boldsymbol{v}_{Ø}]$

The representations in (19) likewise involve a number of important assumptions. One of these assumptions is shared across both accounts—both assume the existence, in English, of zero equivalents of /$_{\pi}$*ize*/ and /$_{\pi}$*ation*/. In other respects, however, the underlying assumptions are very different. First, (19) presupposes no basic, listed, categorial forms. Rather, whatever listing exists consists of category-less roots. Second, there is no derivational relationship between the nominal and the verbal instantiations of roots. Rather, both are derived directly from the root. And finally, as a result of the previous two assumptions, the verbal and the nominal instantiations are equally complex, and specifically, the realization /$_{\pi}$*walk*/ always corresponds to (at least) bi-morphemic structure regardless of its nominal or verbal instantiation.

Finally, (20) would be the structure assigned to (17) in the contextual categorization system endorsed here (with D standing in for any ExP-segment of {Ex[N]} and with T standing for any ExP-segment of {Ex[V]}):

(20) a. [D $[_{C=N}$ $^{\pi}\sqrt{\text{WALK}}\ ]]$ [T $[_{C=V}$ $^{\pi}\sqrt{\text{WALK}}\ ]]$
b. [D $[_{C=N}$ $^{\pi}\sqrt{\text{CHAIR}}]]$ [T $[_{C=V}$ $^{\pi}\sqrt{\text{CHAIR}}]]$

The representations in (20), like those in (19), deny the existence of a basic categorially marked form, as well as any direct derivational relationship between the verbal and the nominal instantiations. As in (19), both variants are related directly to a root. Like the representations in (19), then, they do not postulate differing levels of morphological complexity for the verbal and nominal instantia-

tions. However, (20) differs from (19) in two important ways. First, in (20), neither verbal nor nominal instantiations involve the merger of an additional head, be it nominal or verbal, eventually to remain phonologically unrealized. Secondly, and relatedly, all forms are non-branching terminals and thus mono-morphemic syntactically as well as morpho-phonologically.

The table in (21) might be useful in comparing the assumptions across these three approaches:

(21)

	LPM♦	DM♦	XSM♦
one categorial instantiation basic, the other derived from it	yes	no	no
both forms 'derived' from a category-less root	no	yes	yes
both forms are mono-morphemic	no	no	yes
both forms are bi-morphemic (at least)	no	yes	no
zero categorizers	yes	yes	no
contextual categorizing	no	no	yes

♦*LPM: Lexical Phonology and Morphology; DM: Distributed Morphology; XSM: Exo-Skeletal Model*

With this exposition in mind, consider now the ungrammatical cases in (22b) and (23b):

(22)

a.	b.
a salutation	**to salutation*
an arrival	**to arrival*
a neighborhood	**to neighborhood*
a writer	**to writer*
the kindness	**to kindness*
the ability	**to ability*

(23)

a.	b.
**a crystalize*	*to crystalize*
**an instantiate*	*to instantiate*
**an acidify*	*to acidify*
**an encase*	*to encase*
**a fatten*	*to fatten*
**an enlighten*	*to enlighten*

From the sample of cases in (22)–(23), as compared to those in (17), a tentative generalization emerges: phonologically unmarked categorial noun–verb alternation in English appear impossible for morpho-phonological derivatives.

A further consideration of the facts, however, results in the conclusion that the restriction cannot involve derivational complexity as such. The primary compounds in (24) are indeed excluded as verbs, but not so the primary compounds in (25), which are, presumably, derivationally complex as well:

(24) a. *math teacher* b. **to math teacher*
mass destruction **to mass destruction*
law enforcement **to law enforcement*
fellow traveler **to fellow traveler*
piano recital **to piano recital*
word formation **to word formation*

(25) a. *wardrobe* b. *to wardrobe*
blackboard *to blackboard*
chicken wire *to chicken wire*
wallpaper *to wallpaper*
grandstand *to grandstand*
network *to network*

In turn, note that the compounds in (24) are themselves headed by a nominal derivative, while the compounds in (25) are headed by a form that is itself (morpho-phonologically) mono-morphemic, and hence plausibly co-extensive with a root. Differently put, the compounds in (25) are headed by forms otherwise belonging to the (17) group. The generalization that thus emerges does not concern the derivational complexity of the forms in (22)–(23) as such. Rather, what appears to make a difference is the presence vs. absence of an actual *overt* categorizer such as *-ation*$_N$, *-ize*$_V$, *-en*$_V$-, *-hood*$_N$, etc. We may state the generalization as (26):[10]

(26) Categorially marked forms in English may not undergo a (phonologically) unmarked noun–verb alternation.

Corroboration is available in a study of some 1,200 cases of unmarked noun–verb alternations, in which Clark and Clark (1979) found exactly 6 cases in which the alternation involved an overt C-functor. The six forms are in (27). With the exception of *blockade*, they have been uniformly rejected by native speakers I have consulted.

(27) a. *to tourist; to launderette; to laundress; to lover; to allowance; to blockade*

A slightly higher number was found among instrumentals, where out of 127 instances, 11 were derivatives, but nonetheless allowed a verbal occurrence, including *to computer, to glider* and *to elevator*. We note that these, too, are of questionable felicity, and that even if more acceptable, remain a very small portion of the vocabulary, when compared to the overwhelming number of mono-morphemic forms in English that are attested, simultaneously, as nouns and as verbs.

Consider now how this generalization can be handled. In LPM, and harking back to the representations in (18), it is extremely difficult to see how the ungrammatical

[10] The presence of pairs such as *a portion/to portion; a condition/to condition* and others appears to cast doubt on the generalization in (26). I take up this matter directly in section 6.4.4.

cases in (22)–(24) can be ruled out. To exemplify, it is very hard to see why (18a–b) are licit, but not so (29a–c) or (31c–d). Nor is it obvious why the forms in (25) are licit, presumably with the structures in (32a–b) but not so the forms in (24), effectively with the identical structure, as in (32c–d):

(28) a. $[_V\ [_N$ acidi] ify]
b. $[_N\ [_V$ arrive] al]
c. $[_N\ [_A$ absurd] ity]

(29) a. *$[_N[_V\ [_N$ acidi] ify] $Ø_N$]
b. *$[_V[_N\ [_V$ arrive] al]$Ø_V$]
c. *$[_V[_N\ [_A$ absurd] ity]$Ø_V$]

(30) a. $[_N[_N$ wall] paper]
b. $[_N[_A$ black] board]
c. $[_N[_N$ math] teacher]
d. $[_N[_N$ mass] destruction]

(31) a $[_V[_N[_N$ wall] paper]$Ø_V$]
b. $[_V[_N[_A$ black] board]$Ø_V$]
c. *$[_V[_N[_N$ math] teacher]$Ø_V$]
d. *$[_V[_N[_N$ mass] destruction]$Ø_V$]

Within LPM, at least some affixal combinations are excluded by level mismatches. Specifically, Kiparsky (1982a, 1997) assumes that the $Ø_N$ merging with verbs is a Level I affix. Thus, if *-en*$_V$ is a Level II affix, as seems plausible, the absence of **the fatten* follows from a level mismatch. Similarly, possibly, for **the encase*, under the assumption that the categorial *en*$_V$- prefix is Level II. Level mismatch, however, cannot rule out any of the cases involving a putative $Ø_V$, by assumption a Level II affix, when merging with derived nouns, or cases in which a putative $Ø_N$ is merging with clear Level I verbal affixes such as *-ify* or *-ate*. Even more problematically, there is no obvious reason why $Ø_V$, always a Level II affix, can merge with the compounds in (25), but not to the compounds in (24).

The Distributed Morphology representations in (19) fare no better. Crucially, for DM, as for LPM, the syntax which underlies /$_\pi$*acidify*/ and the verbal instantiation of /$_\pi$*form*/ is identical, with the difference between them reducing to the choice of Vocabulary Items for ***v***. Similarly, the syntax underlying /$_\pi$*formation*/ and /$_\pi$*form*/$_N$ is identical, with the difference between them reducing to the choice of Vocabulary Items for ***n***. It is thus not clear what is to exclude the relevant representations in column B of (32), structurally identical, for all intents and purposes, to those in (19) or to, e.g., *crystallization* or *government*(*al*)*ize* in column C:[11,12]

[11] By assumption in DM both *form* and *formation* are derived by ***n*** merger to the root, making competition, as such, irrelevant for the VI of categorizers. As a result, we cannot appeal to competition with *to form* to exclude *to formation*.

[12] A sole account of primary compounds within DM is available in Harley (2009b), where the structure proposed is as in (i), and where, presumably, a verbal structure underlying to *wallpaper* would involve the merger of a zero-realized ***v*** node, either as in (iia) or as in (iib). It remains entirely unclear, however, why *wallpaper* can merge with ***v***$_Ø$ while *math teacher* or *mass destruction* cannot:

i. [***n***$_Ø$ [[√WALL]√PAPER]] → [√PAPER -***n***$_Ø$ [[√WALL]~~√PAPER~~]]

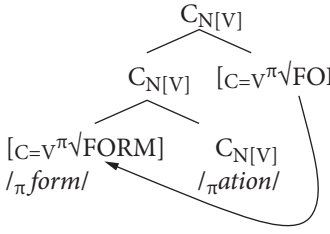
ii. a. [√PAPER -***n***$_Ø$ [[√wall]~~√PAPER~~]] → [***v***$_Ø$ [√PAPER -***n***$_Ø$ [[√WALL]~~√PAPER~~]]] →
[√PAPER -***n***$_Ø$-***v***$_Ø$ [~~√PAPER~~-***n***$_Ø$ [[√WALL]~~√PAPER~~]]
b. [***v***$_Ø$ [[√WALL]√PAPER]] → [√PAPER -***v***$_Ø$ [[√WALL]~~√PAPER~~]]

(32)

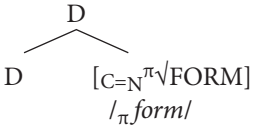
	A	B	C
a.	$[_{v}[\sqrt{\text{CRYSTAL}}]\ \boldsymbol{v}_{ize}]$	$*[_{n}[_{v}[\sqrt{\text{CRYSTAL}}]\ \boldsymbol{v}_{ize}]n_{\emptyset}]$	$[_{n}[_{v}[\sqrt{\text{CRYSTAL}}]\ \boldsymbol{v}_{ize}]\ \boldsymbol{n}_{ation}]$
b.	$[_{n}[\sqrt{\text{GOVERN}}]\ \boldsymbol{n}_{ment}]$	$*[_{v}[_{n}[\sqrt{\text{GOVERN}}]\ \boldsymbol{n}_{ment}]\boldsymbol{v}_{\emptyset}]$ $*[_{v}[_{a}[_{n}[\sqrt{\text{GOVERN}}]\ \boldsymbol{n}_{ment}]\ \boldsymbol{a}_{al}]\ \boldsymbol{v}_{\emptyset}]$	$[_{v}[_{a}[_{n}[\sqrt{\text{GOVERN}}]\ \boldsymbol{n}_{ment}]\ \boldsymbol{a}_{al}]\ \boldsymbol{v}_{ize}]$

But suppose we assume that there are no zero-realized C-functors, thereby excluding both (18) and (19), and opting for the contextual categorization representations in (20). An interesting contrast now emerges between, e.g., /$_{\pi}$*formation*/ and /$_{\pi}$*form*/$_{\text{N}}$. In both cases, the root $^{\pi}\sqrt{\text{FORM}}$ is rendered category-equivalent contextually. In both cases, the C-equivalent root $^{\pi}\sqrt{\text{FORM}}$ spells out identically (stress notwithstanding) as /$_{\pi}$*form*/. Within /$_{\pi}$*formation*/, however, /$_{\pi}$*form*/ is rendered V-equivalent by the $C_{N[V]}$ to be realized as /$_{\pi}$*ation*/. In contrast, in /$_{\pi}$*form*/ it is N-equivalent, as defined by (some) nominal ExP-segment (e.g., D):[13]

(33) a.



b.



With these configurations in place, accounting for (22)–(24) becomes entirely straightforward. Consider first the items in (17). Crucially, no C-functors are in presence. Rather, these are cases very much like (33b), with a root embedded directly under some ExP-segment and thus rendered categorially-equivalent to the Categorial Complement Space of the relevant Extended Projection. *A*, *the*, or *three*, by assumption ExP-segments of {Ex[N]}, would thus render roots such as $^{\pi}\sqrt{\text{SALUTE}}$, $^{\pi}\sqrt{\text{JUMP}}$, or $^{\pi}\sqrt{\text{FLOOR}}$ N-equivalent. *Will,* infinitival *to*, or PST, all ExP-segments of {Ex[V]}, will all equally successfully render roots such as $^{\pi}\sqrt{\text{DANCE}}$, $^{\pi}\sqrt{\text{FLOOR}}$, and $^{\pi}\sqrt{\text{LAMP}}$ V-equivalent, thereby deriving the alternation. Such an alternation is possible for the forms in (17), however, precisely because roots have no inherent category and can thus in principle be rendered C-equivalent to any CCS. This, however, is *not* the case for the forms in (22)–(23), which are all categorical already. *Salutation* already *is* an N, by virtue of being headed by $C_{N[V]ation}$; *encase* already *is* a V, headed by $C_{V[N/A]\text{-}en}$ etc.. In these cases, the roots $^{\pi}\sqrt{\text{SALUTE}}$ and $^{\pi}\sqrt{\text{CASE}}$ having already merged with a C-functor, have already been rendered C-equivalent, and are now embedded within a larger, categorially specified constituent. But if phonologi-

[13] And see Borer (2013) on the adjunction in (33a).

cally unmarked C-functors are not attested in English, and zero-marked noun–verb alternations are *never* mediated by affixation, then it follows that, e.g., /$_{\pi}$*acidify*/ cannot be an instantiation of a noun, quite simply because it is already V, by virtue of /$_{\pi}$*ify*/, itself the realization of a $C_{V[N]}$ functor. If now embedded under, e.g., D, it would become N-equivalent, and a clash would emerge resulting in ungrammaticality. As such, the ungrammaticality of /$_{\pi}$*acidify*/as N is exactly on a par with its ungrammaticality if embedded, e.g., under /$_{\pi}$*ity*/, by assumption an instantiation of $C_{N[A]}$ (offensive categorial clash enboxed and highlighted):

(34) a. *[D [**C=N** [C=N $^{\pi}\sqrt{}$ACID] $C_{V[N]/ify}$]] **the acidify*

b. *[$C_{N[A]/ity}$ [**C=A**[C=N $^{\pi}\sqrt{}$ACID] $C_{V[N]/ify}$]] **acidificity/*acidifity*

Acidify could, of course, merge with some instance of $C_{N[V]}$. However, in the absence of phonologically null instantiations for such functors, the presence of such a functor would be phonologically detectible. The result is, of course, licit, giving rise to *acidification* as well as to *acidifying*, both with a straightforward structure.

A similar account is readily available for the compounds in (24), once we consider the fact that it is the head of the compound, rather than the compound as a whole, that is categorially crucial. Because, e.g., $^{\pi}\sqrt{}$STAND is a root devoid of category, it is equally comfortable in a V-equivalent and an N-equivalent context, giving rise to both a nominal and a verbal licit instantiation of *grandstand*. Because *teacher* and *destruction* are nouns headed by (phonologically overt) C_N functors, spelling out as /$_{\pi}$*er*/ and /$_{\pi}$ *ation*/ respectively, embedding *mass destruction* or *math teacher* within a V-equivalent context would result in a clash and in ungrammaticality, as (35) illustrates:[14]

(35) a. [D [$_{C=N}$ [wall] $^{\pi}\sqrt{}$PAPER]] [T [$_{C=V}$ [wall] $^{\pi}\sqrt{}$PAPER]]
b. [D [$_{C=N}$ $ER_{N[V]}$ [$_{C=V}$ [math] $^{\pi}\sqrt{}$TEACH]] *[T [$_{C=V}$ $ER_{N[V]}$ [$_{C=V}$[math] $^{\pi}\sqrt{}$TEACH]]

Concluding this particular argument, note that the challenge here for proponents of zero categorizers is to explain why it is that such categorizers systematically fail to merge with overt affixes. There are, most certainly, restrictions on the co-occurrence of affixes that must be captured within any approach and which, presumably, could be stated within any of the approaches so far outlined (see especially Fabb 1988 and Plag 1999, as well as discussion in Borer 2013). However, the challenge here is to explain why such a generalization should hold for *all* zero categorizers, regardless of their syntactic properties, insofar as neither zero N and zero V categorizers can merge with any overt affixes. Within Distributed Morphology, this is extremely

[14] Although by and large orthogonal to the argument here, care was nonetheless taken to avoid examples of verbal compounds which could be argued to emerge from the back-formation of synthetic compounds (i.e., *to hand shake* but **math teach*).

puzzling, given the fact that the phonological realization of Vocabulary Items should be altogether orthogonal to their syntactic and hierarchical properties. From that perspective, the fact that ***n*** and ***v*** display identical distributional restrictions exactly when the Vocabulary Item they correspond to is null is difficult to explain. For Lexical Phonology and Morphology, matters are further complicated by the fact that the affixes not only belong to different categories, but also to different levels, and are therefore, by assumption, distinct not only syntactically, but also morphologically, semantically and phonologically. Why, then, should they display the same distributional restrictions? Needless to say, none of these complications emerge if one adopts a contextual approach to the categorization of roots, coupled with the absence of zero realizations for C-functors.

6.3.3 Zero categorizers: The problem of deverbal nominals

Grimshaw (1990) observes that Ø-deverbal nominals in English are largely excluded as AS-nominals (Argument Structure Nominals, Grimshaw's Complex Event Nominals). The generalization does have its exceptions, and thus the nouns in (36) can be used as AS-nominals, although they are homophonous with their verbal instantiation. Nonetheless, the existence of such exceptions pales in comparison with the overwhelming validity of the claim for a huge, productive class of nouns with invariant verbal correlates, which are systematically barred as AS-nominals (see (37) for a small subset of the relevant nouns, and (38) for the illustration that they cannot be AS-nominals):[15]

(36) *change* (*and exchange*), *release, use, murder, discharge, endeavor, abuse, access, consent, resolve*.

(37) (*an*) *admit;* (*an*) *arrest; bite*(*s*)*;* (*a*) *break; cause*(*s*)*;* (*a*)*chase; climb*(*s*)*;* (*a*) *descent; export*(*s*)*;* (*a*) *fall;* (*a*) *float;* (*a*) *follow-up;* (*a*) *frown;* (*much*) *hate;* (*the*) *hold; (the) import;* (*a*) *jump;* (*a*) *kill;* (*some*) *kiss;* (*a*) *laugh;* (*the*) *lick;* (*a*) *lie down; lift*(*s*)*;* (*a*) *look;* (*little*) *love;* (*a*) *make;* (*some*) *mock;* (*a*) *move;* (*every*) *raid;* (*a*) *ride;* (*a*) *rock;* (*a*) *roll; run*(*s*)*;* (*a*) *scream;* (*a*) *sit-in;* (*a*) *smile;* (*a*) *smoke;* (*a*) *stand;* (*a*) *take;* (*a*) *talk;* (*a*) *think;* (*a*) *touch;* (*a*) *turn;* (*a*) *twist;* (*a*) *view;* (*a*) *walk;* (*a*) *whisper;* . . . (and see throughout for many more examples)

[15] (36) is from Newmeyer (2009) who lists 11 such (valid) cases but claims the existence of 'literally dozens', although he does acknowledge that "*the majority—perhaps the large majority—of* AS-nominals *are morphologically complex*", attributing it to historical reasons. His overall conclusion is that the form of AS-nominals or any of their properties can be neither predicted nor correlated with the verbal source, and hence must be listed.

Importantly, focusing on the cases in (36) leaves without any explanation whatsoever the picture in (37). Here we have a productive, systematic, pervasive phenomenon of 'deverbal' underived nouns all of which absolutely do not allow for AS-nominal syntax, in spite of the fact that many of them denote a (simple) event and have a Content that is extremely event-friendly. Listing the nouns in (36) as AS-nominals may indeed help explain their properties but it will be doing so at the expense of any hope of capturing the generalization which underlies the properties of the massive class of nouns in (37). For comments on how to accommodate the exceptional morpho-phonological nature of the cases in (36), see Borer, (2013).

(38) *the walk of the dog for three hours
*the dance of the fairy for a whole evening
*the (gradual) fall of the trees for two hours/in two minutes
*the salute of the officers by the subordinates
*the frown of the director for seven minutes
*the raid of the town in order to retrieve the prisoners

We note, in augmenting the solidity of Grimshaw's original observation, that the absence of AS-nominal instantiation for the nouns in (37) is in actuality extremely surprising, given the fact that most of these nouns maintain an extremely close Content relationship with their corresponding verbal instantiation, and the fact that most of them can, indeed sometimes must, denote a (simple) event (cf. 39)—all factors which would seem to encourage an AS-nominal formation, but the latter is, nonetheless, almost without exceptions barred. For completeness sake, we note that AS-nominals based on the same root are readily available with overt nominal affixation:

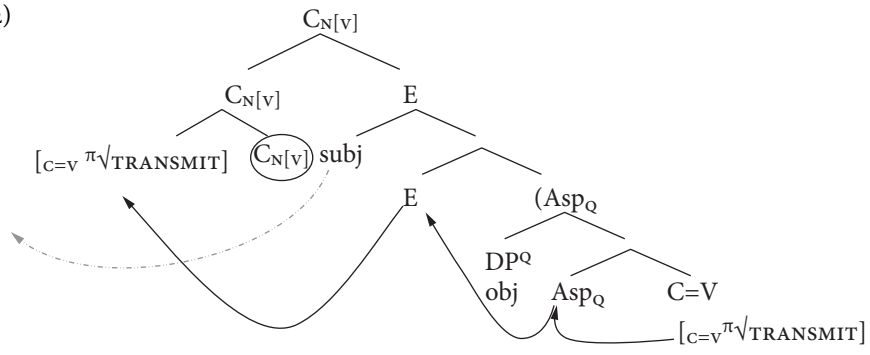
(39) the *walk/dance/kiss/salute/touch/view/smoke/scream/roll* lasted several hours
the *arrest/bite/fall/raid/talk/kill/sit-in/turn/smile* took place at 5 a.m.

(40) the walking of the dog for three hours
the dancing of the fairy for a whole evening
the (gradual) falling of the trees for two hours (multiple events)
the saluting of the officers by the subordinates
the viewing of the results by the visiting committee

(41) the importation of goods from China in order to bypass ecological regulations
the salutation of the officers by their subordinates

In Borer (1993, 1999, 2013) I argue in some detail that AS-nominals must include verbal structure. A schematic structure of an AS-nominal is in (42) with Asp_Q and E event-related nodes, by assumption ExP-segments of {Ex[V]} (immaterial structural details omitted):

(42)



Crucially, none of the relevant properties of AS-nominals follow from the specific spell-out properties of the circled C-functor in (42), quite regardless of whether spells out as /$_{\pi}$*ation*/ (*transmission*) or as /$_{\pi}$*al*/ (*transmittal*) or /$_{\pi}$*ance*/ (*transmittance*), or, for that matter, as /$_{\pi}$*ing*/ (*transmitting*). Rather, the properties of AS-nominals derive from the fact that an event complex, itself consisting of ExP-segments of a verbal Extended Projection, is embedded under some $C_{N[V]}$.[16] Given the orthogonal nature of the realization of $C_{N[V]}$, we note, there is little reason from the structure in (42), as such, to exclude a zero realization of $C_{N[V]}$. Had there been such a possible realization, little would need to change about the structure. Differently put, should it turn out to be the case that $C_{N[V]}$ in (42) *must* correspond to an overt phonological instantiation, the reason for that requirement could not be reduced to the structure of (42). What *is* patently clear, however, is that unless zero categorizers are excluded in English, the systematic exclusion of the nouns in (37) as AS-nominals becomes impossible.

And indeed, excluding the nouns in (37) as well as countless others like them as AS-nominals is a result that cannot be derived in accounts which subscribe to zero categorizers, quite independently of the structure in (42). Neither Kiparsky (1982a, 1997) nor Marantz (1997, 2010) or Harley (2009a,b) can capture this overwhelming generalization. Nor can it be captured by Chomsky's (1970) original execution.

Consider first the account put forth by Kiparsky (1982a, 1997). In Kiparsky's system, deverbal $Ø_N$ merges at Level I, but so do, at the very least, nominalizers such as *-ation*$_N$, *-al*$_N$, and *-ance/ence*$_N$.[17] This fact in and of itself, then, cannot be somehow used to derive the absence of AS-nominal reading of nominals zero-derived from verbs. On the other hand, denominal $Ø_V$ merges at Level II. If all cases in (37) were cases of verbs derived from nouns, and, crucially, if one maintains the generalization that AS-nominals must be derived from verbs, then the exclusion of zero AS-nominals could follow. Specifically, in such cases, verbalizing of a listed noun would take place at Level II, with the consequence that subsequent nominalizing could only be available with Level II nominalizers, e.g., *-ing*, but not with $Ø_N$, and nor, for that matter, with *-ation*, *-al* or *-ance*/*ence*:

(43)	$[_N$pass]	→ $[_V[_N$pass] $Ø_V]$ —*→	$[_N[_V\ [_N$pass] $Ø_V]\ Ø_N]$
	listed form	Level II affix	*Level I affix

Of course, the immediate problem to such an account would be the fact that the forms in (37) do not bar 'zero' nominalization (if such exists) across the board—they only bar it in the context of AS-nominals. If, indeed, all of these are derived verbs,

[16] There are, in fact, semantic and syntactic differences between $C_{N[V]}$, a bleached syntactic operator that may spell out, at the very least, as /$_{\pi}$*ation, ence, ment, al*/, and $ING_{N[V]}$, which is a semantic as well as a syntactic operator. These differences, however, are by and large orthogonal to our purpose here. The reader is referred to Borer (2013) for a detailed discussion.

[17] The status of *-ment* is unclear insofar as it displays mixed level diagnostics.

then across the board, one would have to assume that the basic form is a nominal one, and that e.g., *walk*, *hate* or *think* are all cases in which the verbal instantiation derives from the nominal one. It is hard to see, in fact, that in a system such as this English could afford too many underived verbs, with the possible exception, of course, of *endeavor; consent*, and other members of the list in (36), which would thus stand as the sole class of underived verbs in English. To this rather implausible consequence, we should add the fact that at least some of the forms under consideration do allow nominalization with {*-ation*} (e.g., *salute, form, import, export*), and hence must already be verbs at Level I, raising anew the question of why, at least in *these* cases, $\emptyset_N$ suffixation couldn't give rise to AS-nominals. Finally, we note that the claim that all unmarked noun–verb alternations in English are cases of verbs derived from nouns comes extremely close to arguing that there is, indeed, a root, but, contrary to the claim put forth here or in Distributed Morphology, it is nominal in nature (and on this claim, see specifically Hale and Keyser, 1993, as well as Acquaviva, 2008, this volume).

Turning now to Chomsky (1970) (as well as Marantz, 1997), we note that as by assumption in these executions the morpho-phonological complexity of root instantiations in distinct categorial contexts is syntactically irrelevant, whether a root spells out as *form* or as *formation* in a nominal context cannot be expected to give rise to any syntactically meaningful results, making any statement of the actual difference impossible.

Within executions which involve the merger of roots with categorial labels and which do allow such categorial labels to be phonologically null, excluding *form* as an AS-nominal but including *formation*, or, for that matter, excluding *run* but including *running*, cannot be accomplished. Ignoring potentially intermediate functional nodes or matters of execution otherwise orthogonal to the main issue under discussion, (44) is, as far as I can see, an exhaustive list of all possible root–categorizer combinations that may yield a derived nominal (and where *aff* is a theory neutral reference to a phonologically overt affixal realization):

(44) a. ***Nouns derived from Verbs***

$[_N\ n$	$[_V\ v$	[√ROOT]]]
$n_\emptyset$	$v_\emptyset$	
n_{aff}	$v_\emptyset$	
$n_\emptyset$	v_{aff}	
n_{aff}	v_{aff}	

b. ***Nouns derived from Roots***

$[_N\ n$	[√ROOT]]
$n_\emptyset$	
n_{aff}	

None of these representations predicts syntactic differences based on the phonological realization of affixes as overt or null. If one subscribes to the view that AS-nominals must be derived from verbs, then the structures in (44b) would, presumably, be excluded as AS-nominals. This, however, would only yield the exclusion of the nouns in (37) as AS-nominals with the added assumption that ***n***

may only spell out as Ø when it merges with roots but not when it merges with ***v***, whether $\boldsymbol{v}_{\emptyset}$ or $\boldsymbol{v}_{\boldsymbol{aff}}$ or, for that matter, that $\boldsymbol{n}_{\emptyset}$ may not merge with any affix, thereby ruling out all representations in (44a) and reducing the problem to the one already noted in subsection 6.3.2. Either way, it is clear that the only potential solution would involve some special statement about phonologically null categorial nodes, contingent not on their syntax, but on their phonology, thereby setting them apart from phonologically overt categorial labels and raising the obvious question concerning their usefulness and their theoretical cost. We add, in this context, that proposing that zero categorizers may only merge with roots makes it that much more pivotal to justify their existence, insofar as, by assumption, they could only merge where contextual categorization would otherwise be available.

Consider now a contextual categorization system, coupled with the claim that English doesn't have zero categorizers. If AS-nominals must include a verbal structure, as in (42), then the exclusion of the nouns in (37) as AS-nominals follows straightforwardly from the fact that they do not contain a verbal projection. Rather, they are roots in a nominalizing context, with no additional structural complexity. They are, in other words, truly mono-morphemic, and whatever relationship they hold to their verbal counterparts is mediated through the existence of a common root and not through direct derivational relationship.

A verbal constituent, in turn, can only emerge from a root in V-equivalent contexts. Such contexts involve either verbal ExP-segments, such as E and Asp_{Q}, or a C-functor with a verbal CCS, Considering again the structure in (42), the root embedded under E and Asp_{Q} is per force V-equivalent. It further follows that such a V-equivalent constituent must be nominalized in order for a derived AS-nominal to emerge. In the absence of Ø realizations for such nominalizers, such nominalizations must be overt, directly leading, again, to the conclusion that the forms in (37) cannot possibly be AS-nominals. The unfolding of such a derivation is in (45):

(45) a. $[\quad {}^{\pi}\sqrt{\text{FORM}}]$

b. $[_{\text{E}}\ [_{\text{C=V}}[{}^{\pi}\sqrt{\text{FORM}}]\ [_{\text{ASP}}\ [_{\text{C=V}}\ {}^{\pi}\sqrt{\textit{FORM}}]\ [_{\text{C=V}}\ {}^{\pi}\sqrt{\textit{FORM}}]]]$

c. $[_{\text{N}}\ [{}^{\pi}\sqrt{\text{FORM}}]\text{-}\text{C}_{\text{N[V]}}\ [_{\text{E}}\ [_{\text{C=V}}{}^{\pi}\sqrt{\textit{FORM}}]\ [_{\text{ASP}}\ [_{\text{C=V}}\ {}^{\pi}\sqrt{\textit{FORM}}]\ [_{\text{C=V}}\ {}^{\pi}\sqrt{\textit{FORM}}]]]]$

$/_{\pi}\textit{ing}/ \rightarrow /_{\pi}\textit{forming}/$

$/_{\pi}\textit{ation}/ \rightarrow /_{\pi}\textit{formation}/$

$*/_{\pi}\emptyset/ \rightarrow */_{\pi}\textit{form}/$

6.3.4 Zero categorizers: The selection problem

The English default past tense marking, *-ed*, is entirely systematically the only one available for overtly derived verbs (see also Embick, 2010). There are no overt verbal derivatives that take either *-Ø* past tense (plus potential stem allomorph), *-t/-d*, the other Vocabulary Items available in Halle and Marantz (1993) for past tense marking. Put differently, 'irregular' past tense marking in English is only available for morpho-phonologically mono-morphemic forms.

The very same situation holds for English plural marking. When compared with past tense, the variety of plural forms in English is in actuality quite a bit bigger, allowing for a (putative) -Ø coupled with a stem allomorph (*men, women, feet, geese, fish, sheep*, etc.); *-en*, likewise associated with potential stem allomorphs (*oxen, children*, etc.), and the default *-s*, but also a variety of originally Latin or Greek plural forms such as *-i* (*foci, loci*), *-a* (*data, phenomena*), and others. Nonetheless, the only plural form associated with overtly derived nouns, including those derived with suffixes of a Latino-Greek origin such as *-logy*, is the default *-s*. In other words, just as in the case of past tense, 'irregular' plural marking in English is only available for morpho-phonologically mono-morphemic forms.

From the point of view of root-based systems, this is in actuality a true bonanza, insofar as it provides direct evidence for the existence of roots. Specifically, the default marking on all derived forms follows directly from the claim, hardly controversial, that all instances of selection are local, coupled with the assumption that all unpredictable phonological information is associated specifically with roots. The reason derived forms are restricted to a default instantiation, then, is that the relationship between the root and the inflectional marking is not local, a fact illustrated in (46) for past tense and in (47) for plural (the representations deliberately sidestep the question of whether inflection is morphemic):[18]

(46) $[_{\text{T-PST}}[_{\mathbf{V}}[^{\pi}\sqrt{\text{INSTANT}}]C_{\text{V[N]-}ate}]\text{-}ed]$
$[_{\text{T-PST}}[_{\mathbf{V}}[^{\pi}\sqrt{\text{ACID}}\ ]\ C_{\text{V[N]-}ify}]\text{-}ed]$
$[_{\text{T-PST}}[_{\mathbf{V}}[^{\pi}\sqrt{\text{HARMON}}]\ C_{\text{V[N]-}ize}]\text{-}ed]$
$[_{\text{T-PST}}[_{\mathbf{V}}[^{\pi}\sqrt{\text{FAT}}]\ C_{\text{V[A]-}en}]\text{-}ed]$
$[_{\text{T-PST}}[_{\mathbf{V}}\ C_{\text{V[A/N]}en\text{-}}[^{\pi}\sqrt{\text{CASE}}]]\text{-}ed]$

(47) $[_{\text{CNT-(PL)}}[_{\mathbf{N}}[^{\pi}\sqrt{\text{FORM}}]C_{\text{N[V]-}ation}]\text{-}s]$
$[_{\text{CNT-(PL)}}[_{\mathbf{N}}[\ ^{\pi}\sqrt{\text{DEFER}}]\ C_{\text{N[V]-}ment}]\text{-}s]$
$[_{\text{CNT-(PL)}}[_{\mathbf{N}}[^{\pi}\sqrt{\text{SISTER}}]\ C_{\text{N[N]-}hood}]\text{-}s]$
$[_{\text{CNT-(PL)}}[_{\mathbf{N}}[^{\pi}\sqrt{\text{REFER}}]\ C_{\text{N[V]-}al}]\text{-}s]$
$[_{\text{CNT-(PL)}}[_{\mathbf{N}}[^{\pi}\sqrt{\text{ABLE}}]\ C_{\text{N[A]-}ity}]\text{-}s]$
$[_{\text{CNT-(PL)}}[_{\mathbf{N}}[^{\pi}\sqrt{\text{WEAK}}]\ C_{\text{N[A]-}ness}]\text{-}s]$
$[_{\text{CNT-(PL)}}[_{\mathbf{N}}[^{\pi}\sqrt{\text{READ}}]C_{\text{N[V]-}ing}]\text{-}s]$
$[_{\text{CNT-(PL)}}[_{\mathbf{N}}[^{\pi}\sqrt{\text{FELLOW}}]\ C_{\text{N[N]-}ship}]\text{-}s]$
$[_{\text{CNT-(PL)}}[_{\mathbf{N}}[^{\pi}\sqrt{\text{WRITE}}]\ C_{\text{N[V]-}er}]\text{-}s]$

The problem which now emerges for models subscribing to the existence of zero categorizers is immediately evident. Consider the specific set of assumptions made in Distributed Morphology, and recalling, specifically, that by definition *any* categor-

[18] At least some of the C-functors in (46)–(47) have a semantic function as well as a syntactic one, and hence, in actuality, $\text{ER}_{\text{N[V]}}$, $\text{SHIP}_{\text{N[N]}}$ etc. The matter is set aside here for expositional reasons. See Borer (2013) for a fuller discussion.

ized stem is complex, at the very least bi-morphemic, regardless of whether the node that it merges with is phonologically overt or null—see (19a–b), repeated here as (48):

(48) a. $[_{\boldsymbol{n}}[\sqrt{\text{WALK}}]\ \boldsymbol{n}_{\emptyset}]$ $[_{\boldsymbol{v}}[\sqrt{\text{WALK}}]\ \boldsymbol{v}_{\emptyset}]$
b. $[_{\boldsymbol{n}}[\sqrt{\text{CHAIR}}]\ \boldsymbol{n}_{\emptyset}]$ $[_{\boldsymbol{v}}[\sqrt{\text{CHAIR}}]\ \boldsymbol{v}_{\emptyset}]$

In turn, DM *does* assume, entirely correctly, in my view, that markers such as past tense merge with verbs, and not with roots, and that presumably markers such as plurality merge with nouns, and not with roots. But if every verb and every noun are complex, then it follows that the relationship between the root and the past tense marker, or between the root and the plural marker, is no more local in the case of *run* than it is in the case of *instantiate*, and no more local in the case of *foot* than it is in the case of *formation* or *fellowship*. For DM, specifically, the relevant representations are thus as in (49) and (50) respectively, where any statement concerning the local selection of non-default inflection is impossible to make:[19]

(49) a. [[√INSTANT]-***v***]-PST]]; [[√ACID] -***v***] -PST]]; [[√FAT] -***v***]-PST]]…
↓ ↓ ↓ ↓ ↓ ↓
VI: *-ate* *-ed* *-ify* *-ed* *-en* *-ed*

b. [[√RUN] -***v***]-PST]]; [[√BEND]-***v***] -PST]]]; [[√WALK]-***v***] -PST]]
↓ ↓ ↓ ↓ ↓ ↓
VI: Ø Ø Ø *-t* Ø *-ed*

(50) a. [[√FORM]-***n***]-PL]]; [[√DEFER]-***n***]-PL]]; [[√SISTER]-***n***]-PL]]…
↓ ↓ ↓ ↓ ↓ ↓
VI: *-ation* *-s* *-ment* *-s* *-hood* *-s*

b. [[√GOOSE]-***n***]-PL]]; [[√OX]-***n***]-PL]]; [[√BOOK]-***n***]-PL]]
↓ ↓ ↓ ↓ ↓ ↓
VI: Ø Ø Ø *-en* Ø *-s*

The failure of local selection in such cases is noted and discussed in Embick (2003, 2010). By way of attempting to solve the problem, Embick suggests that locality is sensitive to phases, rather than strict locality. By assumption, the first phase is that which involves categorization, and so, for, e.g., *run*, the first phase is [[√RUN]-***v***]. The irregular past tense selected by *run*, in turn, is adjacent to this first phase, making it local in the relevant sense. We note that the solution does predict that, e.g., *verbalize* would have a regular past tense, insofar as there is, by assumption, a phase

[19] Lexical Phonology and Morphology fares somewhat better on this front, but still faces problems, a matter to which I return in section 6.4.5.

(boundary) between *-al* and *-ize*. The solution nonetheless fails insofar as it fails to distinguish, within its own terms, between [[√RUN] -$\boldsymbol{v}_{\emptyset}$]-PST] or [[√GOOSE]-$\boldsymbol{n}_{\emptyset}$] -PL]] on the one hand, and [[√ACID] -$\boldsymbol{v}_{\textit{-ify}}$]-PST] or [[√BREV]-$\boldsymbol{n}_{\textit{ity}}$] -PL]] on the other hand. Both *brevity* and *acidify*, by assumptions internal to DM, define first phase, and there is little to distinguish them structurally from *run* or *goose*. And yet, irregular inflection is excluded. In fact, insofar as the selection of *-ify, -ate, en-, -ment, -ance, -al*, and so forth is root-conditioned, they *must* merge with roots, and the output defines first phase, were irregular inflection, by this logic, cannot be excluded.[20]

In contrast, the selection properties thus far outlined present no problem whatsoever to a system of contextual categorization. We already noted that in XSM, unlike DM, morpho-phonological constituent structure goes hand in hand with morpho-syntactic constituent structure, and specifically, that morpho-phonological terminals are not branching syntactic constituents. While in Distributed Morphology both $form_{V}$ and $form_{N}$ are syntactically complex and neither PST nor PL can be adjacent to the root, for contextual categorization, both are terminals categorized without the addition of syntactic complexity, as in (51):

(51) a. $[_{\text{CNT-(PL)}}\ [_{\text{C=N}}$ run]] $[_{\text{T-PST}}\ [_{\text{C=V}}$ run]]
b. $[_{\text{CNT-(PL)}}\ [_{\text{C=N}}$ foot]] $[_{\text{T-PST}}\ [_{\text{C=V}}$ foot]]

By the same logic, derivatives with overt categorizers *are* complex (see (46) and (47), with some examples repeated below):

(52) $[_{\text{T-PST}}[_{\mathbf{V}}[^{\pi}\sqrt{\text{LIQUI}}]C_{\text{V[N]-}\textit{ify}}]\textit{-ed}]$
$[_{\text{T-PST}}[_{\mathbf{V}}[^{\pi}\sqrt{\text{FAT}}]\ C_{\text{V[A]-}\textit{en}}]\textit{-ed}]$
$[_{\text{CNT-(PL)}}[_{\mathbf{N}}[\ ^{\pi}\sqrt{\text{DEFER}}]\ C_{\text{N[V]-}\textit{ment}}]\textit{-s}]$

Given these representations, we are in an excellent position to state the distribution of irregular inflection locally and as encoded directly with roots. In (51), the relationship between the roots and PST or PL *is* local, while it is not in (52), where a categorizing C-functor dominates the root. The formal advantage, we note, derives directly from the fact that given contextual categorization, a root may be categorized, or, more accurately, rendered category-equivalent, without increasing its hierarchical complexity. Not so in a system that assumes zero categorizers, where, for principled formal reasons, a root is *never* adjacent to inflection marker (a segment

[20] Insofar as the derivations in (49b) and (50b) involve, in DM, the realization of PST as Ø following a Ø realization of $\boldsymbol{v}$ and $\boldsymbol{n}$, the system as a whole cannot exclude consecutive zero-affixation, nor can it maintain that zero-realized morphemes may only merge with the root. Neither one of these assumptions, then, can be appealed to, to exclude the relevant cases in (44a) or to delimit the structural possibilities in (16). The choice for proponents of zero categorizers in resolving this matter is thus rather limited, and must be based, fundamentally, in treating zero affixation, syntactically every bit as real as overt affixation, as nonetheless transparent to root selection, and has this property in parallel in both its $\boldsymbol{n}$ and $\boldsymbol{v}$ instantiations.

of an Extended Projection, in the terminology developed here, or functional node, as conventionally perceived).[21]

6.3.6 Interim summary: Root-based systems

The account put forth here shares with Distributed Morphology the claim that roots may merge with potentially affixal category labels, C-functors in the present account. The two accounts differ, however, in their approach to the categorization of roots. As noted already, roots, in and of themselves, not only do not have a category inherently in DM, but remain a category-less terminal in the structure. As such, then, no categorial generalizations can ever be applied to nodes that are co-extensive with roots, and all categorial operations by definition must involve a complex structure. Because, by assumption, the terminal occupied by the root is never categorized, zero-realized categorizers become inevitable, for otherwise, there is quite simply no way of associating e.g., √WALK, with a verbal structure, eventually to spell out (in the context of PST) as /$_{\pi}$*walked*/.

Zero-realized categorizers, however, come with a heavy cost, as just illustrated. Conceptually, they result in an across-the-board failure to correlate morpho-phonological complexity with syntactic complexity, thereby depriving us of our primary window into the internal structure of complex words. In the absence of strict mapping between morpho-phonological complexity and structure, what could bear on the existence, or lack thereof, of structures such as (53a) when compared with structures such as (53b), and what, if anything, would be the consequences of structural proliferation?

(53) a. [$_{v}$ ***v*** [$_{n}$***n*** [$_{v}$ ***v*** [$_{n}$***n*** [√FORM]]]]] (*form*) [$_{a}$ ***a*** [$_{v}$ ***v*** [√FORM]]] (*formal*)
b. [$_{v}$ ***v*** [√FORM]] (*form*) [$_{a}$ ***a*** [√FORM]] (*formal*)

The matter is particularly tricky within DM because of the assumption (see Marantz 2000, Arad 2003, Marvin 2002) that non-compositionality is delimited by the domain of (first) categorization. *Formal* as in (53b) is predicted to be non-compositional, but *formal* as in (53a) must be compositional. However, in the absence of any independent evidence for the complexity of structure postulated, the claim runs the danger of being circular.

Empirical problems abound as well, and we noted several, all requiring treating zero-realized categorizers as distinct, across the board, from realized categorizers, and with identical distinctions holding for both verbal and nominal instantiations, in and of itself already a surprising and disturbing result. Unlike overt categorizers, they may not attach to already derived forms and appear licit only when merging directly with the root; unlike overt categorizers, they cannot give rise to AS-nominals, and unlike overt

[21] Note that at least in principle, both N and V derived from the same root could show irregular inflection. The situation, however, appears not to be attested, e.g., *run–ran*, but *runs*; *foot–feet* but *footed*. I return to this matter briefly in section 6.4.5 below.

categorizers, they do not create an opaque domain for selection. Altogether, then, and across their categorial instances, zero affixes very much behave like they are simply not there. What evidence, then, can be brought forth to bolster their existence, and how compelling is that evidence?

A detailed argument for the existence of zero categorizers is, as it turns out, put forth in Kiparsky (1982a, 1997) within a specific level-ordering based hypothesis, that of Lexical Phonology and Morphology. Some problems for that approach were already pointed out in this section, insofar as these were common to all systems which do not incorporate contextual categorization. No attempt to do away with zero categorizers in English could possibly be complete, however, without challenging the substantial argumentation in their favor mounted by Kiparsky (1982a, 1997). A fuller critique of Kiparsky's arguments is undertaken in Borer (2013). A summary of that critique is outlined below.

6.4 Against English zero categorizers, part II: Kiparsky (1982a, 1997)

Kiparsky, as already noted, argues for (at least) two zero categorial affixes in English, one which derives nouns from verbs and which is a Level I, and another one which derives verbs from nouns, and which is a Level II. Insofar as there are distinct zero V and zero N categorizers, Kiparsky's account tallies with that of Distributed Morphology. However, in contrast with DM as well as with the account put forth here, he assumes a directional derivational relationship - Ø-derived nouns and Ø-derived verbs are not derived independently from roots, but from forms that are already categorial. In turn, the major force of his argument derives from the distinct properties of $Ø_N$ and $Ø_V$. We note, specifically, that in a system that assumes no zero categorizers in English and which rather subscribes to the view that both verbal and nominal instantiations of unmarked noun–verb alternations are categorized contextually, such differences, if present, are unexpected and in principle problematic, unless they can be explained by appealing either to general differences between nouns and verbs, or to the properties of the functor which merges with the root.

For Level Ordering-based Morphology systems, of which of which Lexical Phonology and Morphology is the most articulated execution, the most fundamental claim is that (English) affixes can be divided into (at least) two distinct pools, with distinct semantic, morphological and phonological properties associated with each, and with one of these pools, Level I affixes, ordered before (=inside of) the second, Level II affixes. Some of the crucial properties of each pool are listed in (54). Sample affixes of each level are in (55):[22]

[22] The explanatory value of the classification has, in turn, come under considerable criticism in the past two decades, beginning, specifically, with Fabb (1988) and continuing with Plag (1999). See Borer (2013) for some additional discussion.

Forms in parentheses are in reference to affixes whose Level status is either mixed or in dispute.

(54)

LEVEL I* (+ *boundary*) *affixes	***LEVEL II* (# *boundary*) *affixes***
Merge with words and non-words	Merge only with words
May or may not be productive	Productive
Output may or may not be compositional	Output compositional only
May or may not involve irregular inflection	Regular inflection only
Affect (some) phonological rules	Do not affect (same) phonological rules
assimilation	no assimilation
stress shift	no stress shift
Tend to be Latinate	Tend to be Germanic
Tend to merge with Latinate bases	

(55)

C_V	(*-ize*), *-ify, -ate*	*-en, en-, be-,* (*-ize*)
$C_{N[V]}$	*-ation, -al, -anc*(*y*)/*enc*(*y*), (*-ment*)	*-ing,* (*-ment*)
C_A	*-ous,* (*-able*), *-al*	*-en*/*ed, -er, -ful, -less* (*-able*)
$C_{N[A]}$	*-ity*	*-ness*
		N–N, A–N compounds

6.4.1 Two Denominal Verbs in English?

Consider now the paradigm in (56)–(57), and examining specifically the relationship between the verbal and nominal instantiations of *hammer, paint, tape,* and *lacquer:*

(56) a. I hammered the nail in (with my sandal).
b. I painted the wall (with lacquer).

(57) a. I taped the picture (*/#with pushpins).
b. I lacquered the wall (*/#with paint).
c. Screw the fixture on the wall (*/#with nails).

By way of explaining the contrast, Kiparsky (1997) notes that the Content of *paint* appears to be considerably more flexible than that of *lacquer,* and hence it is possible to *paint* with something other than *paint*. Similarly, the Content of *hammer* is considerably more flexible than that of *tape*, and hence it is possible to *hammer* with things which are not a *hammer*. The anomaly of the instrumental specification in (57), it would appear, emerges from the fact that *taping* can really only be done with *tape*, and *lacquering* can only be done with *lacquer*. But why should that be so? The reason, Kiparsky argues, is that the verbs *tape* and *lacquer* are derived from the corresponding nouns with a Ø-verbal suffix which is a Level II suffix. Level II affixes merge with words and are compositional. On the other hand, *hammer* and *paint*, as nouns, are derived from the corresponding verb at Level I. Level I affixation may be non-compositional. Specifically, the Content of the verb *hammer* is not actually *USE A HAMMER*, but rather is entirely compatible with a broader Content, say *EXERTING FORCE BY REPEATED BLOW BY MEANS OF A HEAVY INSTRUMENT*. The Content of the verb *paint* clearly is not actually *COVER WITH PAINT*, but rather *COAT WITH DECORATIVE LIQUID FINISH*. In turn, because *tape* and *lacquer* are

derived from nouns at Level II, they are, so to speak, accountable to the Content of the original nouns *TAPE* and *LACQUER*, resulting in the relevant restrictions.

As Harley and Haugen (2007) show, however, the judgments in (57) appear to result from a certain misclassification of the canonical Content of *tape, lacquer*, and *screw*, respectively. Thus consider the examples in (58)–(59):

(58) a. Lola *taped* the poster to the wall with Band-Aids/mailing labels.
b. *Screw* the fixture on the wall with nails—
OK, provided that the nails are twisted to affix the fixture (Harley and Haugen 2007)

(59) Bento boxes of the week: *lacquered* with bitter persimmon juice (Google search)

Thus while the infelicity of (57a) may, indeed, emerge from the fact that the verb *tape* cannot mean *AFFIX* in general, neither does *hammer* mean *HIT* in general. Rather, *hammer* means something like *HIT DIRECTIONALLY WITH A HEAVY OBJECT*, and *tape* means something like *AFFIX WITH STICKY STRIPS*. Similarly, *lacquer*, likewise, is not strictly *COVER WITH LACQUER* nor is it *COVER WITH DECORATIVE FINISH*, but rather something like *CREATE A GLOSSY HARD FINISH*. Once this is granted, it emerges that there is quite simply no evidence from the paradign in (56)–(57) for two distinct Ø-categorizers operating at two different levels.[23]

6.4.2 Productivity?

$[_V[N]Ø_V]$, a Level II operation, is very productive, Kiparsky claims. Not so $[_N[V]Ø_N]$, which is a Level I operation. We note, however, and with (37) in mind, that the non-productivity of $[_N[V]Ø_N]$ is highly questionable. By way of some specific illustrations, note that the following are all possible, and some are clearly a recent addition (the *Boston Globe* ran a headline with *an embed* three weeks after the beginning of the first Gulf War):

(60) a. *an* *àdmit* (a newly admitted student)
b. *an* *admìt* (a record of a positive admission decision *or* a newly admitted student)
c. give it *a* *think* (note the absence of blocking from *thought*)
d. a responsive *read* (proof-reading process, from a magazine editorial board)
e. there are people on that list who deserve *a* *listen*
f. a scheduled (court) *hear*
g. *an* *embed* (a journalist 'embedded' in a US military unit)

[23] And see Anagnostopoulou and Samioti (this volume) for a discussion of this paradigm from a different angle.

6.4.3 Stress shift?

V→N alternations may give rise to stress shift, as in (61a), Kiparsky observes, but not so the N→V alternations in (61b):

(61) a. permít_V→ pérmit_N; progréss_V→ prógrèss_N admít_V→ ádmit
b. páttern_N → *pattérn_V

If Level II affixation is involved in N→V, and if stress shift is applicable only to the output of Level I affixation, the absence of stress shift in the change from N→V vs. it possibility in V→N cases would be explained.

The claim, however, is only compelling if we take it for granted that *permit* and *pattern* are listed with one categorial instantiation, and the second one is derived from it. If we assume, instead, that both nominal and verbal instantiations are derived from a root (or a compound root), e.g., as in (62), stress *shift*, as such, is non-existent, and what we have in its stead is distinct stress patterns in English, rather systematically, for compound verbs and compound nouns, coupled with the relatively plausible claim that prefixed forms, such as those in (61a), are at least phonologically compound-like in nature. We note in this context that the Compound Stress Rule in English would systematically give rise to initial stress, although by assumption compounding is Level II, making the assignment of initial stress to nouns a poor test for Level I affixation altogether.

(62) a. {Ex[V]} $[_{C=V}{}^{\pi}\sqrt{\text{GRESS}}]$ [***pro***] → $[_{C=V}$[***pro***]$[_{C=V}{}^{\pi}\sqrt{\text{GRESS}}]$ [***pro***]] → /$_{\pi}$*progress*/
b. {Ex[N]} $[_{C=N}{}^{\pi}\sqrt{\text{GRESS}}]$ [***pro***] → $[_{C=N}$[***pro***]$[_{C=N}{}^{\pi}\sqrt{\text{GRESS}}]$ [***pro***]] → /$_{\pi}$*prógress*/
Compound Stress Rule↵

Further support for a directional treatment of the stress alternation emerges, Kiparsky claims, from the existence of triplets such as those in (64). What is notable about these triplets is the emergence of a second instantiation of the verb, but with the nominal stress pattern:

(63) compóund_V cómpound_N cómpound_V
permít_V pérmit_N; pérmit_V

Such triplets, Kiparsky argues, must have the analysis in (64). The original verb, *permít*, merged with $Ø_N$ at Level I with stress shift resulting. The second occurrence of the verb, as $\textit{pérmit}_V$, on the other hand, clearly takes the nominal form as its input, and being a Level II formation, does not allow for the change of stress, giving rise to $\textit{pérmit}_V$:

(64) a. $[\text{compóund}]_V$ → $[[\text{cómpound}]_V\ Ø_N]_N$(LEVEL I) →$[[\text{cómpound}]_V\ Ø_N]_N Ø_V]_V$(LEVEL II)
b. $[\text{permít}]_V$ → $[[\text{pérmit}]_V\ Ø_N]_N$(LEVEL I) →$[[\text{pérmit}]_V\ Ø_N]_N Ø_V]_V$(LEVEL II)$_V$

Note now that intuitively, it is of course entirely obvious that the emergence of *pérmit*$_V$ is a result of the existence of *pérmit*$_N$, with its altered Content. The question, however, is whether the conclusions drawn by Kiparsky (1982a) are inevitable. Consider, specifically, the possibility that the nominal instantiation of *pérmit*$_N$.is derived as in (62b), and as such, *not* from the verbal instantiation *permít*, but rather directly from the root. Suppose now that as related to its altered Content, /$_\pi$*pérmit*/ has become relisted as a separate root (roughly, *OFFICIAL SANCTION*). Alongside the derivation from root-particle compounding depicted in (62b), then, the language has now acquired the roots $^\pi\surd$PÉRMIT (and $^\pi\surd$CÓMPOUND), phonological representations inclusive of penultimate stress, which, we expect, would now proceed to occur as both V- and N-equivalent, but where the existence of the root-derived nouns in (65b) is obscured by the existence of the nouns /$_\pi$*pérmit*/ and /$_\pi$*cómpound*/ as derived through (62b), and as of yet, with an identical Content:

(65) a. {Ex[V]} [$_{C=V}{}^\pi\surd$PÉRMIT] → /$_\pi$*pérmit*/; {Ex[V]} [$_{C=V}{}^\pi\surd$CÓMPOUND] → /$_\pi$*compound*/

b. {Ex[N]} [$_{C=N}{}^\pi\surd$PÉRMIT] → /$_\pi$*pérmit*/; {Ex[N]} [$_{C=N}{}^\pi\surd$CÓMPOUND] → /$_\pi$*cómpound*/

6.4.4 An argument from ordering

We noted briefly, in footnote 10 the existence of cases such as (66):

(66) a. *a portion, the condition, rations, a motion, the air condition, positions, a proposition, the audition, questions, sanctions*

b. *to portion, to condition, to ration, to motion, to air condition, to position, to proposition, to audition, to question, to sanction*

The cases, at least prima facie, appear to contradict the claim made in section 6.3.2, according to which unmarked noun–verb alternations in English are only attested with underived forms, by assumption roots, and in fact, Kiparsky (1982a) explicitly suggests that such cases lend support for postulating a $\emptyset_V$ affix at level II, where it follows the affixation of *-ation*, the latter a clear Level I affix. Using a similar rational, $\emptyset_V$ merger with compounds, as in (25) (repeated here as (67)) argues for $\emptyset_V$ ordering after compounding, itself a Level II operation, and hence for $\emptyset_V$ as a Level II affix:

(67) a. *wardrobe* b. *to wardrobe*
blackboard *to blackboard*
wallpaper *to wallpaper*
grandstand *to grandstand*
network *to network*

A closer look at these cases reveals, rather surprisingly, that the only *-ation*-ending forms which undergo unmarked noun–verb alternation are forms which in their

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nominal instantiation do not have a coherent verbal source from which they could possibly be (synchronically) derived. These and similar cases could be divided into two groups. For cases in (68a), the subtraction of *-ation* gives rise to an otherwise unattested root verb. In (68b) are cases where the subtraction of *-ation* leaves behind an English verb, but with a Content that is clearly divorced from that of the complex form in (66):[24]

(68) a. (*port-*), *cond-*, *rat-*, *mot-*
b. *to pose, to propose, to audit, to quest,* (*to port*)

That the forms in (66) which *do* appear to have a 'source' are not in any way whatsoever related to that putative source can be seen from the complete impossibility of using them as AS-nominals with the Content of the source verb. Thus there is no way the underlined nouns in (70) could possibly be the AS-nominals expressing the events in (69). In fact, the nominals in (70) are altogether ungrammatical as AS-nominals, barring aspectual modifiers, argumental *by*-phrases, and purpose clauses:

(69) a. The model posed in front of the camera for several hours (in order to give herself a chance to deliver the correct photograph).
b. Mary proposed a solution in two minutes (in order to please her boss).
c. The authorities audited my tax records for several weeks (in order to establish my guilt).
d. John quested for love for years (in order to become happy).

(70) a. ⋆the position of the model in front of the camera (*for several hours) (*in order to . . .)
b. *Mary's proposition of a solution (in two minutes) (in order to . . .)
c. *the proposition of a solution by Mary
d. *The authorities' audition of my tax records (for several weeks) (in order to . . .)
e. *the audition of my tax records
f. *the question for love (for years) by adult males
⋆= with the intended reading as events associated with (69a)

The ungrammaticality of the AS-nominals in (70) is quite noteworthy, because the relevant forms here behave very differently from other cases of non-compositional

[24] To the best of my ability to ascertain, and with the possible exception of *to inconvenience*, unmarked V–N alternations are not attested with the nominal realizations /$_{\pi}$*al*; *ance–ence*/, both of them Level I (e.g., **to recital*; **to nuisance*). Nor are there any with /$_{\pi}$*ity*/, similarly Level I. *-age* is sporadically attested with *bandage* and *voyage* and possibly also *mortgage* and *baggage*. Interestingly, the most common instance involves *-ure*, with, at the very least, *to puncture, to gesture, to picture, to culture, to conjecture*, and *to structure*. In all these cases, the verbal source is extremely difficult to spot, and in fact, cases in contemporary English with a transparent verbal source for *-ure* are altogether rare, suggesting that its affixal instantiation may very well be a historical matter.

derived nominals, of which there are many. *Transmission* or *contraction* (as in birth-related spasm), to exemplify, certainly come with Content no longer computable from the Content of either *transmit* or *contract*. Nonetheless, the form has retained its ability to express a fully compositional event, as (71) illustrates:

(71) a. Mary's transmission of the documents (in two minutes) (in order to . . .)
b. the slow contraction of the rubber saddle for three hours

It thus emerges that the forms in (66) with the putative sources in (68b) have gone beyond acquiring a non-compositional Content alongside their compositional one, and rather proceeded to altogether lose their 'internal verb' altogether. Put differently, they are no longer complex in any meaningful sense. Unsurprisingly, and given the absence of a discernible verb altogether, the cases in (68a) do not give rise to AS-nominals either, as (72) illustrates:

(72) a. *the motion of the model in front of the camera (*for several hours) (*in order to . . .)
b. *Mary's condition of the furniture (in two minutes) (in order to . . .)
c. *the ration of the food by the government

Rather, the forms in (66) have the exact same cluster of properties typically found with category-less roots. They exhibit an unmarked alternation with verbal forms, conditioned solely by Extended Projections, they display no internal complexity and may not function as AS-nominals, and finally, they require an overt C-functor in order for an AS-nominal to emerge. In view of this, there is little reason to believe that /$_{\pi}$*ation*/ as it occurs on the forms in (66) is an instance of $C_{N[V]}$, or that these forms are complex and derived. I will assume, rather, that their historical emergence notwithstanding, for present day English, they have been re-listed as roots, thereby accounting for the fact that their synchronic properties are, indeed, those that we fully expect from roots.

The status of the forms in (66) in present day English notwithstanding, the strongest argument against allowing the merger of a $Ø_V$ with a derived noun comes from the observation that the N–V alternation in English is extremely productive, and that practically any mono-morphemic noun in English has a homophonous verbal correlate. As a result, proponents of Level II $Ø_V$ would surely want to postulate it as an extremely productive affixation rule. And yet the cases in (66) are quite rare and clearly not productive. Nor is there a clear account, for proponents of Level II $Ø_V$, for the fact that $Ø_V$ is only available to derivatives that have clearly lost all residue of their compositional Content. Why should $Ø_V$ merge with *question*, but not with *formation*? Why should it merge with *section*, but not with *admission*, or *admittance*, for that matter? In short, there is simply no possible

explanation, as based on the Level II status of $\emptyset_V$, for the complete impossibility, in English, of the forms in (73):[25]

(73) **to construction*, **to availability*, **to performance*

Turning to the compounds in (67), we note that analyzing the verbal variant as involving $\emptyset_V$ suffers from exactly the same problem. I noted already in discussing this matter that alongside the grammaticality of the verbal instantiations in (67), we have the contrastively ungrammatical cases in (24), repeated here as (74):[26]

(74)	a. *math teacher*	b. **to math teacher*
	mass destruction	**to mass destruction*
	law enforcement	**to law enforcement*
	fellow traveler	**to fellow traveler*
	piano recital	**to piano recital*
	word formation	**to word formation*

In Kiparsky's system, there is simply no reason for this contrast. Compounds are a Level II process, as is the affixation of $\emptyset_V$, and compound formation is oblivious to the derivational history of its head. There is no difference, compound-wise, between *chicken wire* and *word formation*. That it is exactly the compounds with a nominally marked head that block verbalization, but not others, follows from a contextual categorization, but cannot be derived by appealing to the properties of a Level II $\emptyset_V$.[27]

6.5 Conclusion

This chapter was devoted to the development of a categorization system in which syntactic category is exclusively a prerogative of functors. Pivotal, here, was the perception of categorial labels as corresponding to divisions within the syntactic space. Our C-functors thus define an outer spatial domain of a particular type (e.g., N, V), as well as a complement space of a particular type (likewise N, V), a function

[25] Note that insofar as we can happily come up with *transformationalization*, preventing $\emptyset_V$ merger with compositional derived nouns by *blocking* appears rather dubious.

[26] There is a direct argument here against Lowenstamm's view (this volume) of (effectively Level I) categorizers as roots, and with, e.g., *acceptance* having the structure in (i) (and see also de Belder, 2011):

i. $[_{\boldsymbol{n}}[[\sqrt{\text{ACCEPT}}]\ [\sqrt{\text{ANCE}}]]\ \boldsymbol{n}_{\emptyset}]$

Specifically, while *wallpaper* would clearly allow the structure in (iia), *acceptance*, or for that matter *piano recital*, would be barred in that very same (putative) structure:

ii. a. $[_{\boldsymbol{v}}[[\sqrt{\text{WALL}}]\ [\sqrt{\text{PAPER}}]]\ \boldsymbol{v}_{\emptyset}]$
b. $*[_{\boldsymbol{v}}[[\sqrt{\text{ACCEPT}}]\ [\sqrt{\text{ANCE}}]]\ \boldsymbol{v}_{\emptyset}]$
c. $*[_{\boldsymbol{v}}[[\sqrt{\text{PIANO}}]\ [[\sqrt{\text{RECITE}}][\sqrt{\text{AL}}]]]\ \boldsymbol{v}_{\emptyset}]$

[27] In conjunction with the claim, in Kiparsky (1982a), that irregular inflection is always Level I, an interesting prediction emerges, within LPM, relative to the derivational properties of V–N pairs such as *shit* or *spit*, with their irregular past tense realization. For a detailed discussion of these issues, see Borer (2013).

we notated as $C_{X[Y]}$. A slightly distinct but nonetheless contextual categorization emerged in the contexts of Extended Projections, viewed as a set of (consecutive) nodes with a shared CCS, and where the formal equivalent of a C-functor is not a single ExP-segment (e.g., D, T), but rather the set as a whole, defining an outer spatial domain of a particular type (e.g., what is typically referred to as DP) and defining its complement space as a particular type (say N).[28]

Crucially, within the system developed here, syntactic categories are never inherently associated with non-functors, e.g., roots, an assumption shared with Distributed Morphology. Unlike the categorization system developed in DM, however, contextual categorization effectively amounts to the denial of the existence, in any syntactic tree, of uncategorized domains. Roots, then, may not have an inherent category, but within any syntactic structure they will per force be co-extensive with a categorized domain.

Of some significance, now, is the fact that in a system of contextual categorization, zero-realized functors are certainly not excluded in principle, and whether or not they do exist is fundamentally an empirical, rather than a theoretical issue. Not so, however, for (hierarchy-based) systems that do not subscribe to contextual categorization, be they root based, as is DM, or lexeme-based, such as LPM. To wit, if contextual categorization is absent, and assuming √BREAK to be a root, zero functors are essential to derive both [$_N$ break] and [$_V$ break]. Similarly, absent contextual categorization, the lexeme *break* is either N or V. Either way, a zero functor is essential to derive its second categorial instantiation. By contrast, in a system that subscribes to contextual categorization, zero functors are not necessary, quite simply because √BREAK will emerge as N in the context of, e.g., D, and as V in the context of T without any need for C-functors.

To the extent that zero categorizers are essential in any hierarchical system that doesn't subscribe to contextual categorization, compelling arguments against the existence of such zero categorizers in English per force favors contextual categorization. Much of this chapter was devoted to showing that regardless of whether non-categorial roots are assumed (DM) or not (LPM), assuming zero categorizers in English results in substantial empirical and formal costs, and few, if any, theoretical or empirical advantages. The conclusion, then, is inevitable. If the structure of complex words is to be integrated into a hierarchical system, categorization must be contextual.

Beyond contextual categorization, in itself a theoretically significant issue, a consequence of much greater significance emerges as well. Crucially, in the absence of zero categorizers and with contextual categorization, a considerably higher level of correspondence can be maintained between morpho-phonological complexity and

[28] And see Borer (2013) for a fuller perspective on the categorial properties of Extended Projections.

hierarchical structure, altogether an extremely encouraging result. Morpho-phonological cues, much more so than any other linguistic factor, remains the first and foremost markers of relatedness, not only within the phonological domain, but within the syntactic and semantic domain as well. By Occam's razor, any model that takes the structural significance of such cues seriously should, then, be favored.