

Anton Karl Ingason. Forthcoming. Phases/cyclicity. Artemis Alexiadou, Ruth Kramer. Alec Marantz, Isabel Oltra-Massuet (eds.). In *The Cambridge Handbook of Distributed Morphology*, Cambridge University Press.

Phases/cyclicity

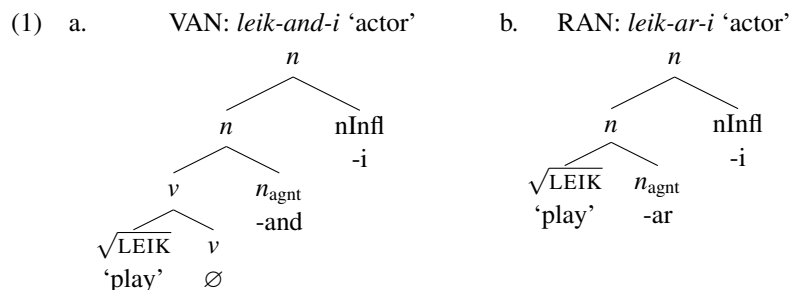
Anton Karl Ingason
antoni@hi.is

1 Locality and Distributed Morphology

1.1 Different ways of manipulating lexical categories

In Distributed Morphology (henceforth, DM), a structure is verbal because it has a category-defining morpheme of the verb type, the verbalizer v , and a structure is a nominal because it has a category-defining morpheme of the noun type, the nominalizer n . A line of research in DM attempts to synthesize certain pre-DM discoveries about locality and word formation by hypothesizing that category-defining morphemes are cyclic nodes in the sense of phase theory (Chomsky 2000, 2001). Such an analysis, if successful, has a pleasing potential to offer a unified explanation of empirically diverse linguistic phenomena. This article presents the shape of phase theory in Distributed Morphology. Relevant examples are examined as well as the implications of this approach for linguistic theory in general.

Before giving more context, let us present one analysis where phase locality is proposed to have a crucial role. According to Ingason and Sigurðsson (2015), Icelandic *leikandi* ‘actor’ and *leikari* ‘actor’, differ in their phase structure, as shown in (1). We refer to the two structures as verb-derived agent nominals (VAN) and root-derived agent-nominals (RAN). The subscript on n_{agnt} refers to an agentive flavor of n .



We will revisit this example and the motivation for the analysis. For now, we simply point out that the two words are remarkably similar, being synonyms with an apparently identical structure of phonologically realized morphemes, $\sqrt{\text{ROOT}}-n-nInfl$, where the label $nInfl$ is used for nominal inflection. The difference in analysis comes from the covert v -layer in (1a). The phonologically silent v is a category-defining morpheme,

such that the noun is built on top of a verb, and it is also the locus of a phase boundary and thus a locality intervener.

One of the essential precursors to phases in DM is the empirical split between phenomena that have been described as lexical vs. syntactic word formation in certain theoretical contexts. The study of this split led to a fruitful path of discovery and a theoretical understanding according to which the so-called “generative” lexicon, in a specific theoretical sense, played a central role. With the subsequent evolution of DM, in which there is no generative lexicon, the locality theory for syntax, phase theory, was proposed as an alternative theoretical tool to model this empirical split. The split has to do with how language manipulates lexical categories.

It is common for a word of a particular lexical category, i.e., verb, noun, or adjective, to have a counterparts of different categories such that two or more words appear to share a root. For example, the English verb *refuse* has the nominal counterpart *refusal*, with the two sharing the root $\sqrt{\text{REFUSE}}$. Processes that relate such pairs differ systematically with respect to productivity, and the way in which syntactic and semantic properties of one category correspond to the other. In an era during which any idiosyncratic aspects of language belonged in in the lexicon, a successful analytical tradition distinguished between lexical and syntactic word formation. Some of the less general ways of building words were morphological processes that took place in a generative lexicon and some of the more general ones were carried out by syntactic transformations. Chomsky (1970) analyzed the difference between how propositions like (2a) can be nominalized as gerunds (2b) or derived nominals (2).

- (2) a. John refused the offer. (Clausal proposition)
b. John’s refusing the offer. (Gerund)
c. John’s refusal of the offer. (Derived nominal)

While gerunds are generally a productive counterpart of any verb and manifest the syntactic properties of corresponding verbs, such as allowing adverbial modifiers (*eagerly refusing*) and accusative direct objects (*refusing the offer*), the derived nominals are more idiosyncratic and disallow adverbial modifiers (**eagerly refusal*) and realize the accusative object of the verb as an *of*-PP (*refusal of the offer*). This split led to an analysis according to which gerunds are the result of a syntactic word formation, i.e., syntactic transformations, and derived nominals result from lexical word formation, i.e., operations in the lexicon. This distinction was further developed by Wasow (1977) with additional empirical coverage, including the theory of adjectival vs. syntactic passives.

1.2 From category-specific locality edges to a syntax that goes all the way down

The status of phases/cyclicity in DM is linked to previous locality theories that proposed locality boundaries at special category-specific edges like the edge of a clause and the edge of a noun phrase. The term category is used here to refer to a syntactic distributional class of the type found in theories of phrase structure, like vP , DP , and CP . It

is useful to take a few steps back and review this context when when discussing phase locality in DM. The grammar of a language can link one place in a sentence to another. This is the case in displacement phenomena when a piece of syntax is interpreted in one place but pronounced elsewhere, like *the pasta* in (3).

- (3) The pasta has been eaten $t_{\text{the pasta}}$ by Cringer.

In (3), the pasta is interpreted as if it were the direct object of eat, but it is pronounced in the subject position of the passive verb. This basic example demonstrates action at a distance in syntax.

If elements are allowed to move, it is important to capture the empirical fact that not every element can move anywhere within a sentence. Therefore, it becomes useful to develop a locality theory of movement, stated in the most general terms possible. The theories of Subjacency and Barriers are milestones in this quest. Chomsky (1973, 1977), drawing on Ross (1967), proposed a Subjacency condition:

- (4) **Subjacency:**

A cyclic rule cannot move a phrase from position Y to position X (or conversely) in ... X ... [α ... [β ... Y ...] ...] ... X ..., where α and β are cyclic nodes. Cyclic nodes are S and NP

Subjacency implements one version of the idea that the edge of a verb phrase (or a clause-like element, S) and the edge of a noun phrase (NP) are special with respect to locality, i.e., they are cyclic nodes. While much can (and has been) said about the implementation details of such constraints, their main connection to the present discussion is that syntactic structures in any theory have edges and there is a long tradition of analyses that build on the idea that certain category-specific edges are special with respect to locality.

In the Barriers framework (Chomsky 1986), locality is imposed by (i) *barriers* as well as (ii) *minimality*. The barriers are the familiar categories, VP and CP, and they should not be crossed. Minimality implements the idea that a closer governor takes preference over a potential governor further away, subsequently relativized by Rizzi (1990); see also (see Boeckx and Grohmann 2004, 2007). In this theory, an element cannot move beyond a barrier without first moving to the edge of the locality domain (by adjoining to the barrier projection).

As such ideas evolved along with Minimalist Syntax and phase theory (Chomsky 2000, 2001), locality in syntax was linked to the independently motivated need for an abstract syntax to deliver its product to its interfaces with phonology and meaning. Structure was transferred to the interface, up to a phase edge, according to some algorithms, and the transferred material became inactive, like the material that used to be too deeply embedded to escape from a locality domain (in the sense of barriers/subjacency), and thus unavailable for action at a distance. In Chomsky's initial phase theory, there was a phase edge at the edge of a clause (CP) and the edge of a verb phrase (*v*P) in the sense of his framework at the time, a reincarnation of the category-specific locality edges of the Barriers framework. More precisely, C and *v*

were analyzed as phase heads, heads whose complements undergo Transfer (or Spell-Out) to the interfaces and are thus deactivated once conditions for Transfer are met. This kind of an analysis is embedded within a framework in which derivational timing is essential, and phase locality is thus not really about distance, but rather about which elements are active (or visible) at the time when they might be targeted by a process that moves them. We say that the invisible elements have been deactivated and at that point various operations cannot target them. We elaborate on visibility and deactivation in Section 2.1.

With phase theory, the cyclic domains for movement (phases) are equated with domains for interpretation and externalization. The notion of a phase becomes a locality domain for movement, interpretation, and externalization. This, as we will explore, finds a natural extension to morphology, particularly in a framework like DM, in which the realization of morphemes is an interface process.

It is worth noting at this point that Distributed Morphology does not depend on Minimalist Syntax and phase theory and many of the key ingredients of a DM approach to linguistic analysis can be applied within different analytical frameworks. However, DM assumptions can be fruitfully incorporated within a Minimalist Syntax and in practice, much current work in DM adopts some version of such a framework. How exactly DM and Minimalism fit together is an active research program and the status of phase theory in DM is no exception.

A key concept in DM, referred to as “syntax all the way down” or as the Single Engine Hypothesis (Halle and Marantz 1993; Embick and Noyer 2007) means that one type of structure building, the one that syntax employs, assembles all the structural pieces whether in phrases or in words. These are the morphemes and they are the terminal nodes of syntax. This contrasts with theories that propose a generative lexicon and a split between syntactic and lexical operations. Because the structure of words is built by syntax, just like the structure of larger phrases, there can be word-internal phase edges. Some important questions that arise include the following:

- (5) a. What are the phases in a DM phase theory?
- b. How do phases interact with morphophonological phenomena?
- c. How do phases interact with the interpretation of morphemes?
- d. How do the DM extensions fit with other perspectives on Chomsky’s phase theory?

This chapter aims to shed light on these issues. First, we outline the general shape of the DM phase theory in Section 2. Section 3 elaborates on the details of how the DM phase theory analyzes word-internal phase phenomena. Section 4 discusses implications of this theory for larger domains. In Section 5, we review some issues that arise when reconciling DM phases with other approaches to phase theory. Section 6 concludes.

2 The shape of DM phase theory

The present section presents the pieces that are at play in the DM phase theory and how they relate to phase theory in general

2.1 Category-defining morphemes as phase edges

Let us be more concrete about how phase theory in DM differs from other implementations of phase theory. We refer to the element that defines a phase edge as a phase head and because all the terminal nodes of syntax are morphemes in a this kind of a theory, a phase head must be a morpheme.

- (6) The syntactic atoms are morphemes. (Assumption)

Analyses vary in how precise they are about the definition of a morpheme, but morphemes in DM have the general property of being abstract elements that are realized at the interfaces of syntax with interpretation and phonology. One formal approach to the morpheme defines it as a partial function from keys to corresponding values (Ingason 2016).

(7) **Morpheme (definition)**

A morpheme is a partial function from the set of possible feature keys to the set of possible values for the same keys.

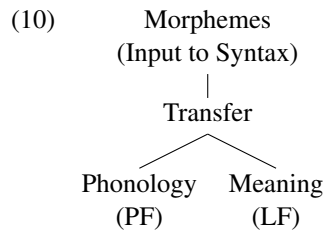
A key is the name (or identifier) of the feature in question. For example, in a feature theory that distinguishes between past and present tense using $[\pm\text{PAST}]$, the relevant key is PAST and the possible values that can correspond to this key are ‘+’ and ‘-’, for the past and present tense, respectively. The key-value terminology comes from computer science where these terms are commonly used to describe this kind of a data structure, often referred to as associative arrays or dictionaries. The definition in (7) is compatible with any organization of features that can be stated in terms of key-value pairs.

The structure of a morpheme is then as in (8). This representation does not include concrete manifestations of the morpheme that are realized in the course of the derivation. Notably, the morpheme does not have a sound form. This is not the only way to define a DM morpheme, and different formalizations can be adopted without derailing the present discussion of phases, yet it is illustrative to the extent that it demonstrates the abstract and realizational nature of the morpheme in this theory. A system that operates on morphemes can access their label/category, such as T for Tense. If the morpheme is defined for $[\pm\text{PAST}]$, the morpheme can be used to access that value. Its name/key is PAST and it can have the values ‘+’ or ‘-’.

- (8) $\{\langle\text{key1,value1}\rangle, \langle\text{key2,value2}\rangle, \dots\}$

- (9) $\{\langle\text{LAB,T}\rangle, \langle\text{PAST,+}\rangle\}$

The syntax is a system that manipulates objects like (9). It can put morphemes together via a Merge operation and establish relations between morphemes via an Agree operation. Because all the terminal nodes are morphemes, phase locality dictates which morphemes are visible to which other morphemes. Although nuances of what exactly constitutes visibility will remain open for discussion, DM-visibility of a morpheme means that the morpheme is accessible as a morpheme, i.e., a partial function if we use the definition in (7). In contrast, a morpheme that is not visible is not accessible as a morpheme and then we say it has been deactivated. It may have properties like a phonological form and some meaning, but retrieving and setting values of the partial function is not possible and operations like movement or agreement will therefore not work on it. An attempted application of an operation that looks for a person feature key, in the sense of (8), cannot target a morpheme that has been deactivated because that element is not a morpheme anymore at the relevant point in the derivation. This illustrates how the effects of phase theory are intertwined with (10) a Y-model of grammatical architecture, where the morphemes are the input and the post-Transfer output is a processed product of a different kind.



The DM architecture is realizational. Morphemes enter the derivation without a sound form and their phonological exponent is inserted derivationally late, at PF (Halle and Marantz 1993). Late insertion initially involved realizing sounds but late realization has evolved to also include late context-dependent insertion of semantic denotations at LF in a similar manner (Wood 2012, 2015; Myler 2014), thus formalizing a notion of contextual allosemy. The way in which a morpheme is pronounced and interpreted depends on its features as well as the syntactic context it appears in and phase locality imposes limitations on how the context can influence realization. In order for context to play a role, it needs to be local, and the information encoded in (8) is visible if it is phase local.

For the purpose of syntactic displacement, C is the most canonical phase head as the edge of the clause. In addition to C, Chomsky also included v in his initial inventory of phase edges. Our category-defining v in DM can be viewed as an element that corresponds to v in a non-DM minimalist framework, depending on further assumptions, some of which will be discussed below. In the context of an emerging research program where v was a phase-edge and category-defining mechanisms were at the center of distinguishing different types of word formation, Marantz (2001, 2007) pursued a system in which all category-defining heads were phase edges:

(11) **Phases**

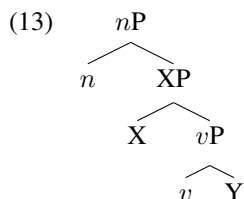
Category-defining heads, at least v , n , a and C , and possibly others, trigger Transfer of their complements; they are the phase heads. These phase heads are often realized as “derivational morphemes”.

The cyclic Transfer means that only a sub-part of the structure is visible (or active) at any given point. In this type of a theory, every syntactic terminal node is a morpheme, and cyclicity constrains interaction between morphemes. This constraint is known as the Phase Impenetrability Condition (PIC) in syntactic analysis and an important aspect of what Marantz was proposing was that the same PIC might be at work in word-internal phenomena. Following Embick (2010), we adopt the so-called PIC2, the second version of PIC proposed by Chomsky (2001); see Section 5 for discussion of different PIC types.

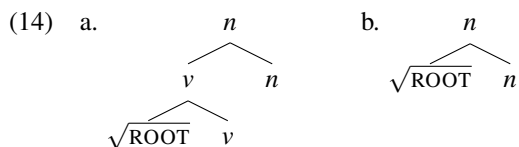
(12) **Phase locality (assuming PIC2)**

A phase head cannot see morphemes across the next phase head. A non-phase-head can see morphemes across (just) the next phase head.

According to PIC2, the complement of a phase undergoes Transfer when the next higher phase head is merged. This means that in structure (13), where n and v are the phase heads, n sees X and v , but it does not see Y . In contrast, X , a non-phase-head between n and v , sees v and it can also see Y past v (because the next higher phase head has not deactivated the complement of v yet).



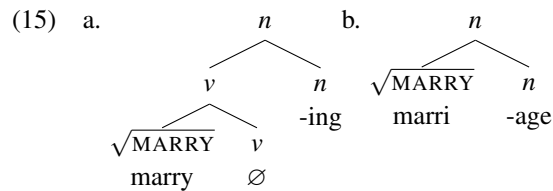
Analyzing category-defining heads as phase heads is particularly useful for the purpose of capturing the effect that inner derivational morphemes behave more idiosyncratically than outer ones. Some of the successful results of distinguishing between lexical and syntactic word-formation in earlier theories can be replicated by phase theory in cases where lexical word-formation is derived from a root and syntactic word-formation is derived from something that already has a lexical category. Consider the two types of nouns in (14).



Both of these are nouns externally and thus they have the syntactic distribution of a noun. However, phase theoretically, there is a crucial difference between the status of

the *n* morpheme that makes the word a noun in the two structures and which idiosyncratic effects we may expect from it. Idiosyncratic often means root-specific and in (14b), *n* sees the root, but in (14a), *n* does not see the root because *v* is an intervening phase head. This type of a contrast in phase structure should be motivated, of course. If we say that there is a *v* head inside a noun, and this yields the locality interventions we seek, the analysis is not insightful unless we can point to empirical side effects of the fact that the structure is a verb at a certain point in the derivation.

Let us consider two splits of type (14) and some evidence that makes them plausible. First, consider the difference between gerunds and derived nominals in English, and then the difference between root-derived agent nominals and verb-derived agent nominals in Icelandic.



The evidence for *v* in a gerund includes verb-like empirical properties like compatibility with verb-adjoined adverbs and accusative objects, as illustrated by the contrasts in (16) and (17), respectively (see Chomsky 1970; Marantz 1997).

- (16) a. Susan's eagerly marrying her girlfriend surprised me.
 b. *Susan's eagerly marriage her girlfriend surprised me.
- (17) a. Susan's marrying her surprised me.
 b. *Susan's marriage her surprised me.

If we assume a theory in which lexical categories are made by merging category-defining heads and we furthermore take this kind of evidence to indicate the presence of a *v* morpheme in a gerund, despite its lack of a phonological exponent, the *v* is now a motivated locality barrier. Thus, the idiosyncratic interactions of roots and suffixes in derived nominals are expected on phase-theoretic grounds because these morphemes see each other, and the lack of such interactions between the root and the suffix in gerunds is expected because they do not see each other as morphemes. An example of this is the diverse *n*-allomorphy that is attested in derived nominals as opposed to the absence of *n*-allomorphy in gerunds, shown in (18).

(derivied) nominal	gerund
marri-age	marry-ing
destruct-ion	destroy-ing
refus-al	refus-ing
confus-ion	confus-ing

The contrast in (18) and its empirical correlates are systematic to the extent that theoretical frameworks concerned with morphology will generally want to account for them with motivated theoretical distinctions rather than attributing them to coincidence. In a framework that proposes a need for a generative lexicon, such a contrast can be analyzed in terms of lexical vs. syntactic word-formation. In DM, especially when embedded within a general pursuit for unifying theoretical machinery, as amplified by Chomsky's Minimalist Program and subsequent further development, the independently developed theory of phase locality in syntax is a natural alternative. If morphological composition is a part of the syntax, syntactic locality affects morphemes and their realization.

2.2 How does DM improve phase theory?

Before elaborating on specific aspects of the DM phase theory, it is worth bringing up whether there is any general benefit to this whole enterprise. The phenomena under investigation had all been analyzed in some way before phase theory and DM were invented, so it is reasonable to ask why the combination of DM and phase theory are a better analytical foundation than the earlier theories. It turns out that the combination of the two novel theories is in some ways better motivated than each of the two novel theories in isolation.

For example, if we are only interested in displacement phenomena that are subject to Barriers, it is not entirely unfair to complain that phase theory sounds a bit like restating Barriers with new terminology. Also, the division between lexical and syntactic word formation accounted for some systematic differences quite elegantly before DM described the same differences in terms of inner and outer category-defining morphemes. However, the hypothesis that these phenomena derive from the same type of locality is strong and intriguing. If the same Transfer operation plays a role in syntactic movement and word-internal phonology, then the analysis of contextual allomorphy and segmental phonology can inform and constrain the analysis of the phrase structure and vice versa. The novelty in phase theory, compared to its predecessors, is to propose a single locality domain for movement, interpretation, and externalization. If this turns out to be well supported it has implications for the landscape of linguistics as a field. For example, a linguist who sets out to analyze palatalization in Icelandic, as we will in Section 3.2, may need to consider syntax and semantics in order to develop an appropriately informed analysis. DM is an interface theory and if the DM approach to phase cyclicity is on the right track, linguistic subfields like morphology, phonology, syntax, and semantics need each other more emphatically than ever before.

Furthermore, if we focus on phase theory from the point of view of syntax, some syntacticians may appreciate the added pressure and accountability that comes from making phase theory responsible for word-internal phenomena. It can be viewed as an industry of sorts within syntax to propose which heads are phases and which are not. A phase theory that also makes predictions inside words may be a more systematic enterprise than one that does not.

3 Word-internal phase phenomena

This section describes three types of word-internal phenomena that have been attributed to phase locality within a DM framework. First, we look at contextual allomorphy, then processes of segmental phonology within the word, and finally constraints on the interpretation of roots.

3.1 Phase locality and contextual allomorphy

Elaborating on the general picture drawn up in Section 2, Embick (2010) develops a theory of locality in DM that makes precise various properties of the system, in particular with respect to contextual allomorphy. In the simplest empirical case, there is a one-to-one relationship between an abstract morpheme with a specific set of features and the phonological exponent that realizes the same morpheme. There are, however, two prominent kinds of exceptions to this basic kind of a situation that morphological theory must account for. First, in the case of syncretism, two distinct morphemes (with related but different feature sets) are realized with the same phonological exponent and second, in the case of contextual allomorphy, the same morpheme (with the same feature set) can be realized with two or more different phonological exponents depending on the context in which the morpheme appears. For example, contextual allomorphy is attested in the English past tense, T [+PAST], which is realized with *-ed* in the context of $\sqrt{\text{WALK}}$, *walk-ed*, but with a *-t* in the context of $\sqrt{\text{BEND}}$, *ben-t*. The memorized relationship between a morpheme with specific features and its phonological exponent is formalized as a Vocabulary Item (VI). The context-dependent choice of a VI, i.e. contextual allomorphy, is constrained by (19) in this theory.

(19) **Phase locality and morphology** (Embick 2010)

Conditions on contextual allomorphy cannot be stated in terms of invisible (inactive) material.

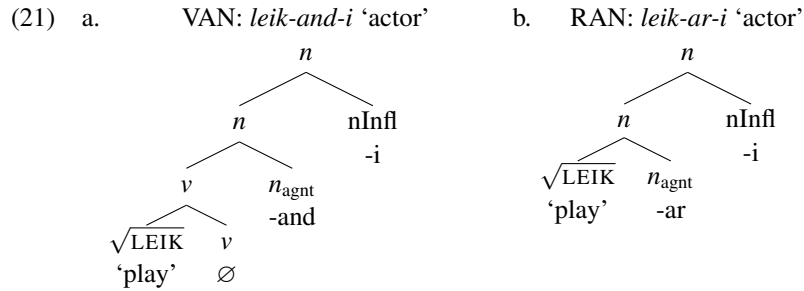
In this theory, VI's like the Icelandic ones in (20) encode the way in which morphemes are realized as sound. The example is simplified for illustration. Here, $\sqrt{\text{LEIK}}$ is the root of 'game, play, act' and $\sqrt{\text{HEST}}$ is the root of 'horse'.

- (20) a. nInfl [+MASC] \leftrightarrow -ur / { $\sqrt{\text{LEIK}}$, $\sqrt{\text{HEST}}$, ...} $\hat{\ } _$
 b. nInfl [+MASC] \leftrightarrow -i

These VI's analyze nominal inflection that appears as a suffix on nouns, adjectives and quantifiers, and for which we will use the label nInfl. They relate the feature +MASC (or $\langle \text{MASC}, + \rangle$ in the notation of (8)) to a default exponent for the weak nominative singular inflection *-i/* as well as a more specific *-ur/* exponent in the context of certain roots. This yields *leik-ur* 'game' when $\sqrt{\text{LEIK}}$ is nominalized and *hest-ur* 'horse' when $\sqrt{\text{HEST}}$ is nominalized, whereas a root like $\sqrt{\text{KASS}}$ 'box' surfaces as *kass-i* 'box'.

When considering phase locality, the identity of a root is crucially a fact about that morpheme and thus VI's like (20a) can only apply in situations where the root is phase-local to nInfl. Turning back to the Icelandic agent nominals for 'actor' in (1), repeated

as (21), the agentive nominalizer n_{agnt} in this analysis sees the root in (21b) whereas it does not in (21a). We refer to the two structures as verb-derived agent nominals (VAN), when v is present, and root-derived agent-nominals (RAN), when n combines directly with the root.



This contrast is similar to the difference between derived nominals and gerunds in English and therefore a distribution of phonological exponents similar to (18) is to be expected if the analysis is on the right track. We can indeed draw up table (22) with attested Icelandic agent nominals where the proposed root-derived ones (RAN) manifest contextual allomorphy in n_{agnt} that is absent in the verb-derived ones (VAN).

(22)

Root-derived	v -derived
leik-ar-i play-NMLZ-MASC.NOM.SG ‘actor’	leik-and-i play-NMLZ-MASC.NOM.SG ‘actor’
lækn-ir heal-NMLZ-MASC.NOM.SG ‘doctor’	lækn-and-i heal-NMLZ-MASC.NOM.SG ‘doctor, healer’
mord-ing-i murder-NMLZ-MASC.NOM.SG ‘murderer’	myrd-and-i murder-NMLZ-MASC.NOM.SG ‘murderer’
hugs-uð-ur think-NMLZ-MASC.NOM.SG ‘thinker’	hugs-and-i think-NMLZ-MASC.NOM.SG ‘thinker’

While curious to the eye, such a table is only an illusion if the proposed v -layer in the nouns with the *-and* exponent is not correlated with empirical properties of verbs. The evidence we reviewed for English gerunds is not available here because agent nominals do not in general permit adverbs or accusative objects. This is not necessarily surprising because their interpretation is quite different from gerunds, but it demands that we inspect other types of evidence.

Ingason and Sigurðsson (2015) present three types of facts that support this analysis. First, requirements for thematic arguments, made by the corresponding verbs, are inherited by agent nominals of the *-and* type.

- (23) (Context: John answers the door when somebody rings the doorbell and then he brings his mother to the door and introduces her to the visitors. They were not expecting visitors and did not know in advance why the visitors are here.)
- a. Þessir #(bók-a-)selj-end-ur vilja tala við þig.
 these #(book-LM-)sell-NMLZ.PL-MASC.NOM.PL want talk with you
 ‘These #(book) sellers want to talk to you.’
- b. Þessir (bók-a-)sölumenn vilja tala við þig.
 these (book-LM-)salesmen.MASC.NOM.PL want talk with you
 ‘These (book-)salesmen want to talk to you.’

The examples in (23) are evidence that the agent nominal with *-and*, realized as *-end* in the plural, inherits thematic requirements for a direct object theme from the verb *selja* ‘sell’, even though this is not generally the case with all agent nominals. The elaborate context is needed to ensure that the object of ‘sell’ is not recoverable from the context. Such recoverability also plays an important role for implicit objects of verbs.

- (24) Mary and John are here to sell.

The acceptability of the English example in (24) depends on how easy it is in a given context to guess what Mary and John are selling. In many situations, this is a slightly odd thing to say out of the blue because the object of *sell* is missing, but it is perfectly normal if the couple just walked into the office of a real estate agent. For insights and findings on object omission, see Glass (2014, 2020) and her references.

The second kind of evidence comes from noun-verb correspondances. For every agent nominal with *-and*, there exists a corresponding verb with the same root. This is not always the case for agentive nominalizers in Icelandic, such as those whose phonological exponent is *-ar*.

(25) RAN	Non-existing verb	Noun with the same root
<i>apótekari</i> ‘pharmacist’	* <i>apóteka</i>	<i>apótek</i> ‘pharmacy’
<i>borgari</i> ‘citizen’	* <i>borga</i>	<i>borg</i> ‘city’
<i>pönkari</i> ‘punk rocker’	* <i>pönka</i>	<i>pönk</i> ‘punk music’
<i>sjóari</i> ‘seaman’	* <i>sjóa</i>	<i>sjór</i> ‘sea’

The *n*-exponent *-ar* is common in Icelandic agent nominals. The examples in (25) show that a number of nouns with *-ar* do not correspond to any Icelandic verb. This contrast between *-and* and *-ar* supports the view that *-and* is associated with a verbal structure.

The third kind of evidence comes from looking at the phonological form of the root in nouns analyzed as VAN vs. RAN. The generalization emerges that *-and* nominals always occur with the exact same form of the root as the corresponding verb, but this is not always the case for *-ar* nominals.

- (26) a. v. *drep-a* ‘kill’
 n. *dráp* ‘killing’ – n. *dráp-ar-i* ‘killer’

- b. v. *gef-a* ‘give’ – n. *gef-and-i* ‘giver’
n. *gjöf* ‘gift’ – n. *gjaf-ar-i* ‘giver’
- c. v. *kvelj-a* ‘torment’
n. *kvöl* ‘torment’ – n. *kval-ar-i* ‘tormentor’
- d. v. *leys-a* ‘solve, untie, loosen’ – (leys-and-i ‘solver’)
n. *lausn* ‘liberation’ – n. *lausnari* ‘redeemer, liberator’
- e. v. *ljúg-a* ‘lie’
n. *lyg-i* ‘lie’ – *lyg-ar-i* ‘liar’
- f. v. *svíkj-a* ‘betray’
n. *svik* ‘betrayal’ – n. *svik-ar-i* ‘traitor’
- g. v. *syngj-a* ‘sing’
n. *söng-ur* ‘song’ – *söng-v-ar-i* ‘singer’
- h. v. *syrgj-a* ‘mourn’ – n. *syrgj-and-i* ‘person who mourns’
n. *sorg* ‘sorrow’ – n. *sálu-sorg-ar-i* ‘lit. soul-sorrow-er; priest, a person who helps others when they mourn or are in trouble’

Mismatches are widely attested between the phonological form of the root in a verb and nouns that share the same root as shown in (26). For example, the verb *gefa* ‘give’ in (26b) has nominal counterparts like *gjöf* ‘gift’ and *gjaf-ar-i* ‘giver’, both of which diverge from the verb in the realization of the root. Yet, the *-and* nominal is simply *gefandi* ‘giver’, whose root is exactly like the verb. This distribution yields further support to the proposed VAN vs. RAN distinction.

These findings illustrate how a theory that takes interfaces and realization seriously motivates an analysis of a canonically morphological phenomenon as sensitive to not only the facts that look like traditional morphology but also the meaning properties of the pieces that build the word, pieces that are the same ones that are central to the theory of syntax. The integration of *v* in Chomsky’s phase theory and word-internal morphology is an avenue for discovery, should the approach prove fruitful. We will now take this inquiry a step further by examining segmental phonology within the same agent nominals.

3.2 Phase locality and phonological processes (word-internally)

We have seen that the Icelandic VAN cases that realize n_{agnt} as *-and* in the singular have an *-end* exponent in the plural. A paradigm for *leikandi* ‘actor’ is shown in (27).

(27) Realization of Root- n_{agnt} -nInfl in *leikandi* ‘actor’

	SING	PLUR
NOM	leik-and-i	leik- <u>end</u> -ur
ACC	leik-and-a	leik- <u>end</u> -ur
DAT	leik-and-a	leik- <u>end</u> -um
GEN	leik-and-a	leik- <u>end</u> -a

Rögvaldsson (1990) points out a puzzle: The n_{agnt} -initial /e/ never triggers palatalization (28) even though /e/ and /i/ are robust palatalizers in the language and a reliable source of [k] vs. [c] alternations. This contextual absence of palatalization is categorical and triggers a response of unacceptable phonology for native speakers when attempted, even in nonce words that include *-and*, e.g. *blú[k]endur* vs. **blú[c]endur*.

- (28) a. lei[k]-end-ur ‘actors’
 b. dýr[k]-end-ur ‘worshippers’
 c. þáttta[k]-end-ur ‘participants’

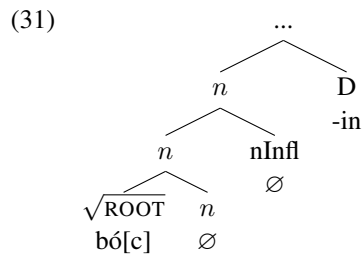
In other environments, /k/ is pronounced [c] when immediately followed by front vowels /e/, /i/, or /í/.

- (29) a. [c]efa ‘give’ vs. [k]af ‘gave’ (Morpheme internal)
 b. ví[c]-ing-ur ‘viking’ vs. ví[k] ‘bay’ (Level I Suffix)
 c. fan[c]-elsi ‘prison’ vs. fan[k]-ar ‘prisoners’ (Level I/II Suffix)
 d. bó[c]-in ‘book-the’ vs. bó[k] ‘book’ (Suffixed Definite Article)

Ingason and Sigurðsson (2015) propose a simple analysis of this distribution:

- (30) **Analysis of Icelandic palatalization**
 Palatalization requires phase locality.

This is not the final word on Icelandic palatalization, and important issues remain, such as why some phonological processes require phase locality and others operate across boundaries in situations that appear similar. Further investigation remains an adventure for the future. Yet, the nature of the phase-theoretic approach to palatalization is instructive. We can compare the shape of this analysis to alternatives, such as a levels-based analysis (see Indriðason 1994). The distribution can be analyzed by saying that *-and* is the only potentially palatalizing suffix in Icelandic that is categorically Level II and that palatalization is turned off as the generative lexicon enters that level. Choosing between these analyses will in part be influenced by broader theoretical commitments, but it is also worth considering how the proposals would address potential counterexamples. In fact, both analyses struggle with the suffixed definite articles in nouns like (31), e.g., *bó[c]-in* ‘book-the’, possibly analyzed as (31) in the DM context.



The suffixed definite article is the rightmost morpheme of any Icelandic noun. This is subideal for the Levels-based analysis because it suggests that the palatalization rule needs to be turned back on before attaching the article, and then off again to shut it down for even larger domains beyond the word. While additional machinery can be proposed in any framework, Levels seem conceptually more elegant when a rule that has been turned off stays that way. Yet, the definite article also has potential to make us uneasy about the phase analysis.

If D is not a phase boundary, (31) is not a concern. We assume PIC2, according to which non-phase-heads outside n see the root if no other phase heads intervene. However, it has been proposed that there is a phase boundary at the edge of the noun phrase (Svenonius 2004), probably D, and such phases have been used to analyze phenomena involving extraction out of the noun phrase (Bošković 2005). In particular, a motivated absence of D has been argued to correlate with relatively more freedom in extraction out of the noun phrase, especially in the Slavic languages.

Ingason and Sigurðsson (2015) note that while Icelandic is not quite at the level of Slavic in extraction possibilities, there are some cases of adverb extraction out of the Icelandic noun phrase that go beyond, for example, English, like (32).

- (32) Rosalega_i er hún [t_i góður málfraeðingur].
extremely is she t good linguist.
'She is an extremely good linguist.'

This line of reasoning must be worked out more carefully if it is to form the basis of a full analysis, but it remains a curious possibility that the ability to extract an adverb may be a meaningful piece in the analysis of palatalization. It is not the only imaginable analysis. Ingason and Sigurðsson entertain the possibility that *-in* in (31) is the exponent of something other than D, like some subpart of the definiteness semantics, or that this exponent is really a concord morpheme that receives its definiteness value from elsewhere. Again, while any of these suggestions may be false, it would be intriguing if a proper analysis of palatalization required a careful view of both phonology and the details of the syntax – and even interpretive details like the thematic requirements of the corresponding verb.

3.3 Phase locality and root interpretation

The relationship between phases and contextual allomorphy is made precise in (19), but the discussion of phases and interpretation has been informal so far, stated in terms like “inheriting thematic requirements”. We will now build on Marantz (2013) to establish a formal semantics for how phases constrain the interpretation of roots.

- (33) **Phase locality and meaning** (Marantz 2013; see also Arad 2003, 2006)
A meaning of a root that has been excluded at an inner phase head is unavailable at an outer phase head.

This empirical effect can be illustrated with an example from Marantz. The English root $\sqrt{\text{GLOBE}}$ manifests polysemy because it has (at least) the two related interpretations in (34).

- (34) a. $\sqrt{\text{GLOBE}}$ ‘abstract sphere, something spherelike’
 b. $\sqrt{\text{GLOBE}}$ ‘the world’

The root is associated with a polysemy set, $\{\llbracket\sqrt{\text{GLOBE}}_1\rrbracket, \llbracket\sqrt{\text{GLOBE}}_2\rrbracket\}$, whose members correspond to distinct denotations.

- (35) a. $\llbracket\sqrt{\text{GLOBE}}_1\rrbracket = \lambda x . \text{spherelike}(x)$
 b. $\llbracket\sqrt{\text{GLOBE}}_2\rrbracket = \lambda x . \text{world}(x)$

In line with (33), phase heads are the locus of subset-selecting operations over denotations of the polysemy set. All available interpretations are available at the root, but when we enter a phase head, one or more of these may be excluded. The idea is that once a meaning has been excluded, it cannot be brought back, as in (36).

- (36) a. **Noun:**
 \checkmark ‘spherelike’
 \checkmark ‘world’
 n
 $\sqrt{\text{GLOBE}}$ n
 $-\emptyset$
- b. **Adjective:**
 $*$ ‘spherelike’
 \checkmark ‘world’
 a
 $\sqrt{\text{GLOBE}}$ a
 $-\text{al}$
- c. **Adjective-derived:**
 $*$ ‘spherelike’
 \checkmark ‘world’
 v
 a v
 $\sqrt{\text{GLOBE}}$ a $-\text{ize}$
 $-\text{al}$

The nominalizer n lets both interpretations through in *the globe*, whereas a in *global* only lets the ‘world’ denotation through. According to this theory, the absence of the ‘spherelike’ meaning in *globalize* is related to the fact that this member of the polysemy set was already excluded at a .

This makes us equipped to address the analysis of an agent nominal that inherits the requirement for a direct object theme, as in the case of *bókaseljandi* ‘book seller’ in (23a). The polysemy set of $\sqrt{\text{SELL}}$ is compatible with an explicit or an implicit object, $\{\llbracket\sqrt{\text{SELL}}_1\rrbracket, \llbracket\sqrt{\text{SELL}}_2\rrbracket\}$, shown in (37). The v head excludes (37b).

- (37) a. $\llbracket\sqrt{\text{SELL}}_1\rrbracket = \lambda x . \lambda e . \text{sale}(e) \ \& \ \text{theme}(e,x)$ (With explicit theme)
 b. $\llbracket\sqrt{\text{SELL}}_2\rrbracket = \lambda e . (\exists x) \text{sale}(e) \ \& \ \text{theme}(e,x)$ (With implicit theme)

It is an important aspect of this analysis that the formal semantics explains the distribution of implicit themes. A covert element can be assumed to supply the theme x when x is in fact recoverable from the context, but in the absence of v , existential closure comes for free, even in an uninformative context.

Phase-theoretic constraints on the interpretation of roots, as analyzed in this section, reflect a phenomenon that is probably too systematic to be a coincidence, yet the

empirical picture is also probably more nuanced. No attempt will be made here to address apparent counterexamples in which meanings are reported to be brought back. Such examples should provide a fruitful ground for future research on the subject. The generalization in (33) is open to falsification as well as refinement. For example, a popularly cited fact in DM is the fact that idioms exist, which means that meaning can be paired with structures that are larger than whatever we might refer to as a word (notably by Marantz 1997, 2013). This possibility complicates any theory that aims to exclude interpretive options. If the brain is satisfied with pairing *kick the bucket* with ‘die’, it is not obvious why the same mechanism should be unable to pair *globalization* with ‘the act of making something spherelike’. Nevertheless, such complications are not a reason to give up on pursuing systematic constraints on meaning in natural language.

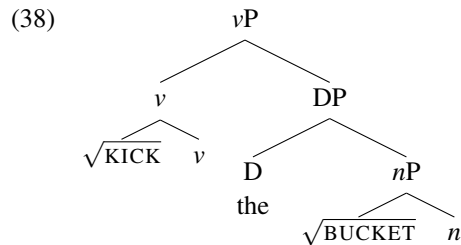
Idioms are a phenomenon that allows entire phrases to be paired with a specific meaning and this brings us to a more general issue. As we develop a locality theory that assumes phase boundaries even within the word, this may affect our understanding of phenomena that involve larger domains. For idioms, we must have some understanding of what it means to interpret a large piece of structure as one if Transfer to LF generally delivers only a small part of the structure at a time. Moreover, if the same phase theory constrains syntax in general and realization of morphemes at the interfaces, the overt consequences of phase theoretic constraints at PF may reveal the nature of abstract syntactic structures that involve more than one word. We now turn our focus toward the status of larger domains in a DM phase theory.

4 Implications for larger domains

This section considers how a word-internal phase theory constrains and informs the analysis of domains beyond the word. This includes the implications of phase theory for domains of interpretation; see also chapters XXX in this volume.

4.1 Reconciling idioms, phases and phase proliferation

A theory which aims to model locality constraints on interpretation must consider idioms like *kick the bucket* in English. For example, if category-defining heads, as well as the definite article, define phase edges, the roots $\sqrt{\text{KICK}}$ and $\sqrt{\text{BUCKET}}$ are not phase-local to each other in an analysis like (38) according to any obvious approach to Transfer. Neither root has the ‘die’ meaning of the idiom at the category level, yet the verb phrase is realized that way at LF. This means that if phases constrain interpretation it is important to have some idea of how that works for idioms.



As analyzed by Nunberg et al. (1994), not all idioms have the same properties. A class of verbal idioms like *kick the bucket*, referred to as Idiomatic Phrases, loses its special meaning in the passive (39a), whereas others, called Idiomatically Combining Expressions, like *spill the beans*, retain their special meaning in the passive (39b).

- (39) a. # The bucket was kicked.
 b. The beans were spilled.

This is important for locality considerations because while *spill the beans* seems to have a compositional nature that allows for its subparts to be interpreted separately, as ‘reveal’ and ‘secret’, respectively, the class of truly Idiomatic Phrases really appears to be interpreted as one chunk in an empirically distinct manner, however the notion of one chunk may be formalized. For example, according to Chomsky (1981:194), certain idioms, such as *kick the bucket*, require the verb and its direct object to be adjacent at LF; such idioms cannot be interpreted via traces.

In order to allow idioms to exist while maintaining phase constraints on meaning, Ingason et al. (2016) propose a mechanism of Late Transfer of Idioms.

(40) **Late Transfer of Idioms**

If a phase head is a part of an idiom, Transfer to LF is delayed until the next higher phase.

Late Transfer of Idioms allows for large idioms, but it importantly does not allow for idioms in which an embedded position in the idiom is variable, cf. Marantz (1984) on the lack of ‘agent idioms’. The passive establishes a relationship between the canonical object position and a higher position. That changes the content of the verb phrase, introducing a trace, and therefore delayed Transfer is unavailable in that construction. This accounts for several Idiomatic Phrases in which a verb and its direct object are interpreted as one. However, it remains a topic for further research how other syntactic combinations should be analyzed in the context of Late Transfer, for example when adjuncts are a part of an idiomatic chunk.

Whether or not we wish to use Late Transfer of Idioms as the basis of making idioms fit with phase locality, this kind of a DM phase theory places additional demands on proposals for what counts as a phase. They need to have some understanding of how phase-distant objects combine at LF. When we discuss whether D should be analyzed as a phase boundary on the basis of syntactic phenomena like displacement, this is also relevant for the interpretation of *kick the bucket*.

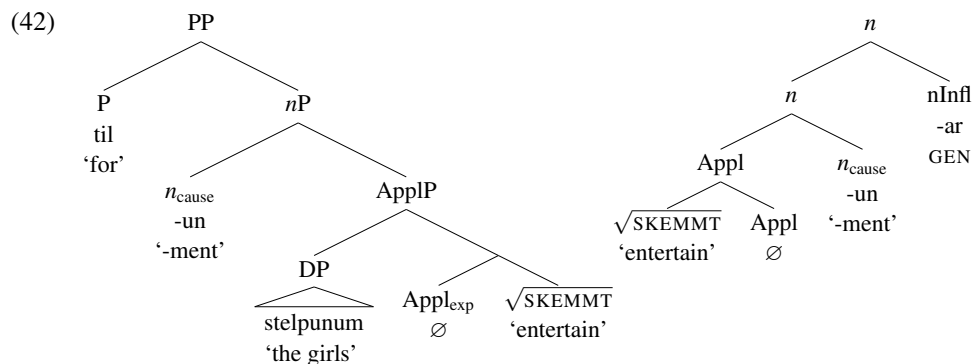
4.2 Morphological evidence for syntactic structure

We reviewed the proposed constraint that contextual allomorphy can only be stated in terms of phase-visible material, in (19). This view accounted for some promising empirical effects in English gerunds and Icelandic agent nominals. If we think this analysis is on the right track, the allomorphy in question can be used more generally as evidence for which category-defining head is closest to the root.

This kind of reasoning has been used to determine the syntactic structure of a Caused Experience (CEX) construction. We will stick to Icelandic examples (Ingason 2016), but similar constructions are attested, at least, in Basque (Berro and Fernández 2019) and Turkish (Akkuş 2019). The CEX construction involves datives of the type introduced by Appl(icative) heads. The puzzle is that these datives seem to be arguments of nouns, whereas Appl is usually associated with verbs. This could mean (i) that the nouns in questions are verbs on the inside, like English gerunds, but it could also mean (ii) that Appl can combine with a structure in which n is the closest category-defining head to the root. The above studies on Icelandic, Basque, and Turkish argue, with some variation, for the second version, which is interesting because a nominal applicative of this type demands an extension of the widely cited Appl framework proposed by Pylkkänen (2002, 2008), according to which Appl relates a dative to a verb.

An example of a CEX construction is given in the brackets in (41) and Ingason (2016) argues for the base-generated structure in (42), as well as some movement, including head movement that unites $\sqrt{\text{SKEMMT}}$ ‘entertain’ with *-un* ‘-ment’.

- (41) Þeir dönsuðu [stelpunum til skemmtunar]
 they danced [girls.the.DAT for entertainment.GEN]
 ‘They danced for the girls’ entertainment’



There are several moving parts in this, some of which are beyond the scope of the present discussion. Yet, for an overview, the dative ‘the girls’ is interpreted as the experiencer of ‘entertainment’ and these two are a part of a constituent that passes Icelandic constituency tests. The dative can appear in different positions, including to the right of ‘entertainment’ and the nP can be embedded under more external environments than a PP. The nominalizer has a n_{cause} subscript because the analysis realizes it with

a causative denotation, but this is an orthogonal non-essential issue. In the tree, nInfl stands for nominal inflection, here an instance of genitive case.

The crucial question for the present discussion of DM phase theory is whether *n* is the closest category-defining head to the root, because this demands a reconsideration of the Appl theory. More specifically, we must consider what kind of evidence speaks against a covert *v*-layer insider of *n*. If our analysis of gerunds and agent nominals is correct, it is quite revealing to look at a range of Icelandic nouns in (43) that are the predicates of the CEx construction, like *skemmtun* ‘entertainment’.

(43) **Root-conditioned allomorphy in CEx:**

<u>Root</u>	<u><i>n</i>_{cause}</u>	<u>nInfl</u>	
skemmt	-un	-∅	‘entertainment’
létt	-∅	-ir	‘relief’
	-ir	-∅	(alternative segmentation of ‘relief’)
hvat	-ning	-∅	‘encouragement’
yndisauk	-∅	-i	‘pleasure’
hress	-ing	-∅	‘refreshment’
dægradvöl	-∅	-∅	‘recreation’
skapraun	-∅	-∅	‘annoyance’
vonbrigð	-i	-∅	‘disappointment’
niðurlæg	-ing	-∅	‘humiliation’
álitshnekk	-∅	-ir	‘reputation damage’
	-ir	-∅	(alternative segmentation of ‘reputation damage’)

The CEx predicates in (43) are all nouns, and they all take a dative experiencer, yet it is obvious that the overt phonological exponents of the nominal morphology manifest diverse allomorphy, much like derived nominals and unlike gerunds. While this does not motivate all aspects of (42), it does rule out analyses with a covert *v* inside of *n*, and that is the point to be made here. Furthermore, these nouns can be shown to not systematically inherit properties of verbs, as discussed by Ingason (2016), a fact consistent with the conclusion that *n* is the closest category-defining element to the root. This finding that applicative heads do not exclusively combine with verbs mirrors the status of applicatives in the *i** framework of argument interpretation (Wood and Marantz 2017). In this framework, there is a general purpose syntactic atom *i** that introduces arguments and the interpretation of *i** is contextually determined (via contextual alloosemy) in such a way that the presence of *v* is not crucial for an Appl denotation to emerge at LF. The take-home message of the section, however, is that contextual allomorphy by itself can crucially inform the typology of applicative constructions in a DM phase theory.

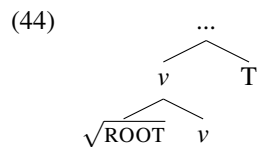
5 Reconciling DM phases with other perspectives

The DM phase theory is most interesting if the phases of word-internal phenomena are really the same phases as the phases of syntax in general. If not, DM phases are just

another parallel locality theory. This puts some stress on diagnostics for what counts as a phase boundary. While C is not the most controversial phase edge, the edge of the verb phrase, v , requires more nuanced argumentation in the pre-DM phase theory. Legate (2003) identified evidence for vP phases based on *wh*-reconstruction effects, Quantifier Raising, parasitic gaps, and the Nuclear Stress Rule, but not everyone was convinced (Den Dikken 2006). Ingason and Wood (2017) added to the evidence that v is a phase by arguing that the locality of Icelandic Stylistic Fronting can be captured by the generalization that Stylistic Fronting can only cross one phase boundary, assuming that v is a phase, regardless of whether the verb is linked to an external argument or not (Legate 2003; Marantz 2007). If we want to pursue the most interesting version of DM phases, any arguments for and against a phase boundary is potentially sensitive to word-internal facts and this constrains the analysis.

Matters are furthermore complicated if we want to be precise about where the edge of the verb phrase is for locality purposes in a theory that includes both Voice and v (Legate 2014). While the DM perspective presented here takes v to be the phase boundary and at the same time a morpheme that is often realized as traditional derivational morphology at PF, Voice is possibly a more obvious position for a phase boundary in a Voice plus v syntax. Yet, this matter is still up for discussion, and depends on the diagnostics that we adopt. For example, Legate’s (2003) criteria do not distinguish between Voice and v as the phase edge. It is probably fair to say that unresolved issues remain in this area of investigation, but in any case it requires more consideration to propose a phase in the DM phase theory than in a phase theory that imposes no restrictions on word-internal effects.

The DM phase theory is also most interesting if it is based on the same Phase Impenetrability Condition (PIC) as syntax in general. If not, DM Transfer does not really derive from the same fundamental principles as other locality phenomena in syntax. Chomsky (2000, 2001) developed two versions of the PIC. The first version, PIC1, deactivates the material embedded within the phase when the phase head is merged. According to assumptions about the system in general in Embick (2010), this is hopeless for the purposes of DM phase locality.



If we assumed PIC1, and the root of a regular (say English) verb would get deactivated as v is merged, the verb inflection outside v could never be root-conditioned. This is obviously false because the morpheme where past tense allomorphy is realized, with the same feature values, can have different phonological exponents, depending on which verb root it combines with, as in the English past tense, *lef-t/hit-∅/dance-d*. If this is the morpheme T, the root must be visible to T. For this reason, Embick (2010) adopts PIC2 when developing constraint (19). Under PIC2, deactivation takes place at the next higher phase head and therefore non-phase heads in-between, like T, can see the

root past v . Implementation specifics, however, may make a theory like PIC1 viable. For example, we can return to the phase constraints on interpretation hypothesized by Marantz (2013). That analysis assumes that because the root is base-generated as an adjunct to v it is not in v 's complement and thus not interpreted when merging v deactivates its complement. Various details affect this line of reasoning. For example, it matters whether (i) the root is base-adjoined to v or whether it (ii) starts out as the head of a root phrase in the complement of v and combines with the root via head movement. It also matters whether one of (i) or (ii) is always correct, or whether the analysis varies by construction, and then what would count as a reliable diagnostics of (i) vs. (ii). Details of how head movement is implemented may also introduce further nuances. Evaluating the facts and arguments at stake to the point of a definitive conclusion is beyond the scope of the present discussion. Yet, again, this puts the analyst in a position in which maintaining a DM phase theory in its most interesting form constrains the theoretical choices they have quite broadly.

6 Conclusion

This article has given an overview of the status of phase theory in Distributed Morphology. DM phase theory is an ambitious project that aims to unify the locality theory of syntax and other locality phenomena that would have required special and different tools in other approaches. Building on insights from previous work on lexical and syntactic word-formation, the DM phase theory offers interesting analyses when empirical correlations cross the interfaces of syntax with pronunciation and meaning, such as when the absence of contextual allomorphy correlates with the verbiness of an English gerund. The ambitious goals of this research programs also lead to further questions of how its details can be implemented and reconciled with other theoretical perspectives on phases. This state of affairs is bound to be a fruitful ground for future research on phases in DM.

References

- Akkuş, Faruk. 2019. Dative arguments in Turkish: Caused experiencers versus applicatives. In *Proceedings of the Workshop on Turkic and Languages in Contact with Turkic*, volume 4, 1–13.
- Arad, Maya. 2003. Locality constraints on the interpretation of roots: The case of Hebrew denominal verbs. *Natural Language & Linguistic Theory* 21:737–778.
- Arad, Maya. 2006. *Roots and patterns: Hebrew morpho-syntax*. Dordrecht: Springer.
- Berro, Ane, and Beatriz Fernández. 2019. Applicatives without verbs. *Natural Language & Linguistic Theory* 37:1273–1317.

- Boeckx, Cedric, and Kleanthes K. Grohmann. 2004. Barriers and phases: Forward to the past? Paper presented at TiLT 2004.
- Boeckx, Cedric, and Kleanthes K. Grohmann. 2007. Remark: Putting phases in perspective. *Syntax* 10:204–222.
- Bošković, Željko. 2005. On the locality of left branch extraction and the structure of NP. *Studia Linguistica* 59:1–45.
- Chomsky, Noam. 1970. Remarks on nominalization. In *Readings in English Transformational Grammar*, ed. Jacobs A. Roderick and Peter S. Rosenbaum. Waltham, MA: Ginn and Co.
- Chomsky, Noam. 1973. Conditions on transformations. In *A festschrift for Morris Halle*, ed. S. Anderson and P. Kiparsky, 232–286. New York: Holt, Rinehart and Winston.
- Chomsky, Noam. 1977. *Essays on form and interpretation*. New York: North-Holland.
- Chomsky, Noam. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.
- Chomsky, Noam. 1986. *Barriers*. MIT Press.
- Chomsky, Noam. 2000. Minimalist inquiries: The framework. In *Step by step. Essays on Minimalist Syntax in honor of Howard Lasnik*, ed. Roger Martin, David Michaels, and Juan Uriagereka, 89–155. Cambridge, MA: MIT Press.
- Chomsky, Noam. 2001. Derivation by phase. In *Ken Hale: A life in language*, ed. Michael Kenstowicz, 1–52. Cambridge, MA: MIT Press.
- Den Dikken, Marcel. 2006. A reappraisal of vP being phasal: A reply to Legate. Manuscript, CUNY Graduate Center.
- Embick, David. 2010. *Localism versus globalism in morphology and phonology*. Cambridge, MA: MIT Press.
- Embick, David, and Rolf Noyer. 2007. Distributed morphology and the syntax/morphology interface. In *The Oxford handbook of linguistic interfaces*, 289–324. Oxford University Press.
- Glass, Lelia. 2014. What does it mean for an implicit object to be recoverable? *U. Penn Working Papers in Linguistics* 20.1:121–130.
- Glass, Lelia. 2020. Verbs describing routines facilitate object omission in English. *Proceedings of the Linguistic Society of America* 5:44–58.
- Halle, Morris, and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In *The view from building 20. Essays in linguistics in honor of Sylvain Bromberger*, ed. Ken Hale and Samuel Jay Keyser, 111–176. MIT Press.

- Indriðason, Þorsteinn G. 1994. *Regluvirkni í orðasafni og utan þess. Um lexíkalska hljóðkerfisfræði íslensku*. Reykjavík: Málvísindastofnun Háskóla Íslands.
- Ingason, Anton Karl. 2016. Realizing morphemes in the Icelandic noun phrase. Doctoral Dissertation, University of Pennsylvania.
- Ingason, Anton Karl, and Einar Freyr Sigurðsson. 2015. Phase locality in Distributed Morphology and two types of Icelandic agent nominals. In *Proceedings of NELS 45*, ed. Thuy Bui and Deniz Özyıldız, volume 2, 45–58. Amherst, MA: GLSA.
- Ingason, Anton Karl, Einar Freyr Sigurðsson, and Jim Wood. 2016. Displacement and subject blocking in verbal idioms: evidence from passive-like constructions in Icelandic. *Working Papers in Scandinavian Syntax*.
- Ingason, Anton Karl, and Jim Wood. 2017. Clause bounded movement: Stylistic fronting and phase theory. *Linguistic Inquiry* 3:513–527.
- Legate, Julie Anne. 2003. Some interface properties of the phase. *Linguistic Inquiry* 34:506–515.
- Legate, Julie Anne. 2014. *Voice and v: Lessons from acehnese*, volume 69. MIT Press.
- Marantz, Alec. 1984. *On the nature of grammatical relations*. Cambridge, MA: The MIT Press.
- Marantz, Alec. 1997. No escape from syntax: Don't try morphological analysis in the privacy of your own lexicon. *U. Penn Working Papers in Linguistics* 4:201–225.
- Marantz, Alec. 2001. Words and things, Handout, MIT.
- Marantz, Alec. 2007. Phases and words. In *Phases in the theory of grammar*, ed. Sook-Hee Choe, 191–222. Seoul: Dong In.
- Marantz, Alec. 2013. Locality Domains for Contextual Allomorphy across the Interfaces. In *Distributed Morphology Today: Morphemes for Morris Halle*, ed. Ora Matushansky and Alec Marantz, 95–115. Cambridge, MA: MIT Press.
- Myler, Neil Joseph. 2014. Building and interpreting possession sentences. Doctoral Dissertation, New York University.
- Nunberg, Geoffrey, Ivan A Sag, and Thomas Wasow. 1994. Idioms. *Language* 491–538.
- Pylkkänen, Liina. 2002. Introducing arguments. Doctoral Dissertation, Massachusetts Institute of Technology.
- Pylkkänen, Liina. 2008. *Introducing arguments*. Cambridge: The MIT Press.
- Rizzi, Luigi. 1990. *Relativized minimality*. The MIT Press.

- Ross, John R. 1967. Constraints on variables in syntax. Doctoral Dissertation, Massachusetts Institute of Technology.
- Rögnauldsson, Eiríkur. 1990. *Íslensk orðhlutafræði*. Reykjavík: Institute of Linguistics, University of Iceland.
- Svenonius, Peter. 2004. On the edge. In *Peripheries: Syntactic edges and their effects*, ed. David Adger, Cecile de Cat, and George Tsoulas, 259–287. Dordrecht: Kluwer.
- Wood, Jim. 2012. Icelandic morphosyntax and argument structure. Doctoral Dissertation, New York University.
- Wood, Jim. 2015. *Icelandic morphosyntax and argument structure*. Cham: Springer.
- Wood, Jim, and Alec Marantz. 2017. The interpretation of external arguments. In *The verbal domain*, ed. Roberta D’Alessandro, Irene Franco, and Ángel J. Gallego, 255–278. Oxford: Oxford University Press.