

REALIZING MORPHEMES  
IN THE ICELANDIC NOUN PHRASE

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ABSTRACT

REALIZING MORPHEMES

IN THE ICELANDIC NOUN PHRASE

Anton Karl Ingason

David Embick

This dissertation defends a strong version of the view that linguistic surface complexity is the product of interactions between deep syntactic mechanisms and shallow interface-specific mechanisms. I argue that current developments in the theory of locality in Distributed Morphology (Embick 2010, Marantz 2013) impose boundaries on syntactic analysis and that morphemes cannot be identified and analyzed without studying their realization at the interfaces of syntax with both phonology and interpretation. The empirical focus is on a series of phenomena which are attested in Icelandic noun phrases and involve the realization of roots, category-defining heads, inflection morphemes, and definite articles, all of which may appear in the same noun as shown below.

- (1) *leik-end-ur-nir* 'play'-NMLZ-M.NOM.PL-DEF

Three main components of the dissertation involve applicative structures, definite articles and morphophonology. I argue for the existence of applicatives in noun phrases which do not include a verbal substructure based on the realization of morphemes in an Icelandic Caused Experience construction. A study which compares definite articles in German and Icelandic supports the findings in Schwarz (2009) that there are two definite articles in natural language and the realization of the Icelandic articles has implications for the theory of suffixation under adjacency (Embick and Noyer 2001).

These case studies, in addition to a series of smaller case studies, support the view that an analysis of one linguistic component may only be well-informed if it considers other interacting components as well. My method, to approach a well-defined empirical case, Icelandic nouns, with a precise theoretical framework like Distributed Morphology, yields valuable results. I show how many types of locality constraints interact in the same word and this is pleasing because it shows that the theory is not based on convenient but cross-linguistically isolated data sets. Rather, aspects of language like syntax, morphology and semantics are constantly interacting and they are best understood in the context of each other.

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## Abbreviations

1	first person
2	second person
3	third person
ACC	accusative
DAT	dative
DEF	definite
F(EM)	feminine
GEN	genitive
GEND	gender
LM	linking morpheme
M(ASC)	masculine
N(EUT)	neuter
NMLZ	nominalizer
NOM	nominative
PL	plural
PRES	present
PAST	past
SG	singular
ST	strong declension
WK	weak declension

# Chapter 1

## Introduction

Linguistics has subfields like syntax, phonology and semantics and puzzles of linguistic analysis are commonly framed within such fields. It is well motivated that these subfields reflect something real about the organization of language in the brain. For example, it is reasonable to think that the mechanisms that assemble hierarchical structure in syntax are qualitatively different from the mechanisms that arbitrate segmental phonology. However, it is also clear that these components are interconnected and the connections have consequences.

This dissertation studies phenomena where the analysis of linguistic sound objects is only well informed if it considers evidence of syntactic structure and its interpretation in context. In such cases, the syntax makes predictions about the ways in which morphemes can and cannot be realized. Importantly, if we understand how surface patterns in morphology and meaning are related to the syntax, we are in a position where surface observations about morphemes inform and con-

strain syntactic analysis. Theoretically, I aim to defend a strong version of the view that surface complexity in natural language is the result of an interaction between different linguistic systems:

- The theory of realization of morphemes imposes boundaries on syntactic analysis.
- In order to identify and analyze morphemes, we need to examine their realization in both pronunciation and interpretation.

These broad goals can be addressed rigorously in a setting where a precise theoretical framework meets a well defined empirical case in which many different linguistic constraints interact with each other. The theoretical foundation of the dissertation is the framework of Distributed Morphology (DM, Halle and Marantz 1993 and subsequent work) and I investigate the realization of Icelandic nouns, including their roots, nominalizers, inflection morphemes and markers of definiteness, all of which may appear in the same noun, as shown in (2).

(2) *leik-end-ur-nir* play-NMLZ-M.NOM.PL-DEF ‘the actors’

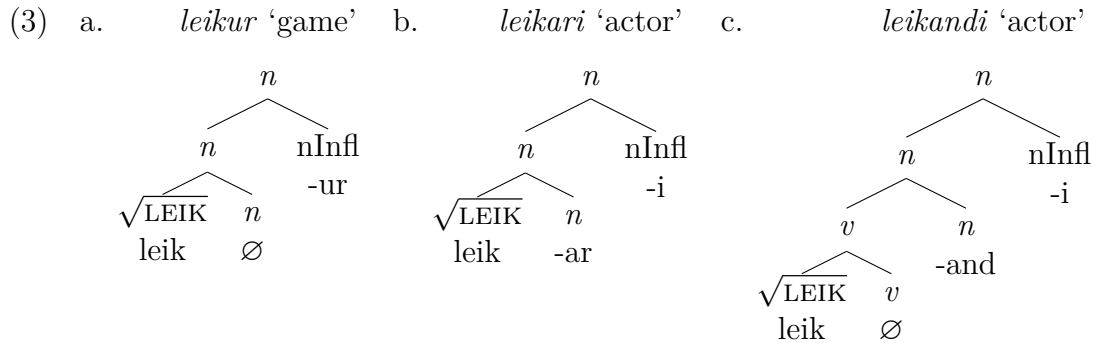
Each morpheme raises questions about realization in context: To what extent can the identity of the root influence the pronunciation of the other morphemes and vice versa? How does derivational morphology restrict the interpretation of the root? Is there any unpronounced structure in the word and how does it affect the surface form? Are there limits to the variation associated with the so-called declension

classes which are reflected in the expression of gender, case and number? Due to which kind of a mechanism is the definite article in Icelandic usually a suffix, but not always?

Research in DM has provided evidence for locality principles which constrain the realization of morphemes at the interfaces of syntax (Embick 2010, Marantz 2013). On the one hand, the pronunciation and interpretation of a morpheme is sensitive to **deep syntactic mechanisms** like phase locality, which is a consequence of cyclic Spell-Out in syntax (Chomsky 2001). Thus, the sound form of a morpheme can only be determined by material which is phase-theoretically active at the point in the derivation at which the allomorph selection takes place. Furthermore, phase heads are the locus of polysemy resolution in the interpretation component and therefore phase structure limits the range of possible interpretations. On the other hand, the realization of the same morphemes is also constrained by more **shallow interface-specific mechanisms** which are sensitive to notions like linear adjacency. Therefore, conditions on the form of a morpheme require the conditioning environment to be not only phase-active but also linearly adjacent to the position which is being realized. This linear effect is shallow because there is no principled reason for syntax to care about linear order. However, the linear nature of time means that we pronounce morphemes one after the other, and it appears to be a fact that speakers can select the form of a morpheme based on properties of the

preceding and the following morphemes. We refer to such selection as contextual allomorphy.

The Icelandic nouns in (3) are representative of the relevant types of empirical distinctions. They are all built on the root  $\sqrt{\text{LEIK}}$  ‘play’ but they arguably differ with respect to the structure of their category-defining heads. Category-defining heads are assumed to be phase heads and they include  $n$ (ominalizers) and  $v$ (erbalizers) (Marantz 2001, 2007). The label nInfl stands for the nominal inflection morpheme which expresses gender, case and number.



The difference between (3a) and (3b) is that the latter contains overt nominalization morphology but the former does not. This means that nInfl is linearly adjacent to the root in *leik-ur* ‘game’ but not in *leik-ar-i* ‘actor’. The difference between (3b) and (3c) is that the latter contains a verbal layer which is not present in the former (Ingason and Sigurðsson 2015). This means that despite superficial similarities, the nominalizer is phase-local to the root in *leik-ar-i* ‘actor’ but not in *leik-and-i* ‘actor’. These differences have consequences that will be elaborated throughout this dissertation. The point to be made right away is that a well informed analysis of

the sound form has to ask questions like the following, assuming that a morpheme generally represents a piece of meaning.

- Which pieces of meaning are there in the word?
- Which of these pieces have an overt phonological exponent?
- How many category-defining heads are there in the word, whether overt or covert?

Empirically, I focus on the Icelandic noun phrase as well as comparative evidence from Germanic. A wide range of locality effects is attested in Icelandic nouns. This is pleasing because it shows that the locality principles are not artifacts of convenient but cross-linguistically isolated data sets. Several locality effects can be manifested in one Icelandic noun. The exposition is organized around three case studies.

- **Part I: Applicatives in the noun phrase:** Contrary to the predictions of the widely adopted theory of applicatives by Pylkkänen (2008), Icelandic nouns are shown to introduce dative experiencers without having a verbal substructure. The study compares English gerunds and an Icelandic Caused Experience construction. The crucial evidence involves constraints on contextual allomorphy and polysemy resolution.
- **Part II: Suffixation under adjacency:** This comparative study of German and Icelandic supports the proposal by Schwarz (2009) that there exist two



types of definite articles, a weak uniqueness article and a strong anaphoric article. In Icelandic, the uniqueness article participates in support morphology but the anaphoric article does not. The support phenomenon, dubbed *the*-support, is structurally similar to English *do*-support and has implications for the role of linear adjacency and head-to-head relations in affixation (cf. Embick and Noyer 2001).

- **Part III: Morphemes and morphophonology:** The final main part of the dissertation introduces further case studies which emphasize the role of the morpheme as the central unit of morphophonology – in a broad sense. I study the consequences of phase theory for the realization of morphemes in Icelandic agent nominals. Another case study focuses on constraints imposed by the process of Vocabulary Insertion in Icelandic nominal declension and finally I develop a theory of morphophonology in terms of the type of reference which is made to the trigger and target of an alternation, rather than to the type of effect imposed on the representation.

This dissertation is organized as follows. A theoretical background is given in Chapter 2. The case study on applicatives is presented in Chapter 3, suffixation under adjacency in Chapter 4 and the study on morpheme-skipping and morphophonology in Chapter 5. I summarize the theoretical and empirical implications of the dissertation in Chapter 6.

## Chapter 2

### Theoretical background

This chapter lays out the main theoretical assumptions that will be assumed throughout the dissertation. The system is an implementation of minimalist syntax (Chomsky 1995, 2000, 2001) in which syntactic structures are realized derivationally late at the interfaces of syntax with interpretation and phonology in line with current work in Distributed Morphology. This general approach to late realization of phonology goes back to Halle and Marantz (1993) and has been refined in subsequent work (see Embick 2010, 2015 for a current implementation). An extension to a radically parallel mechanism for realizing meaning is assumed in some recent work in DM (see Wood 2012; Myler 2014). The system which is presented in this chapter shares many of the theoretical assumptions of the work cited above. In many cases, alternative formulations would work equally well but I believe the ideas of this dissertation will be communicated more clearly if the formal foundations are stated explicitly.

## **2.1 Grammatical architecture**

### **2.1.1 Syntax**

#### **2.1.1.1 Basic mechanism**

Syntax is a system which assembles morphemes into syntactic structures and establishes relations between them. Syntax does nothing else. A crucial aspect of the current system is that all pieces of structure which are syntactic atoms are morphemes.

- (4) The syntactic atoms are morphemes.

Assumption (4) reflects the hypothesis which has been called the Single Engine Hypothesis or “syntax all the way down” (Halle and Marantz 1993; Embick and Noyer 2007). The idea is that there is no system separate from syntax which assembles syntactic units. Notably, there is no Lexicon in the sense “word factory”; the notion word does not have a privileged status and the lexicon is just the set of morphemes which are available to a speaker for syntactic composition. Objects which we sometimes think of as words are simply syntactic structures which are realized in a particular way, perhaps forming phonological units like phonological words.

A major distinction is made between two types of morphemes, l-morphemes and f-morphemes. These types are related to the traditional distinction between lexical

and functional elements. The l-morphemes are lexical roots which are not specified for syntactic category (5a). The f-morphemes can be category-defining morphemes, including *v*(erbalizers), *n*(ominalizers) and *a*(djectivizers) (5b). A category-defining head like *v* can combine with a root to build a verb. Other f-morphemes include elements like T(ense), C(omplementizer), Voice, and Appl(icatives) (5c).

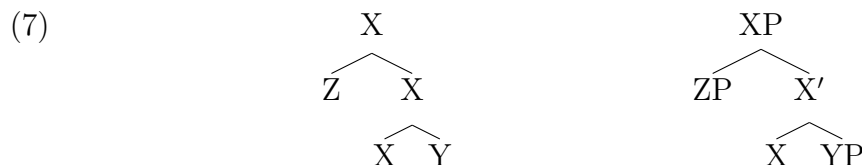
- (5) a.  $\sqrt{\text{WALK}}$ ,  $\sqrt{\text{RUN}}$ ,  $\sqrt{\text{CAT}}$   
 b. *v*, *n*, *a*  
 c. T(ense), C(omplementizer), Voice, Appl(icative)

The operation which builds syntactic structures from morphemes is called Merge (Chomsky 1995). Merge takes two morphemes as its input and the output is a set whose members are the same two morphemes. For the morphemes X and Y, the operation Merge(X,Y) constructs the set {X,Y}. One of the elements projects and labels the combined structure. If X labels the combined structure, this is indicated as {X,{X,Y}}, which is equivalent to the ordered pair ⟨X,Y⟩. The same ordered pair can be represented with the following tree diagram.



For formal concreteness, I will present a system below in which the label is determined by selectional features at Merge. Other approaches to labels may or may not be empirically distinguishable, see Chomsky (2013) for a recent discussion and a proposal involving dynamic labeling at the phase level. The morpheme X may

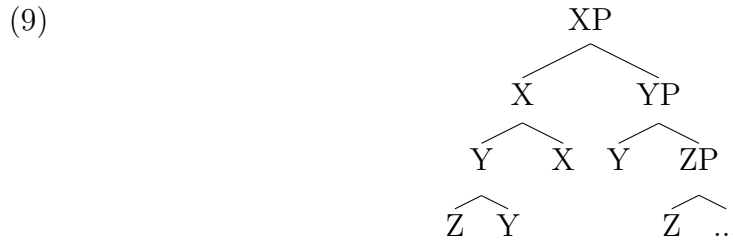
merge with a complement Y and a specifier Z and form the structure in (7). The two tree diagrams in (7) are notational variants in this system. The diagram on the right uses notational conventions from X-bar theory to facilitate distinct reference to X, X' and XP but these X-bar notions are not part of the syntactic representation. The complement of X, Y, is the first element which satisfies a selectional need imposed by X. The label X' indicates that X has fulfilled some but not all of its selectional needs. The label XP similarly signals that all selectional requirements of X have been met.



Movement/displacement is formalized as applying the operation Merge(X,Y) where Y is already a part of X. This is referred to as Internal Merge. Other applications of Merge are either referred to as External Merge or just Merge. Internal Merge results in there being two instances (or copies) of the piece of structure which was re-merged with the tree, such as YP below. Internal Merge may be triggered by interpretive requirements or by imperfections of syntax such as unmotivated (EPP) edge features.



Implementation details of movement will not play a big role in this dissertation. However, it should be noted that the discussion will assume a traditional understanding of head-movement.<sup>1</sup> If Y is the head of the complement of X, Y can adjoin to X and form a complex head with X. Head movement can be iterative as demonstrated in (9) where Z has head-moved to Y and the complex head Z-Y subsequently head-moved to X, forming Z-Y-X. Complex heads are typically realized as phonological words. There exist proposals for doing head movement without head movement notation (Matushansky 2006). As far as I am aware, these are empirically equivalent so readers who find such derivations more appealing should be able to translate between these conventions and the current one.



In addition to Merge and Internal Merge, syntax has Agree(ment). Agree accounts for cases where feature values which enter the syntax at a given terminal node (a morpheme) are realized elsewhere. I will adopt a basic mechanism under which morphemes need to Match in order to Agree and must Agree if they can.

- (10) **Match:** If X c-commands Y and X and Y have a feature with the same key K, then X and Y Match on K.

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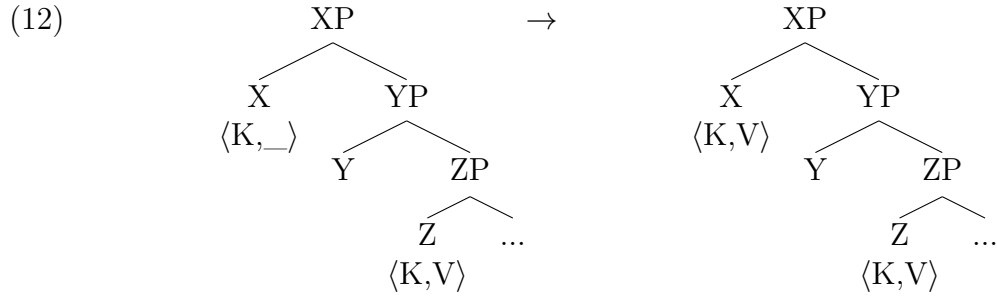
<sup>1</sup>I will, however, not be concerned with the nuances of different implementations of head movement because these are unimportant here (see, e.g., Koopman 1984; Travis 1984; Baker 1988).

- (11) **Agree:** If X and Y Match on K and K is valued on X or Y but not both, then the unvalued instance of K is valued with the value from the valued instance.

This formulation is a version of bidirectional Agree because valuation can be either upwards or downwards.<sup>2</sup> Morphology on a verb which expresses features associated with a noun phrase is the canonical Agree phenomenon. However, the operation is extensible to other phenomena and various interactions between syntactic pieces can be and have been reduced to Agree in the literature on minimalist syntax. In this dissertation, I will not attempt to review the different views on the details of how Agree works and which phenomena it is responsible for in syntax, but I will assume a version like the above for the purpose of my analysis. An example of the application of Agree is shown in (12) where X and Z match on K and K is valued on X but not Z. An underscore is a notation for “no value”. In this situation, K on X receives the value of K on Z.

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<sup>2</sup>Although standard Agree probes downwards (and values upwards) (Chomsky 2000, 2001), various researchers have pursued approaches in which Agree can be upwards or bidirectional; see, e.g., Neeleman and van de Koot (2002); Adger (2003); Baker (2008); Hicks (2009); Haegeman and Lohndal (2010); Bjorkman (2011); Merchant (2011); Zeijlstra (2012); Wurmbrand (2014); Baier (2015).



To summarize, the current theory of syntax consists of syntactic atoms and operations which arrange these atoms to build syntactic structures. The syntactic atoms are the morphemes and nothing else. The syntactic operations are Merge and Agree. A morpheme which is already part of a structure can be Merged again to yield the effect of movement, also referred to as Internal Merge. Agree can value a feature based on the value of a corresponding feature on another morpheme, but only if the two morphemes Match on a key. Given Merge and Agree, the definition of grammaticality is as follows.

- (13) A syntactic structure is grammatical if and only if (i) it can be built by Merge and Agree from the morphemes available to a speaker and (ii) it can be realized at the interfaces of syntax with meaning (LF) and pronunciation (PF).

This formalization of grammaticality is similar to the view of Collins and Stabler (2016). A consequence of (13) is that a derivation is not well formed if it crashes either in the syntax, the semantics or the phonology. A crash is to be understood here as a technical mathematical notion of a situation in which the derivation cannot proceed to convergence. Different implementations of a formal grammar will have



different ways of expressing situations which lead to a crash and in some cases the nuances of the implementation differences will not be important. However, to take some concrete examples, a crash might result from an unvalued feature which fails to get a value (Legate 2002) or from a type mismatch in the semantics.

The following discussion will elaborate what precisely a morpheme is and what constrains the ways in which they can be arranged, and realized.

### 2.1.1.2 What is a morpheme?

The atoms of syntax are morphemes. What is a morpheme? For concreteness, consider the English sentence below. It has a subject which is an agent and an unergative verb in the past tense.

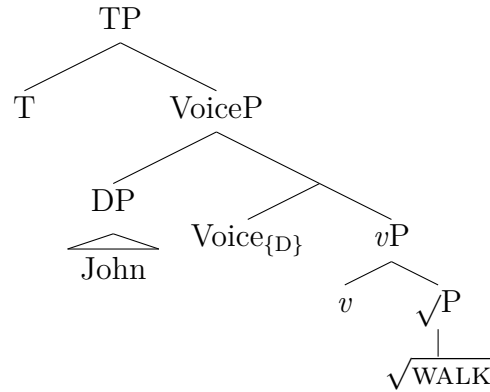
(14) John walked

In the present system, the syntactic structure of the sentence above is as in (15). If we assume for the present purpose that no structure is omitted in this diagram and that a proper name noun phrase like *John* is just one morpheme of category D, then there are five morphemes in this sentence: T, D, Voice<sub>{D}</sub>,  $\sqrt{\text{WALK}}$  and *v*.<sup>3</sup>

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<sup>3</sup>The subscript on Voice<sub>{D}</sub> indicates that Voice requires a specifier of type D. See Section 2.1.1.3 for discussion.

(15)



I will now formalize which kind of an object elements like T and Voice are. Semi-formally, this kind of a theory assumes that morphemes are feature bundles. This means that a formal account of morphemes needs an understanding of the notions “feature” and “bundle”. In the present system, a syntactic feature is defined as in (16) where a key is an identifier which can be used to look up the value of a feature or assign a value to a feature.

(16) A syntactic feature is an ordered  $\langle \text{key}, \text{value} \rangle$  pair.

This definition of a syntactic feature means that the elements listed in (17) are potential features in the system. A feature is an ordered pair where the first element is understood as the key and the second element as the value of that key. Some examples are shown below.

(17) a.  $\langle \text{GEND}, \text{MASC} \rangle$

b.  $\langle \phi, \text{M3SG} \rangle$

The feature for masculine gender in (17a) has the key GENDER and the value MASCULINE. Depending on our theory of features, we might collapse gender, number

and person to the key  $\phi$  and that can be represented as (17b) where M3SG stands for the value MASCuline, 3rd person, singular (SG). I will in fact adopt a theory in which gender, number and person are encoded as distinct features, but the point to be made here is that when we speak of features, we speak of key-value pairs. A tense feature can be represented in one of the ways shown in (18).

- (18) a.  $\langle \text{TENSE, PAST} \rangle$  vs.  $\langle \text{TENSE, PRES} \rangle$   
 b.  $\langle \text{PAST, 1} \rangle$  vs.  $\langle \text{PAST, 0} \rangle$   
 c.  $\langle \text{PAST, +} \rangle$  vs.  $\langle \text{PAST, -} \rangle$   
 d.  $*\langle \text{YEAR, 1859} \rangle$

The version in (18a) uses the key TENSE and the values PAST and PRES to express tense. If we explicitly want to represent a binary feature, we can have the value range over  $\{1,0\}$  or  $\{+,-\}$ . In that sense, (18b-18c) impose the same restriction as a notation which contrasts  $[+\text{PAST}]$  and  $[-\text{PAST}]$ . In many cases, a given analysis can be expressed in various different feature systems without consequences. However, we can note that it is a useful null hypothesis that the range of possible keys and values is universal and that therefore there will be no feature like (18d) in the syntax to represent the year 1859. I will assume that features as they are defined in (16) are the material that morphemes are made of. A morpheme is defined in terms of a partial function.

(19) **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.

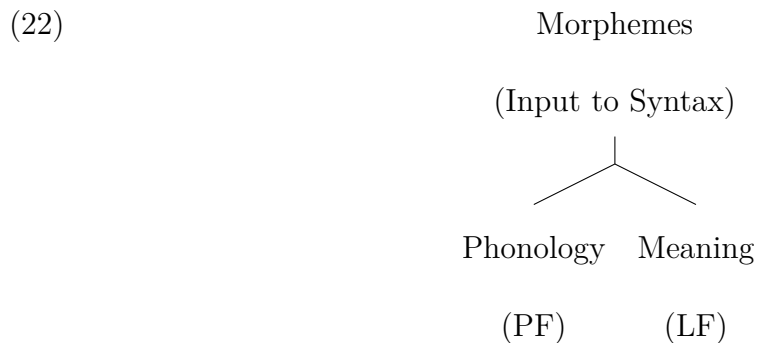
The structure of a morpheme is then as in (20) and nothing else is part of it.

$$(20) \quad \{ \langle \text{key1}, \text{val1} \rangle, \langle \text{key2}, \text{val2} \rangle, \dots \}$$

This means that when we speak of a past tense T(ense) morpheme, the label T and the value [+PAST] are both represented by syntactic features as in (21) because there are no other ways of encoding information as part of a morpheme. We might use shorthand notation like  $T_{\text{past}}$  to refer to the same morpheme, but any such notation must be understood as a reference to this type of a partial function.

$$(21) \quad \{ \langle \text{LAB}, \text{T} \rangle, \langle \text{PAST}, + \rangle \}$$

In the current architecture, all objects which are manipulated by the syntax are morphemes of type (21). In the familiar Y model of the grammar, the role of syntax is to arrange morphemes together into syntactic structures and establish relations via Agree.



The current architecture is strongly realizational, a view which has been part of Distributed Morphology since Halle and Marantz (1993). In recent work such as Wood (2012) and Myler (2014) late realization has also been assumed for the LF interface and this means that morphemes cannot be pronounced or interpreted in the form in which they enter the syntax. Rather, they are syntactic pieces whose realization at PF and LF depends on both the content of their syntactic features and the syntactic context they appear in. The system for realization will be introduced in Sections 2.1.2 and 2.1.3, but first I will review how the syntax knows which morphemes are allowed to merge and in which ways.

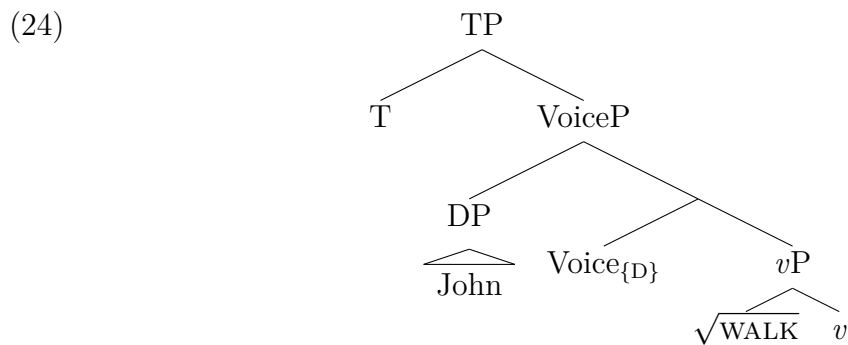
### **2.1.1.3 Selection and projection**

Following Chomsky (1965), I assume that pieces of syntax can have opinions about the category labels of their immediate neighbors. This property of a morpheme is referred to as *c(ategory)-selection* and it accounts for phenomena associated with the notion subcategorization. I assume late insertion of semantic denotations at LF and therefore the effect of semantic selection is not part of the selection system proper but rather an effect of the definition of grammaticality, see (13), which requires the structure to be realizable for interpretation. This means that some of the effects of semantic selection have a parallel in this system, because a structure is ungrammatical if it cannot be interpreted, notably if there is a type-mismatch

at the LF interface. If the morpheme T requires a complement whose head has the label Voice, this means that T has a selectional feature  $\langle \text{COMP}, \text{Voice} \rangle$ .

$$(23) \quad \{ \langle \text{LAB}, \text{T} \rangle, \langle \text{COMP}, \text{Voice} \rangle, \langle \text{PAST}, + \rangle \}$$

The selectional feature is satisfied in (15), repeated as (24), because the head of the complement of T is indeed Voice.



A morpheme can also demand an externally merged specifier. In Schäfer (2008), this is indicated with a subscript notation, thus  $\text{Voice}_{\{D\}}$  requires a specifier whose category is D, as in (24), but  $\text{Voice}_{\{\}}$  does not take a specifier at all. I will use the subscript notation as a shorthand but this notation really concerns the presence or absence of a selectional feature  $\langle \text{SPEC}, D \rangle$  as shown below.

- (25) a.  $\text{Voice}_{\{D\}} = \{ \langle \text{LAB}, \text{Voice} \rangle, \langle \text{COMP}, v \rangle, \langle \text{SPEC}, D \rangle \}$   
 b.  $\text{Voice}_{\{\}} = \{ \langle \text{LAB}, \text{Voice} \rangle, \langle \text{COMP}, v \rangle \}$

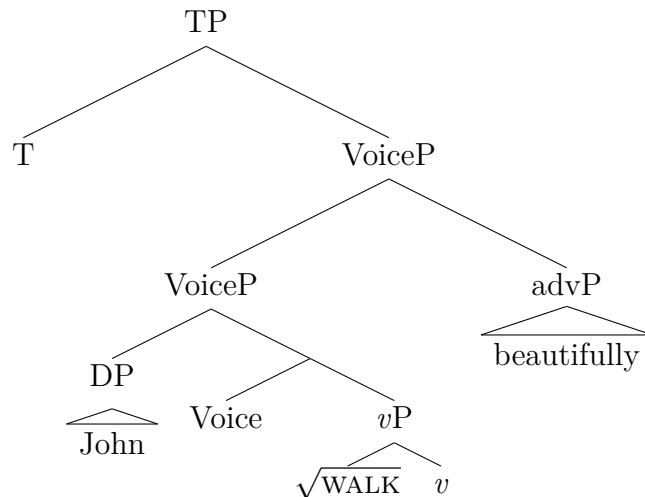
The empirical intuition which is encoded by c-selectional features is that certain morphemes need an immediate neighbor of some category. Thus,  $\text{Voice}_{\{D\}}$  needs a D in its specifier but D does not need Voice; noun phrases can for example be direct

objects in which case they do not have a Voice neighbor. When two morphemes Merge, the morpheme whose requirements are satisfied by the operation *generally* labels the resulting structure.  $\text{Voice}_{\{D\}}$  selects a *v* complement and the combined structure is still of the category Voice. It then selects a D specifier and the combined phrase is still of type Voice. In other words, the head which selects projects.

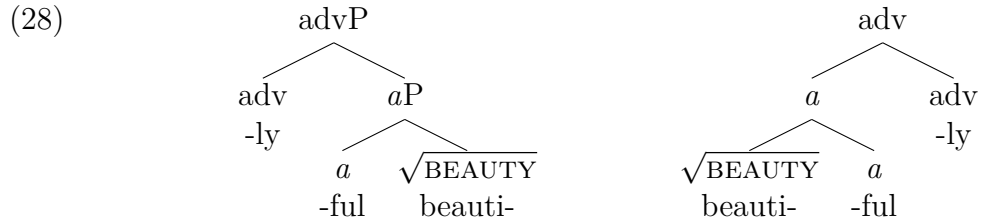
Mismatches between needs and projection are traditionally called adjuncts. In example (26), *beautifully* needs to combine with some part of the verb phrase, say Voice, but the verb phrase does not need the adverb. Nevertheless, the combined structure is a VoiceP but not an adverb phrase.

(26) John walked beautifully.

(27)



Let us say that a manner adverb phrase like *beautifully* is headed by an adv(erbializer) which takes an *a*(djective)P(hrase) as its complement as in the tree below (the phonological word being the realization of a complex head derived by head movement as shown on the right). Our real current interest is the way in which the adverb phrase combines externally with Voice.



This view of adjunction is compatible with the idea that adjuncts are not selected; it is the adjunct which selects its target; see Bruening (2013) for a discussion in favor of this view. The main advantage of the current approach is that it is precise about how the speaker knows where an adjunct can and cannot enter the syntax. If the need for target features can be successfully replaced with a precise alternative, such an alternative should be used instead, but it is not obvious at this point that another satisfying solution has successfully resolved the distribution of adjuncts.<sup>4</sup>

The requirement that manner advP targets Voice is encoded with a target feature  $\langle \text{TARG, Voice} \rangle$ . The morpheme which is realized as *-ly* at PF is the morpheme in (29). The target feature is an instruction to Merge *adv* and Voice and project Voice. This will be referred to as Target Merge and it encodes the triggering environments of what is called Pair Merge in Chomsky (1995). Target Merge is just like any other application of Merge except it is the selected element which projects. Furthermore, directionality of the adjunction must be specified, e.g., right-adjunction with a feature  $\langle \text{DIR, R} \rangle$ , because adjuncts can attach on either side of their host.

$$(29) \quad \{ \langle \text{LAB, adv} \rangle, \langle \text{COMP, } a \rangle, \langle \text{TARG, Voice} \rangle \langle \text{DIR, R} \rangle \}$$

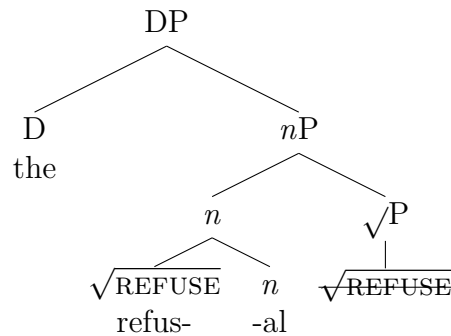
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<sup>4</sup>Potential avenues which have been suggested include proposals to account for the distribution of adjuncts in terms of independent principles (Ernst 2002) or linking each type of an adjunct with a specific type of a specifier of functional projection (Cinque 1999).



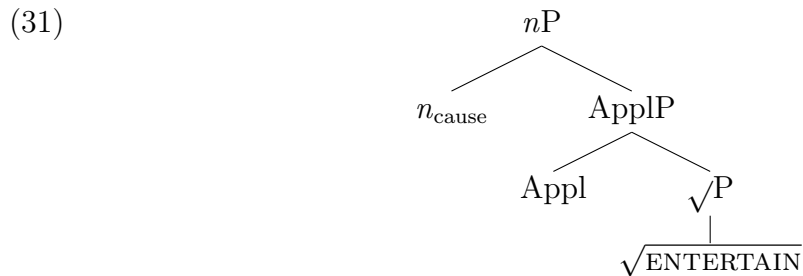
Roots have a special status in being the link to lexical information about the world which is not encoded by functional morphemes. Every root must be categorized by combining with a category-defining head and there is a close relationship between the root and its closest category-defining head. I assume that roots are the heads of root-phrases,  $\sqrt{P}$ , which are in many respects parallel to the “big” phrases of non-DM minimalist theory, e.g., “big VP”. The canonical way for a root to participate in a phonological word is by selection by a category-defining head and head movement which forms a complex head. For example, the English noun phrase *the refusal* which is built from the root  $\sqrt{\text{REFUSE}}$  is derived as follows, omitting any additional structure. Note that while I draw  $\sqrt{P}$  and  $\sqrt{\text{REFUSE}}$  separately in this tree diagram to emphasize the root’s dual status as a minimal and maximal projection, I will generally omit the  $\sqrt{P}$  level below.

(30)



Roots are licensed in terms of the features of their closest category-defining heads. For example, a certain nominal root might be licensed in the context of feminine gender features on a nominalizer (Kramer 2014) or by some other property which distinguishes nominalizers for each other. I assume that such compatibility conditions between roots and the closest category-defining head may extend further

than head-to-head selection if there is any functional structure below the closest category-defining head. I will, for example, assume that the root  $\sqrt{\text{ENTERTAIN}}$  and a special flavor of a nominalizer,  $n_{\text{cause}}$ , can stand in a compatibility relationship with each other in a configuration like the following.



There are a few different options in specifying how exactly the compatibility relationship between roots and their category-defining heads works. Ideally, such compatibility should arise because of the meaning properties of the elements in question but it might also be the case that the identity of a root is simply available for selection at any level until it is categorized. One way to implement such a system would be to say that category-defining heads define extended projections of the lexical type they specify (see Grimshaw 2000), e.g.,  $n$  for nouns, but that at the lowest level of the structure roots define their own extended projections. I will leave the technical exercise of the implementation details involved for future work.

Having discussed the central mechanisms which I assume are at work in the syntactic component of the grammar, I now turn to the interpretive system which realizes the structures built by syntax at its interface with meaning.

## 2.1.2 Realization of meaning

### 2.1.2.1 Ingredients of a proper system for semantics

I follow the view that a proper analysis of natural language semantics needs to unambiguously derive the truth conditions which correspond to certain syntactic terminal nodes and their hierarchical organization. This general approach to natural language semantics is widely adopted in formal linguistics and the system in Heim and Kratzer (1998) is an example of a well known modern implementation. The standard formalism for expressing an analysis of this type is the typed lambda calculus and an analysis must include the following.

- (32) a. A denotation is assigned to every syntactic terminal node.
- b. Composition principles are stated and they unambiguously derive the truth conditions associated with a syntactic structure, given the denotations of the terminal nodes.

An analysis which meets the requirements in (32) makes predictions which can be tested against alternative proposals in a rigorous manner and the conditions under which such an analysis is falsified are fairly well understood. There is no reason to resort to anything less precise and I will therefore spell out explicitly the denotations and composition principles for the proposed structures in this dissertation. Many aspects of my system adopt a standard approach in formal semantics but I will

nevertheless err on the side of overclarifying the formal tools and terminology in order to minimize the risk of misunderstanding.

Semantic composition is assumed to be type-driven and the basic semantic types are (i) truth values and (ii) particulars. A truth value has the type signature  $t$  and its value can be either true or false, often written as  $1/0$ , respectively. A particular is any other basic type and it is something that can be picked out in the world and referred to. A particular can be concrete or abstract and the set of particulars includes at least individuals, events and states. Individuals can be humans, animals, or inanimate objects. Events include activities like dancing and walking, and states include the state of someone being cold or something being closed. I will not be concerned with the philosophical implications of such a classification beyond its utility for capturing the distribution of linguistic elements.

The type signature  $e$  is used to refer to the subset of particulars which are individuals (entities) and  $s$  is used for particulars which are eventualities, including Davidsonian events (Davidson 1967) and states. The type signatures  $e$  and  $s$  are therefore notational conventions for restricting the domain of particulars.<sup>5</sup> I will use conventional labels for variables of each respective basic type as shown in (33). These conventions mean that whenever I use the variable  $x$ , it refers to an individual even if I do not explicitly mention that the type signature is  $e$ .

---

<sup>5</sup>Particular may also be further divided into subdomains like events, states, times, degrees, humans, animates, etc. and notational conventions can be introduced for any of these if they allow us to capture semantic distinctions which are important for grammatical representation.

(33) **Semantic types**

type	signature	variables
truth value	t	p, q
individual	e	x, y, z
eventuality	s	e, e', e''

For any two types  $X$  and  $Y$ , which may or may not be the same type, the ordered pair  $\langle X, Y \rangle$  is also a type. A denotation of type  $\langle X, Y \rangle$  is a function from (input) type  $X$  to (output) type  $Y$ . Type signatures are used to write out such complex types. For example,  $\langle e, t \rangle$  is the type of a function whose domain is the set of individuals and whose range is the set of truth values. A special function, the interpretation function, is written out using double brackets  $\llbracket \cdot \rrbracket$ . When the syntax is done, the interpretation function maps each morpheme to a specific denotation and computes the compositional meaning.

The denotation of a morpheme can be of any basic or complex semantic type. If proper names are analyzed as monomorphemic individuals, the denotation of **Cringer** is just ‘Cringer’ as in (34). The morpheme  $\sqrt{\text{CAT}}$  is interpreted as in (35a), where “ $\in D_{\langle e, t \rangle}$ ” means that its denotation is a function of type  $\langle e, t \rangle$ . The denotation of  $\sqrt{\text{CAT}}$  is the function which maps any individual  $x$  to ‘true’ (or 1) if the individual is a cat, but ‘false’ (or 0) otherwise. Rather than writing “true if  $x$  is a cat”, predicates will be written out in function notation below, for example “ $\text{cat}(x)$ ” in (35b). The two notations are equivalent.

$$(34) \quad \llbracket \mathbf{Cringer} \rrbracket \in D_e = \text{Cringer}$$

- (35) a.  $\llbracket \sqrt{\text{CAT}} \rrbracket \in D_{\langle e,t \rangle} = \lambda x . \text{true if } x \text{ is a cat, false otherwise}$   
 b.  $\llbracket \sqrt{\text{CAT}} \rrbracket \in D_{\langle e,t \rangle} = \lambda x . \text{cat}(x)$

Under the hood, a function is a set of ordered pairs. If Cringer and Oliver are cats but Adam is not, then the function  $\llbracket \sqrt{\text{CAT}} \rrbracket$  includes the following.

- (36)  $\llbracket \sqrt{\text{CAT}} \rrbracket \in D_{\langle e,t \rangle} = \{ \langle \text{Cringer}, 1 \rangle, \langle \text{Oliver}, 1 \rangle, \langle \text{Adam}, 0 \rangle \dots \}$

For the purpose of writing out derivations in the dissertation, the notation in (35b) will be used to express the meaning of predicates. However, the output of  $\text{cat}(x)$  is mathematically derived by looking the value of  $x$  up in the initial elements of a set of ordered pairs as shown in (36) and returning the corresponding second element. Given the state of the world in (36), the following holds.

- (37) a.  $\text{cat}(\text{Cringer}) = 1$   
 b.  $\text{cat}(\text{Adam}) = 0$

### 2.1.2.2 Semantic composition

Let us now consider how a compositional semantics works in the system. The syntax derives a hierarchical structure and this structure is the input to the interpretation component. Following standard terminology, the hierarchical structure which is interpreted is called Logical Form (LF). I will capture most semantic composition with the basic operations Functional Application and Predicate Conjunction. Functional Application (see Heim and Kratzer 1998:44) is triggered when a node is of a type which is the appropriate input for its sister node.

(38) **Functional Application**

If  $\alpha$  is a branching node,  $\{\beta, \gamma\}$  is the set of  $\alpha$ 's daughters, and  $\llbracket \beta \rrbracket$  is a function whose domain contains  $\llbracket \gamma \rrbracket$ , then  $\llbracket \alpha \rrbracket = \llbracket \beta \rrbracket(\llbracket \gamma \rrbracket)$ .

For a simplistic illustration, assume that the LF for sentence (39) contains only two terminal nodes (40), corresponding to *Cringer* and *cat*, respectively, and that their denotations are as in (41) where **Cringer** denotes an individual, of type e, and  $\sqrt{\text{CAT}}$  denotes a function from individuals to truth values, of type  $\langle e, t \rangle$ .

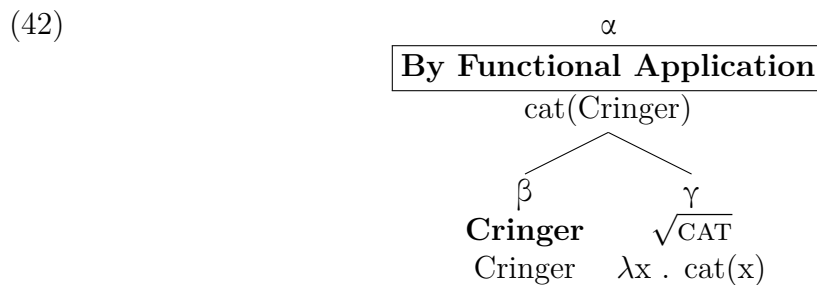
(39) Cringer is a cat.



(41) a.  $\llbracket \mathbf{Cringer} \rrbracket \in D_e = \text{Cringer}$

b.  $\llbracket \sqrt{\text{CAT}} \rrbracket \in D_{\langle e, t \rangle} = \lambda x . \text{cat}(x)$

Given these assumptions, the truth conditions for the sentence are derived as in (42a). An individual, type e, is an appropriate input to a function from individuals to truth values, type  $\langle e, t \rangle$ , and thus Functional Application is triggered. The lambda term  $\lambda x$  is dropped and x is replaced with Cringer. This sentence is true if and only if Cringer is a cat.



Predicate Conjunction (Kratzer 2009), written out as in Wood (2012), is triggered when two sisters are of the same type.

(43) **Predicate Conjunction**

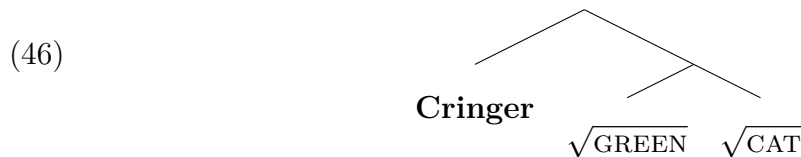
If  $\alpha$  is a branching node,  $\{\beta, \gamma\}$  is the set of  $\alpha$ 's daughters, and  $\llbracket \beta \rrbracket$  and  $\llbracket \gamma \rrbracket$  are both in  $D_f$ , and  $f$  is a semantic type which takes  $n$  arguments, then  $\llbracket \alpha \rrbracket = \lambda(a_1, \dots, a_n). \llbracket \beta \rrbracket \lambda(a_1, \dots, a_n) \wedge \llbracket \gamma \rrbracket \lambda(a_1, \dots, a_n)$ .

Predicate Conjunction is a generalized type-independent version of Predicate Modification (Heim and Kratzer 1998). An intersective adjective like the color *green* is a canonical modifier which is combined with a noun via Predicate Conjunction. A denotation for the root  $\sqrt{\text{GREEN}}$  is given below.

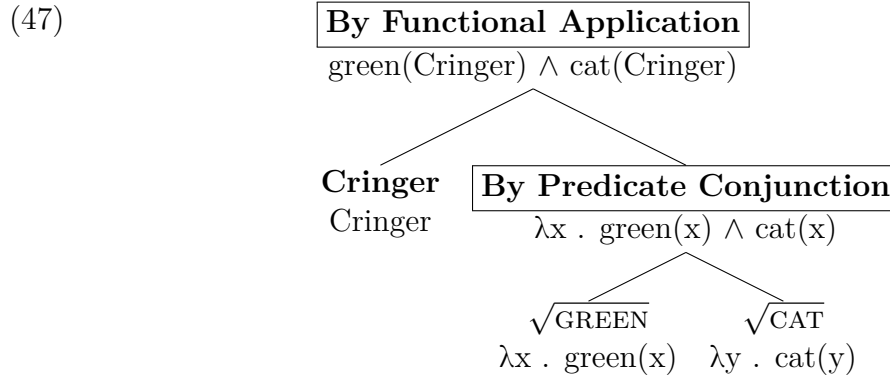
(44)  $\llbracket \sqrt{\text{GREEN}} \rrbracket \in D_{\langle e, t \rangle} = \lambda x . \text{green}(x)$

Again, simplifying matters by omitting functional structure, the truth conditions of (45) can be derived from the LF in (46) as shown in (47). The sentence is true if and only if Cringer is green and Cringer is a cat.

(45) Cringer is a green cat.







Functional Application (FA) and Predicate Conjunction (PC) will be sufficient for deriving the truth conditions of most of the structures below.

### 2.1.2.3 Interpreting morphemes

The next part of this overview of the basic semantic formalism describes how exactly denotations of morphemes (syntactic terminal nodes) are determined. These implementation details will play a role in some of the following chapters. Nevertheless, the discussion here should primarily be understood as an explicit formulation in the interest of being precise about how the system works. I am not systematically arguing for all aspects of this formalism and many of them can without doubt be translated into other systems without much impact on my findings.

First, functional heads will be considered, then roots. The first example involves applicatives. An event applicative<sup>6</sup> relates a noun phrase (DP) in its specifier to the event of which its complement is a predicate.

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<sup>6</sup>An event applicative is called a high applicative in the terminology of Pylkkänen (2008). Applicatives will be discussed in more detail in Chapter 3.



Applicatives introduce arguments like experiencers and benefactives and in the structure in (48), the noun phrase will typically be interpreted as an experiencer or a benefactive of the event described by the verb. For the sake of demonstration, let there be two flavors of the Appl morpheme as in (49).

- (49) a.  $\text{Appl}_{\text{exp}} = \{ \langle \text{LAB}, \text{Appl} \rangle, \langle \text{COMP}, \text{v} \rangle, \langle \text{SPEC}, \text{D} \rangle, \langle \text{EXP}, + \rangle \}$  (Experiencer)  
 b.  $\text{Appl}_{\text{ben}} = \{ \langle \text{LAB}, \text{Appl} \rangle, \langle \text{COMP}, \text{v} \rangle, \langle \text{SPEC}, \text{D} \rangle \}$  (Benefactive)

The two flavors are related in how they have the same label and they both take a verb as their complement. However, as presented above, the experiencer applicative is distinguished from the benefactive by an additional [+exp] feature,  $\langle \text{exp}, + \rangle$ . Morphemes are paired with denotations by Meaning Items (MIs).<sup>7</sup> MIs for the above morphemes are given in (50). The left side of the MI states which syntactic features it matches and its right side states the denotation which corresponds to these features.

- (50) a.  $\llbracket \mathbf{Appl} \langle \text{EXP}, + \rangle \rrbracket = \lambda P_{\langle s,t \rangle} . \lambda x . \lambda e . P(e) \ \& \ \text{experiencer}(x,e)$   
 b.  $\llbracket \mathbf{Appl} \rrbracket = \lambda P_{\langle s,t \rangle} . \lambda x . \lambda e . P(e) \ \& \ \text{benefactive}(x,e)$

---

<sup>7</sup>The MI is an LF parallel to the Vocabulary Item at PF. See Section 2.1.3.1 on Vocabulary Items.

Denotations of terminal nodes are selected according to (51). This formulation, in turn, depends on an LF Subset Principle (52) which is directly parallel to the Subset Principle for PF which is formulated in Halle (1997) and discussed in Section 2.1.3.1 below.

(51) **Terminal Nodes**

If  $\alpha$  is a terminal node,  $[[\alpha]]$  is the denotation of a Meaning Item which is selected by the LF Subset Principle.

(52) **LF Subset Principle (adapted from PF version of Halle (1997))**

The denotation of a Meaning Item is inserted into a position if the item matches all or a subset of the features specified in that position. Insertion does not take place if the Meaning Item contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

The above discussion of functional heads only considered cases where the features of a morpheme X are sufficient for determining its denotation. Denotations can also arise contextually, a phenomenon referred to as Contextual Allosemy by Wood (2012). Following Marantz (2009a,b), Wood (2012) and Myler (2014), I assume that a denotation of a terminal node can depend on properties of its immediate environment. An example of Contextual Allosemy adapted from Wood (2012:28)

is given in (53) where  $v$  is by default interpreted as (53a) but as a causative (53b) when its complement is of type  $\langle s,t \rangle$ .

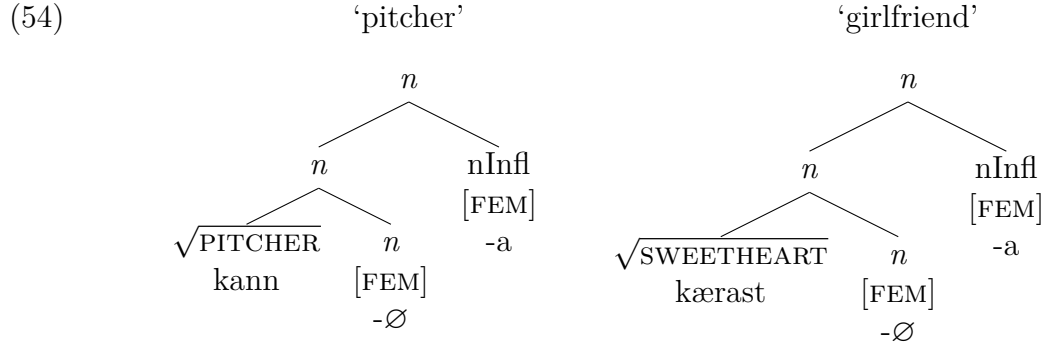
- (53) a.  $\llbracket \mathbf{v} \rrbracket = \lambda e . \text{activity}(e)$   
 b.  $\llbracket \mathbf{v} \rrbracket = \lambda P_{\langle s,t \rangle} . \lambda e . \exists e' . \text{activity}(e,s) \wedge \text{CAUS}(e,e') \wedge P(e') / \text{---} \langle s,t \rangle$

A system with Contextual Alloosemy and Late Insertion at LF takes over some of the role of interpretable and uninterpretable features as distinct primitives in the syntax. For the purpose of deriving truth conditions, an interpretable feature simply becomes any feature which an MI refers to rather than something which is flagged in any special way in the syntax. This is not a radical move away from traditional interpretable and uninterpretable features but rather a way of taking advantage of late insertion at LF in order to separate the roles of the syntax and the semantics.

Consider, for example, the finding of Kramer (2009, 2014, 2015) that gender is sometimes interpretable and sometimes uninterpretable. The Icelandic nouns *kanna* ‘pitcher’ and *kærasta* ‘girlfriend’ are both in the weak feminine declension but it is reasonable to believe that only the latter has interpretable gender. The noun for ‘girlfriend’ contrasts with the masculine noun *kærasti* ‘boyfriend’.<sup>8</sup>

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<sup>8</sup>I will not treat the root *kærast-*  $\sqrt{\text{SWEETHEART}}$  as morphologically complex for the purpose of this demonstration even if it derives (at least historically) from the superlative of *kær* ‘dear’ in which *-ast* represents the superlative morphology.



In both cases, the gender feature originates on  $n$  and is copied onto the nominal inflection  $n\text{Infl}$  via the concord mechanism at PF (see Section 5.3.3). Contextual allosemy realizes the nominalizer at LF such that it contributes natural gender to the truth conditions in the context of certain roots. I put to the side the orthogonal question of whether interpreted gender is presuppositional in nature.

- (55)
- a.  $\llbracket \mathbf{n}\langle \text{GEND}, \text{FEM} \rangle \rrbracket = \lambda P_{\langle e, t \rangle} . \lambda x . P(x) \wedge \text{female}(x) / \_ \{ \sqrt{\text{SWEETHEART}}, \dots \}$
  - b.  $\llbracket \mathbf{n}\langle \text{GEND}, \text{MASC} \rangle \rrbracket = \lambda P_{\langle e, t \rangle} . \lambda x . P(x) \wedge \text{male}(x) / \_ \{ \sqrt{\text{SWEETHEART}}, \dots \}$
  - c.  $\llbracket \mathbf{n} \rrbracket = \lambda P_{\langle e, t \rangle} . \lambda x . P(x)$

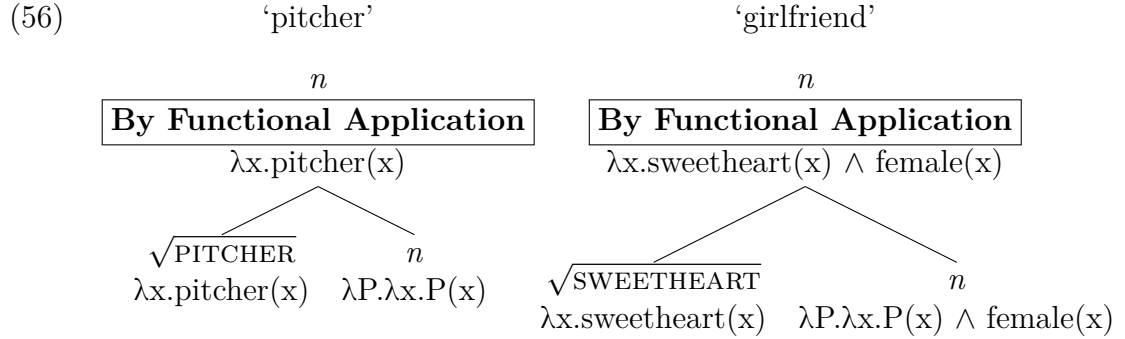
The MIs state that a feminine interpretation should be inserted for a feminine gender feature in the context of roots like  $\sqrt{\text{SWEETHEART}}$  but the elsewhere nominalizer is realized at LF as the identity function.<sup>9</sup> The following derivations show how our two example nouns are derived in the semantics.

<sup>9</sup>Here, I abstract away from nouns whose root is not of type  $\langle e, t \rangle$ . A more detailed analysis of the elsewhere interpretation would be along the following lines:

- (i)  $\llbracket \mathbf{n} \rrbracket = \lambda P_{\langle \phi, t \rangle} . \lambda x_{\phi} . P(x)$  (Where  $\phi$  is some semantic type)

This would account for event denoting nouns such as *destruction* whose roots are of type  $\langle s, t \rangle$ .

They are presumably never associated with interpretable gender.



Languages differ greatly in their use of interpretable and arbitrary gender. Icelandic gender is predominantly arbitrary whereas for example Amharic and Spanish make substantial use of interpretable gender (Kramer 2015).

Roots are also interpreted by inserting an appropriate denotation at LF. Roots are assumed to be licensed in terms of the features on the closest category-defining head, including gender (Kramer 2014).<sup>10</sup> For example, the root  $\sqrt{\text{LAND}}$  ‘country, land, etc.’ is compatible with neuter, masculine and feminine nominalizers. Importantly, the different genders correlate with different members of the polysemy set of  $\sqrt{\text{LAND}}$ .

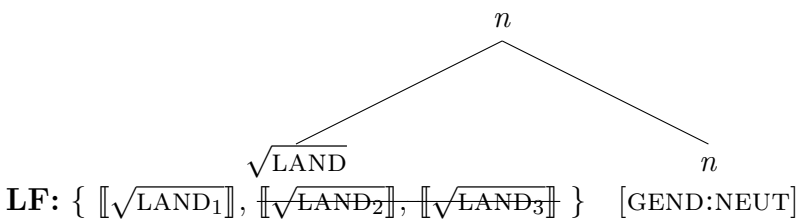
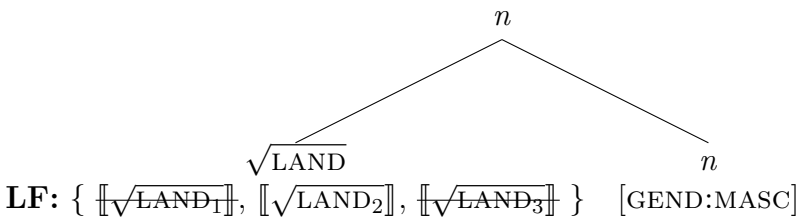
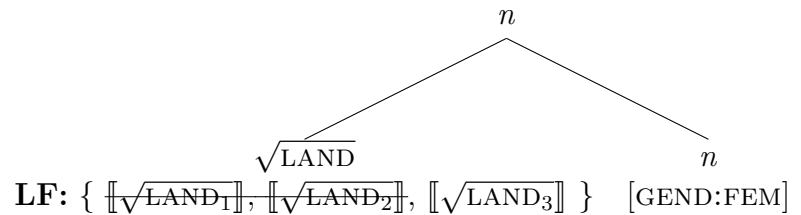
- (57)
- a. land- $\emptyset$  ‘country’ NEUT.NOM.SG (strong neuter declension)
  - b. land-i ‘compatriot’ MASC.NOM.SG (weak masculine declension)
  - c. lönd-un- $\emptyset$  ‘unloading (of fish) onto land’ FEM.NOM.SG (fem. nmlz. *-un*)

We can formalize the polysemy set as  $\{\llbracket \sqrt{\text{LAND}_1} \rrbracket, \llbracket \sqrt{\text{LAND}_2} \rrbracket, \llbracket \sqrt{\text{LAND}_3} \rrbracket\}$  where the respective denotations are realized as follows at LF.

<sup>10</sup>See Harley and Noyer (1999, 2000) on the general idea that roots are licensed by their context.

- (58) a.  $\llbracket \sqrt{\text{LAND}_1} \rrbracket = \lambda x . \text{country}(x)$   
 b.  $\llbracket \sqrt{\text{LAND}_2} \rrbracket = \lambda x . \text{compatriot}(x)$   
 c.  $\llbracket \sqrt{\text{LAND}_3} \rrbracket = \lambda e . \text{unloading-of-fish}(e)$

Phase heads, category-defining heads in particular, are the locus of subset operations over denotations in polysemy resolution and this is demonstrated below for the LF of the words under discussion.

- (59) a. 
- b. 
- c. 

Phase-cyclic locality constraints on polysemy resolution will be elaborated below.

The term polysemy is reserved for related meanings of the same root and is not to be confused with accidental homophony as in *bank* ‘financial institution’ vs. ‘river bank’. These are assumed to be distinct roots.

## 2.1.3 Realization of sound

### 2.1.3.1 The morphological component

Parallel to the manner in which the interpretation component of the grammar takes the output of the syntax as its input, the phonological component takes the same output of the syntax and maps it to a phonological representation. The postsyntactic derivation applies morphological operations which realize the syntactic terminal nodes and subsequently the structure is linearized and flattened and phonological processes operate on the output.

Consider the nouns *leikur* ‘game’ and *kassi* ‘box’ whose morphological segmentation is given below.

- (60) a. leik-ur  $\sqrt{\text{PLAY-nInfl[MASC,NOM,SG]}}$  ‘game’  
b. kass-i  $\sqrt{\text{BOX-nInfl[MASC,NOM,SG]}}$  ‘box’

Two morphemes have overt phonological exponents in each noun, the root and the nominal inflection nInfl. The exponent is decided in each case by Vocabulary Items of the following type.<sup>11</sup>

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<sup>11</sup>It should be noted that the effect of the notion declension class is derived in this system by assuming that sets like  $\{\sqrt{\text{PLAY}}, \sqrt{\text{HORSE}}, \dots\}$  are reusable. Thus, even if my Vocabulary Items do not make reference to features along the lines of CLASS-IV, the system allows for systematic correlations between nouns which take a particular nominative nInfl exponent and a particular accusative exponent. We could equivalently write something like [CLASS:IV], using IV as a diacritic. A class is a diacritic phenomenon where the diacritic is a shorthand for set membership.



- (61) a.  $\text{nInfl}[\text{MASC},\text{NOM},\text{SG}] \leftrightarrow -ur / \{\sqrt{\text{PLAY}}, \sqrt{\text{HORSE}}, \dots\}^{\wedge} \_$   
 b.  $\text{nInfl}[\text{MASC},\text{NOM},\text{SG}] \leftrightarrow -i$

The Vocabulary Item in (61a) states that the phonological exponent for the morpheme  $\text{nInfl}[\text{MASC},\text{NOM},\text{SG}]$  is  $-ur$  when  $\text{nInfl}$  is concatenated with the roots  $\sqrt{\text{PLAY}}$ ,  $\sqrt{\text{HORSE}}$ , and some others. The Vocabulary Item in (61b) states that the same morpheme is generally realized as  $-i$ . The choice between VIs is constrained by the Subset Principle.

(62) **PF Subset Principle (Halle 1997:128)**

The phonological exponent of a Vocabulary Item is inserted into a position if the item matches all or a subset of the features specified in that position. Insertion does not take place if the Vocabulary Item contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

It is a consequence of the Subset Principle that the most specific match is chosen in each case. Note that the context counts for specificity so that a VI is selected if it matches the features  $[\text{MASC},\text{NOM},\text{SG}]$  and also some aspect of the context like a concatenated root, rather than just the features.

Consider the PF derivation of *leikur* ‘game’ from the root  $\sqrt{\text{PLAY}}$  which is given in some detail below. In this tree, the root has combined with a category-defining

head  $n$  which makes it into a noun and the nominal inflection morpheme  $n\text{Infl}$  has been adjoined to  $n$ .

- (63) a.
- 
- b.  $\sqrt{\text{PLAY}} \frown n, n \frown n\text{Infl}$  (Concatenation)
- c.  $\sqrt{\text{PLAY}} \frown [n, -\emptyset], [n, -\emptyset] \frown n\text{Infl}$  (Vocabulary Insertion)
- d.  $\sqrt{\text{PLAY}} \frown n\text{Infl}$  (Pruning)
- e.  $\sqrt{\text{PLAY}} \frown [n\text{Infl}, -ur]$  (Vocabulary Insertion)
- f.  $\sqrt{\text{PLAY}} -ur$  (Chaining)
- g. /leikur/ (PF output)

The tree in (63a) is converted into concatenation statements which encode linear adjacency (63b). Vocabulary Insertion starts by inserting a  $-\emptyset$  exponent for the nominalizer due to a Vocabulary Item as follows, leading to (63c).

$$(64) \quad n \leftrightarrow -\emptyset$$

A linear configuration in which two morphemes are connected via a zero exponent undergoes an operation of Pruning which removes the zero exponent from the representation (Embick 2010). This operation leads to (63d).

(65) **Pruning**

$$\sqrt{\text{ROOT}} \frown [x, -\emptyset], [x, -\emptyset] \frown Y \rightarrow \sqrt{\text{ROOT}} - Y$$

Vocabulary Insertion proceeds. The  $-ur$  exponent is selected according to the Subset Principle because it is the most specific candidate for insertion (63e). Finally, everything is chained together (63f) and the phonological output representation of

the noun is as in (63g). The root might enter the derivation with a phonological form or it might undergo Vocabulary Insertion like other morphemes (Harley 2014). The issue will not be explored in the dissertation but whichever answer is correct, I will in general not show the VI step for the root in PF derivations.

I assume with Embick and Marantz (2008:6) that every root must combine with a category-defining functional head. For this reason, a noun always has an *n* morpheme and a verb a *v* morpheme, even if there is no overt derivational morphology.

(66) **Categorization assumption**

Roots cannot appear (cannot be pronounced or interpreted) without being categorized; they are categorized by merging syntactically with category-defining functional heads.

A category-defining head may vary in its interpretive realization depending on its feature content and its context. In many cases, I only write *n* for nominalizer and leave implicit the potential need for different flavors of this head. For example, an agentive nominalizer *-er* in *sing-er* might contain a feature [+AGENT] or it might receive a special interpretation in the context of agent-associated functional structure, e.g., a Voice head or something similar. When a special emphasis is placed on a particular flavor of a category-defining head, I use a subscript to indicate this. For example, a causative nominalizer which is introduced in Chapter 3 is referred to as  $n_{\text{cause}}$ . Due to the Subset Principle, the same Vocabulary Items are used

to realize special flavors as the vanilla  $n$  at PF unless they make reference to the relevant feature distinctions.

### 2.1.3.2 Morphophonology

In addition to the regular pure phonology, the present system assumes that phonological processes can be triggered on a morpheme-specific basis. The generalizations which will be investigated in Chapter 5 make use of the terms Morphological reference (M-reference) and Phonological reference (P-reference) to discuss morphophonology.

(67) **M-reference:**

Reference to morpheme as a morpheme, e.g., referring to a feature of a morpheme like [MASC] or the identity of a root like  $\sqrt{\text{SING}}$ .

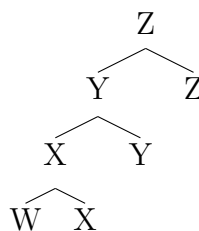
(68) **P-reference:**

Reference to a phonological environment, e.g., referring to a “phonological pause” or “the vowel of the preceding syllable”.

A PF process which makes M-reference to both the trigger and the target of the effect is referred to as an M/M effect and it is predicted to obey morphological locality. In contrast, if one of the two, trigger or target, are accessed by P-reference, it is predicted that the effect obeys phonological locality, and in such cases we speak of an M/P effect.

I follow Shwayder (2015:242) in assuming that the relevant difference between M/M effects and M/P effects is a result of the two applying at distinct stages of the derivation. As described above, a structure like the following is first converted into a set of concatenation statements and then chained together. M/M effects apply at the concatenation stage and M/P effects at the chaining stage.

(69)



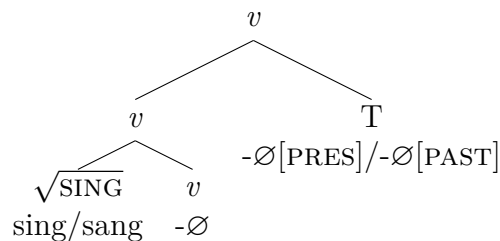
Concatenation stage:  $W \frown X$ ,  $X \frown Y$ ,  $Y \frown Z$

Chaining stage:  $W-X-Y-Z$

An example of an M/M effect in English is the alternation between the present tense *sing* and the past tense *sang*.

(70) a. sing [PRES]

b. sang [PAST]



Because the change in exponence involves a minor adjustment to the phonological representation, /i/ → /a/, we analyze the effect in terms of a morphophonological readjustment rule in the sense of Halle and Marantz (1993) rather than as VI-based suppletive allomorphy. The trigger of the readjustment is clearly accessed by M-reference, namely the syntacticosemantic feature [PAST]. Furthermore, because not

all English verbs with /i/ in the present undergo the alternation, the speaker must also make M-reference to the identity of the root  $\sqrt{\text{SING}}$ ; this is an M/M effect.

M/M effects and M/P effects can appear similar at first sight. However, the hypothesized difference between them involves the so-called Morpheme Interaction Conjecture (Embick 2013a).

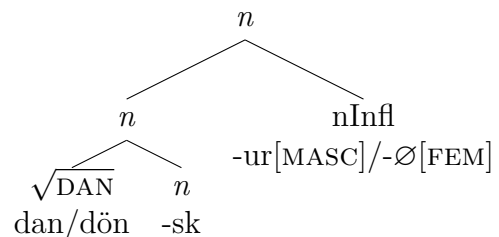
- (71) **Morpheme Interaction Conjecture (MIC):** PF Interactions in which two morphemes are accessed by M-reference (as morphemes) occur only under linear adjacency (concatenation).

In Chapter 5, I analyze the Icelandic *u*-umlaut as an M/P effect. The effect makes morpheme-specific reference to various triggers but it makes P-reference to its targets; the target is simply the vowel /a/ in the syllable which precedes the triggering morpheme and is thus realized as /ö/ due to the umlaut process. According to the MIC, this means that the Icelandic *u*-umlaut can skip morphemes if they are not syllabic. We find that this is the case as shown below.

- (72) ‘Danish’

a. dan-sk-ur [MASC,NOM,SG]

b. dön-sk-∅ [FEM,NOM,SG]



Here, the feminine, nominative, singular of the nominal inflection triggers the umlaut across the *-sk* ‘-ish’ nationality suffix.

If this kind of a theory is on the right track, the observed locality conditions on morphophonological processes can sometimes serve as a evidence for which type of a process we are looking at in each case.

#### **2.1.4 Section summary**

This section introduced the three main components of the grammar which are at the core of the phenomena which this dissertation is about. The syntax assembles morphemes into hierarchical structures via Merge and establishes relationships between them via Agree. A semantic component takes the output of the syntax and maps it onto a representation which is appropriate for interpretation. This component assigns a denotation to every terminal node and then computation is driven by the composition principles of Functional Application and Predicate Conjunction. Finally, a phonological component realizes the output of syntax at its interface with pronunciation. This component uses an operation of Vocabulary Insertion to give morphemes their underlying phonological representation which may then be further adjusted by phonological or morphophonological processes. All of these three components, syntax, semantics and phonology, are constrained by principles which control which elements are allowed to interact with each other. The following section elaborates on the locality principles which are most important for the forthcoming discussion.

## 2.2 Locality in Distributed Morphology

The central theoretical basis for the dissertation is the part of Distributed Morphology (DM) which imposes limits on how morphemes can be realized. This section gives a brief theoretical background. I first review the role of linear adjacency and phase locality in contextual allomorphy and meaning and then I discuss the role of interveners for affixation in phenomena like English *do*-support.

### 2.2.1 Linear adjacency and contextual allomorphy

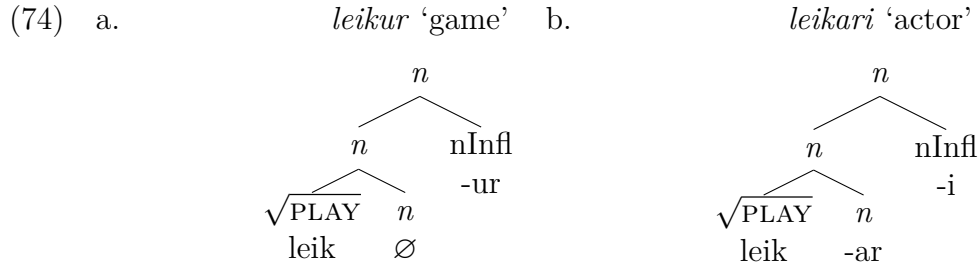
I follow Embick (2010) in assuming that conditions on contextual allomorphy can only refer to linearly adjacent morphemes. This Bidirectional Linear Adjacency Constraint can be thought of as the effect of the Morpheme Interaction Conjecture in the special case of Vocabulary Insertion.

(73) **Bidirectional Linear Adjacency Constraint (BLAC)**

Conditions on contextual allomorphy require linear adjacency. Therefore, Vocabulary Insertion at a morpheme X can only refer to properties of the context if they are a part of the morpheme immediately to the left and/or immediately to the right of X.

Consider the two Icelandic nouns in (74). They are both built on the root  $\sqrt{\text{PLAY}}$  and they crucially differ with respect to whether they contain overt nominalization morphology or not.





In DM, the phonological exponent of a morpheme is determined by a set of ordered Vocabulary Items. A toy analysis for the nominative singular of the above words is given below. The Vocabulary Items state that nInfl is pronounced *-ur* if it is concatenated with one of the roots on the list but otherwise *-i* is inserted.<sup>12</sup>

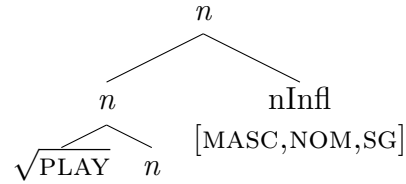
- (75) a. nInfl[MASC,NOM,SG] ↔ -ur / { $\sqrt{\text{PLAY}}$ ,  $\sqrt{\text{HORSE}}$ , ...} ◌  
 b. nInfl[MASC,NOM,SG] ↔ -i

Recall the derivation of the root-adjacent nInfl *-ur* in *leik-ur* ‘game’ which is repeated in (76). The syntactic structure (76a) is converted to a set of concatenation statements (76b). Vocabulary Insertion takes place from the inside out (see Bobaljik 2000), first by making *-∅* the phonological exponent of *n* (76c). Null nodes are removed by an operation of Pruning which results in nInfl being concatenated with the root (76d). The Vocabulary Items in (75) state that nInfl is realized as *-ur* when concatenated with the root  $\sqrt{\text{LEIK}}$  as is shown (76e). Finally, everything is chained together (76f).

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<sup>12</sup>The example is constructed to demonstrate the adjacency constraint and it ignores various aspects of these morphemes, including potential for underspecified Vocabulary Items.

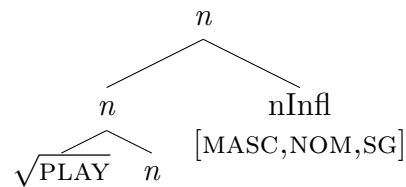
(76) a.



- b.  $\sqrt{\text{PLAY}} \frown n, n \frown \text{nInfl}$  (Concatenation)
- c.  $\sqrt{\text{PLAY}} \frown [n, -\emptyset], [n, -\emptyset] \frown \text{nInfl}$  (Vocabulary Insertion)
- d.  $\sqrt{\text{PLAY}} \frown \text{nInfl}$  (Pruning)
- e.  $\sqrt{\text{PLAY}} \frown [\text{nInfl}, -\text{ur}]$  (Vocabulary Insertion)
- f.  $\sqrt{\text{PLAY}} - \text{ur}$  (Chaining)
- g. /leikur/ (PF output)

The derivation of *leik-ur* ‘game’ shows how the Pruning of null *n* puts the root within reach of the mechanism that determines the form of nInfl. We can now contrast the above with *leik-ar-i* ‘actor’ in which the *n* morphology is overt. The syntax is the same (77a) and after concatenation (77b), *-ar* is inserted as the form of agentive *n* (77c). There is no null morpheme here, so no Pruning takes place, and according to the rules in (75), nInfl is realized as *-i* (77d).

(77) a.



- b.  $\sqrt{\text{PLAY}} \frown n, n \frown \text{nInfl}$  (Concatenation)
- c.  $\sqrt{\text{PLAY}} \frown [n, -\text{ar}], [n, -\text{ar}] \frown \text{nInfl}$  (Vocabulary Insertion)
- d.  $\sqrt{\text{PLAY}} \frown [n, -\text{ar}], [n, -\text{ar}] \frown [\text{nInfl}, -\text{i}]$  (Vocabulary Insertion)
- e.  $\sqrt{\text{PLAY}} - \text{ar} - \text{i}$  (Chaining)
- f. /leikari/ (PF output)

Conditions on contextual allomorphy are expressed in terms of the concatenation operator, as in (75a), and therefore it cannot see past overt intervening material.

In addition to the adjacency constraint, the present system assumes that phase-theoretic locality constrains contextual allomorphy.

### 2.2.2 Phase locality

I assume that syntactic structures are sent cyclically to the interfaces, by phase (Chomsky 2000, 2001), for phonology (PF) and interpretation (LF), and that the cyclic nature of the derivation imposes locality constraints. Although considerable work has been done in recasting earlier work in syntax in terms of phases, particularly with respect to constraints on movement, there is also evidence that phases play a role in surface phenomena at the interfaces. My formulation of such locality effects mostly follows the implementation in Embick (2010, 2013a), which assumes the second version of Chomsky’s Phase Impenetrability Condition (PIC2) (Chomsky 2001).

#### (78) Phases

Category-defining heads, at least *v*, *n*, *a* (Marantz 2001, 2007), and C, and possibly others, trigger Spell-Out of their complements; they are the phase heads.<sup>13</sup> These phase heads are often realized as “derivational morphemes”.

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<sup>13</sup> For the purpose of syntactic displacement, C is the most canonical phase head. Depending on other assumptions, the category *v* corresponds for the most part to *v* in a non-DM minimalist framework, although a synthesis of the different implementations of phase theory is a non-trivial theoretical matter. It is less obvious in the syntax than in the morphology that all instances of

The cyclic Spell-Out 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.

(79) **Phase locality**

A phase head cannot see morphemes across the next phase head. A non-phase-head can see other non-phase heads across the next phase head but not further than that.



In (80),  $n$  and  $v$  are cyclic (phase) heads, whereas  $X$  and  $Y$  are not. Because of (79),  $n$  sees  $X$  and  $v$  but it does not see  $Y$ . In contrast,  $X$  sees  $v$  and  $Y$ . Phases have consequences for the realization of morphemes with respect to both morphology and meaning. First, consider morphology (Embick 2010, 2013a).

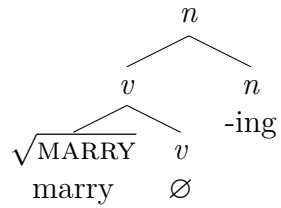
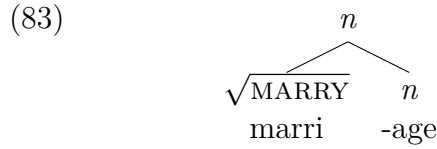
(81) **Phase locality and morphology**

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

The difference between derived nominals and gerunds in English is a clear example of (81). In addition to a sharp split between the syntactic properties of the two types  $v$  are phases, but I will nevertheless assume so. On every  $v$  being a phase, see Legate (2003); Ingason and Wood (2013, 2014 [Submitted.]).

of nouns, diverse allomorphy is attested in the case of derived nominals whereas gerunds always surface with the *-ing* suffix.

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



It is a well motivated syntactic analysis to say that gerunds, unlike derived nominals, are verbs internally, as reflected by the structural contrast in (96) (cf. Chomsky 1970). This rendering of the structures is modeled after Marantz (1997) and Embick (2010) where the *n* of a derived nominal combines directly with a root but in a gerund, *n* combines with a *v* which has already combined with a root. In the DM framework, the allomorphy contrast is predicted because (81) means that *n* can see a root that it combines with directly but it cannot see a root across *v*. Root-conditioned allomorphy on *n* in gerunds is impossible.

Moreover, the phase is also a locality domain for conditions on meaning. When narrowing down the set of possible related meanings for a root, a meaning that has been excluded at an inner phase head is unavailable at an outer phase head. The phase heads can therefore be viewed as the locus of subset operations over possible meanings of roots in polysemy resolution (Marantz 2013, see also Arad 2003).

(84) **Phase locality and meaning**

A meaning of a root that has been excluded at an inner phase head is unavailable at an outer phase head.

Consider the polysemy of English *globe* as an example (see Marantz 2013 for a more detailed discussion of the same example).

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

Once the polysemy cloud of the root has been restricted by a phase head (derivational morpheme), the excluded meanings are unavailable to outer phases. At the root, the range of possible meanings includes both of the above. Making *globe* a noun allows for both meanings, whereas the adjective *global* excludes the ‘spherelike’ meaning. This contrast is shown in (86).

- (86)
- |   |   |   |
|---|---|---|
| <b>Noun:</b><br>✓ ‘spherelike’<br>✓ ‘world’<br><i>n</i><br>$\sqrt{\text{GLOBE}}$ <i>n</i><br>-∅ | <b>Adjective:</b><br>* ‘spherelike’<br>✓ ‘world’<br><i>a</i><br>$\sqrt{\text{GLOBE}}$ <i>a</i><br>-al | <b>Adjective-derived:</b><br>* ‘spherelike’<br>✓ ‘world’<br><i>v</i><br><i>a</i> <i>v</i><br>$\sqrt{\text{GLOBE}}$ <i>a</i> -ize<br>-al |
|---|---|---|

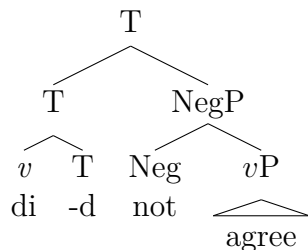
As the rightmost example shows, (84) has the effect that the ‘spherelike’ meaning that is excluded at the *a* phase head remains unavailable at the outer *v* phase head. Once a possible meaning has been excluded from the range of options, it cannot be brought back.

### 2.2.3 Interveners for affixation

Another type of a locality effect in morphology is that some morphemes need to attach to an “immediately local” morphological host. A well known example of this type is *do*-support in English. The T(ense) morpheme in English needs to be immediately local to *v* (the verb). In the absence of T/*v* interveners, tense in English is expressed as a suffix on the verb (87a). Negation is a T/*v* intervener and therefore (87b) is ungrammatical; negation triggers *do*-support (87c). However, *v*P-adjoined adverbs are not T/*v* interveners for the purpose of *do*-support (87d). The syntactic analysis of (87c) is given in (88), based on Embick and Noyer (2001:587), where *do* is a default *v* morpheme.

- (87) a. John agreed.  
 b. \*John not agreed.  
 c. John did not agree.  
 d. John completely agreed.

(88) Syntax of English *do*-support



While some notion of “immediate locality” is clearly needed, it is a complicated matter to determine the most appropriate formulation of this locality. For the

analysis of English *do*-support, Embick and Noyer propose an operation of morphological Tense lowering in the phonological component that is constrained to a relationship between a head and the head of its complement. The English *vP* is not the complement of T when negation intervenes and therefore lowering is blocked and *do*-support is triggered. Since the relationship is defined in terms of a head and its complement, an adverb that is adjoined to *vP* is correctly predicted not to have an effect. A possible alternative is to say that the suffix T combines with its host, *v*, by so-called local dislocation under linear adjacency (see Embick and Noyer 2001).<sup>14</sup> In that case, a reason has to be provided for why adjuncts do not count as interveners. There exist analytical options, e.g., some implementation of late adjunction (Lebeaux 2000; Stepanov 2001).

For the purpose of analyzing English *do*-support, it is not obvious whether it is preferable to require the T morpheme to be linearly local to the verb or in a head-to-head selectional relationship with it. Either option can be reasonably entertained, depending on the theoretical preferences of the analyst. The dissertation includes a case study on definite articles in Icelandic (see Chapter 4) which has general consequences for the theory of interveners for affixation.

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<sup>14</sup>Local dislocation and lowering build on earlier work on Morphological Merger (Marantz 1984, 1988). The relationship between syntactic structures and affixation in English was already an object of inquiry in Chomsky (1957).



## 2.2.4 Section summary

This section provided a brief background on the theory of locality in Distributed Morphology. This theory makes predictions about how deep syntactic mechanisms and shallow interface-specific mechanisms conspire to constrain linguistic surface forms. Three main types of locality were identified.

- **Linear adjacency:** Morphemes can condition allomorphy on each other if they are adjacent to each other. Furthermore, it appears that affixation of bound morphemes to an appropriate host does, in at least some cases, demand linear adjacency between the affix and the host.
  - See Chapter 4 on adjacency and the affixation of the Icelandic definite article as well as related phenomena in English *do*-support.
  - See Chapter 5 on root-adjacency in nominal declension.
  - See Chapter 5 on the lack of adjacency in the Icelandic umlaut.
  
- **Phase locality:** Syntactic structure is sent cyclically to the interfaces, by phase. Conditions on contextual allomorphy require the conditioning environment to be phase-theoretically active. Phase heads are also the locus of subset operations over sets of possible interpretations in polysemy resolution.
  - See Chapter 3 on phase locality in applicative structures.
  - See Chapter 5 on phase locality in agent nominals

- **Head-to-head locality:** Head movement in syntax is a displacement relationship between a head position and the head position of its complement. Affixation may in some cases involve a morphological operation of lowering which is a mirror image of head movement. If so, lowering is structurally parallel to head movement, but downwards.

- See Chapter 4 on head-to-head locality in affixation of the Icelandic definite article and English *do*-support.

All of these locality conditions play an important role in the case studies which form the main part of this dissertation. The case studies are presented in the following chapters.

## Chapter 3

### Applicatives in the noun phrase

The first main case study defends the hypothesis that dative experiencers and benefactives can be introduced internally to nominal structures that are not verbs on the inside.<sup>1</sup> The discussion is framed with respect to a widely adopted theory of applicatives (Pykkänen 2008) and the findings are noteworthy because the theory needs to be extended in order to accommodate them. The crucial evidence involves phase locality in contextual allomorphy and polysemy resolution and therefore the case study shows how our understanding of surface patterns in morphology and semantics inform and constrain syntactic analysis. I first present the core data and then move on to an analysis.

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<sup>1</sup>This case study is based on Ingason (2013). Parts of this material were presented at the 25th Scandinavian Conference of Linguistics in Reykjavík, May 13, 2013, as well as at the University of Massachusetts, Amherst, April 26, 2013, and at the University of York, October 30, 2013.

### 3.1 Introduction

This chapter argues in favor of the hypothesis that dative experiencers and benefactives can be introduced internal to nominal structures that are not verbs on the inside. Nouns vary with respect to how much they manifest properties of verbs. This fact is amply demonstrated in English in the difference between the so-called derived nominals, like *destruction*, and gerunds, like *destroying*, where the latter type patterns with verbs to a greater extent than the former (Chomsky 1970). Compatibility with a dative experiencer/benefactive<sup>2</sup> argument is one empirical property that is traditionally associated with verbs. One commonly adopted view is that such datives are introduced as specifiers of Applicative heads as in the framework of Pylkkänen (2002, 2008) who proposes an explicit restricted typology of applied datives. They can be generated in two structural positions, but always immediately local to a verb.

In this chapter, I discuss one way in which this typology is too restrictive. The chapter shows that the mechanism that relates dative experiencers to events is in-

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<sup>2</sup>Conflating experiencers and benefactives means losing an empirical distinction that is quite real; see Bosse and Bruening (2011) and Bosse et al. (2012) about teasing the two apart. I assume that both of these types are introduced by Appl which relates them to an event. The distinction between the two Appl heads is not important here. A more fine-grained view will distinguish Appl<sub>exp</sub> and Appl<sub>ben</sub> which have a different meaning. For example, the specifier of Appl<sub>exp</sub> needs to be restricted to sentient individuals.

dependent of verbal morphosyntax and can occur with nominal predicates whose formal properties do not relate systematically to verbs. In the context of separating elements from the verb (Kratzer 1996; Pylkkänen 2008), we get rid of the verb altogether for Applicative purposes. We draw on data from an Icelandic Caused Experience (CEx) construction, a type of a root nominalization of which four variants are shown in (89–92). The dative CEx argument *stelpunum* ‘the girls’ is interpreted as an experiencer of the event denoted by the CEx predicate *skemmtun* ‘entertainment’.

**CEx, DP causing event:**

- (89) *Dansinn var stelpunum góð skemmtun.*  
 dance.the.NOM was girls.the.DAT good entertainment.NOM  
 ‘The dancing entertained the girls well.’

**CEx, PP causing event:**

- (90) *Stelpunum var skemmtun \*(af dansinum).*  
 girls.the.DAT was entertainment.NOM \*(by dance.the)  
 ‘The girls were well entertained by the dancing.’

***til*-CEx, DP causing event:**

- (91) *Dansinn var [stelpunum til skemmtunar].*  
 dance.the.NOM was [girls.the.DAT for entertainment.GEN]  
 ‘The dancing was for the girls’ entertainment.’

***til*-CEx, Sentence causing event:**

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

Note that the preposition *til* ‘for’ is part of (91–92) and takes a genitive complement as it normally does in Icelandic.<sup>3</sup> Here, the dative experiencer appears in Spec,P although it can also optionally follow the noun *skemmtun*. The dative in (89) is assumed to have moved from its base position to a specifier of some functional projection FP which it also moves through in (90). Displacement is not of primary interest here but it will be discussed below to the extent it is relevant for the main hypothesis. The obligatory *by*-phrase in (90) is returned to in Section 3.4 and the constituency indicated in (91–92) in Section 3.3.3. Some other representative examples of CEx predicates are shown in (93).

- (93) skemmtun ‘entertainment’, léttir ‘relief’, hvatning ‘encouragement’, yndisauki ‘pleasure, enjoyment’, hressing ‘refreshment’, dægradvöl ‘recreation’, skapraun ‘annoyance, bothering’, vonbrigði ‘disappointment’, niðurlæging ‘humiliation’, álitshnekkir ‘reputation damage’

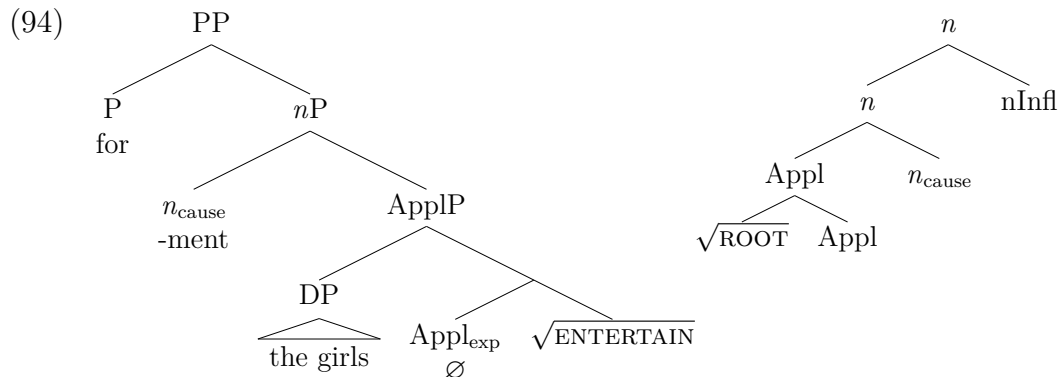
A (base-generated) analysis, to be elaborated, is given in (94). Its crucial property is that the closest category-defining head to the root is *n*.<sup>4</sup> This  $n_{\text{cause}}$  is realized with a causative interpretation in the semantics. A detailed analysis of the

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<sup>3</sup>The definite article is usually realized as a suffix on the noun in Icelandic. Throughout the dissertation, I do not show the relevant morphological segmentation in examples where it is not important for the point to be made.

<sup>4</sup>Under a view in which a DM root phrase corresponds to a big VP in non-DM Minimalism, the syntactic difference between this Appl analysis and the theory of Pyllkänen (2008) is that an event Appl can be selected by other category heads than *v*, e.g., by *n*. We are not concerned with

causative semantics which is presented in Section 3.4 serves a crucial role in accounting for certain properties of the construction. The morphology of *skemmtun* ‘entertainment’, on the right in (94), is derived by head movement and by attaching the nominal inflection nInfl as a dissociated morpheme (see Embick 1997). The argument in this chapter is also compatible with the alternative that the nominal inflection realizes Num(ber) or some other functional head on the nominal spine (see, e.g., Julien 2005).



Case syntax and argument structure in Icelandic clausal syntax have been studied in great detail in a number of works by several researchers throughout the last few decades (see Thráinsson 1979; Zaenen et al. 1985; Yip et al. 1987; Sigurðsson 1989; Jónsson 1996; Barðdal 2001; Thráinsson 2007; Sigurðsson 2012; Wood 2015, to name a few). Interestingly, much less attention has been paid to arguments in the Icelandic noun phrase<sup>5</sup> and to my knowledge there is no previous systematic the implementation details of clausal applicatives here. The crucial facts here are that this dative is an applied argument and the closest category head to the root is nominal.

<sup>5</sup>There is a literature though that puts a primary focus on the ordering of elements in the noun phrase, e.g., Magnússon (1984); Sigurðsson (1993); Julien (2005); Pfaff (2015).

treatment available of the dative experiencers in (89–92). In fact, previous work on Icelandic nominalizations explicitly assumes that datives of this type cannot be part of nominalizations. In the approach taken by Yip et al. (1987:233–234), “the presumably lexical operations of nominalizations have, as one component, the removal of lexical case”, which rules out noun phrase internal dative experiencers in their system, and Maling (2001:447–451) specifically rules out non-PP goal arguments in the Icelandic noun phrase.<sup>6</sup> The current study shows that these generalizations need to be reconsidered by examining facts that have escaped notice.

The argument is presented from the inside out. Section 3.2 shows that a CEx predicate is a noun both externally and internally, unlike for example English gerund nominals which are internally verbal. I examine a series of evidence in support of the view that the category-defining head closest to the root is nominal. Section 3.3 shows that applicatives are independent of verbal morphosyntax. I introduce the framework of Pykkänen (2008) and present arguments that the CEx dative is an applied argument which is introduced as part of the noun phrase. I propose a Root-Selecting Event Applicative, a structure which allows noun-internal applicative heads. Compatibility of a root and an applicative structure is acquired separately for nouns and verbs under this analysis. Section 3.4 focuses on the empirical generalization that whenever a CEx dative is introduced by a CEx predicate, the construction is interpreted as a causative, and there must be an overt mention

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<sup>6</sup>The thematic role ‘goal’ covers recipients, experiencers and benefactives in the terminology of Maling (2001).



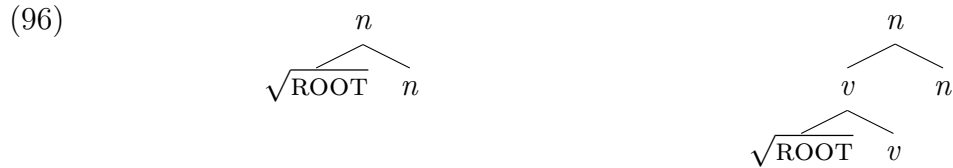
of a causing event. A causative analysis explains (i) the obligatory *by*-phrase adjunct in (90), (ii) the distribution of external environments in which CEx appears, and (iii) the way the causing event and the caused event enter into modification relationships. Section 3.5 concludes.

### 3.2 The Icelandic Caused Experience predicate is a noun

This section shows that the CEx predicate is a noun, internally as well as externally. The external status of *skemmtun* ‘entertainment’ as a noun in examples (89–92) is uncontroversial. It bears overt nominalizing morphology *-un*, as well as morphological case which is in accordance with other nouns in the same positions. For example, the element *til* ‘for’ in (91) and (92) is a preposition which standardly assigns genitive case to its complement. The main focus of the section is therefore to rule out that the CEx predicate is internally a verb.

It has been widely known since Chomsky (1970) that nouns can differ systematically in how much they resemble verbs. The difference between derived nominals and gerunds in English is a clear example of such a difference. In addition to a sharp split between the syntactic properties of the two types of nouns, diverse allomorphy is attested in the case of derived nominals whereas gerunds always surface with the *-ing* suffix.

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



It is a well motivated syntactic analysis to say that gerunds, unlike derived nominals, are verbs internally, as reflected by the structural contrast in (96) (Marantz 1997; Embick 2010). For example, gerunds are compatible with adverbs and accusative objects as shown by *violently* and *the city* in (97a) whereas derived nominals are not (97b).

- (97) a. The army's violently destroying the city.  
 b. \*The army's violently destruction the city.

The following discussion presents evidence in support of the analysis that the Icelandic CEx predicate patterns with derived nominals and against gerunds in lacking an internal verbal layer.

### 3.2.1 The category-defining head closest to the root is nominal

We can now proceed to show that the predicate in the Icelandic CEx construction is internally a noun and not of the English gerund type. In current theoretical terms, the category-defining head closest to the root is a nominalizing *n*. A gerund-type analysis predicts lack of *n*-allomorphy, and it predicts systematic mappings

between formal properties of CEx predicates and their verbal counterparts. The first argument comes from allomorphy. Repeating the examples in (93), now splitting off the *n* morphology and the nominal inflection layer nInfl, it is obvious that the list in (98) patterns with derived nominals and not gerunds. We find root-conditioned allomorphy in CEx nouns and this allomorphy is evidence that *n* is the closest category head to the root. Representative examples of CEx predicates are listed in (98) (NOM.SG forms) and they pattern with derived nominals rather than gerunds in their allomorphy.<sup>7</sup>

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<sup>7</sup>The phonological exponent *-ir* which is for example shown in *léttir* was historically segmented with *-i* as the nominalizer and *-r* as the nominal inflection. A segmentation of this type may be available as one of the options for modern speakers although this requires some additional assumptions about the (morpho)phonology. The attested variability suggests that it is not straightforward for children to acquire a consistent system for this class of nouns and it is plausible that different individuals may to some extent acquire different systems. The core of the present argument is compatible with there being 2-3 analytical options for speakers. Thanks to Eiríkur Rögnvaldsson for bringing up issues regarding this class of nouns.

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

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

The cases of *skemmt-un*, *hvat-ning*, *hress-ing*, *vonbrigð-i* and *yndisauk-Ø-i* show that the nominalization morphology can be conditioned by the root in CEx nouns. The same applies to *létt-ir* and *álitshnekk-ir* when *-ir* is segmented as a nominalizer by speakers, a non-standard but widely attested pattern. These root-specific phonological exponents of  $n$  contrast with English gerunds in which the nominalization morphology is always *-ing*. The cases which involve null nominalizers furthermore show that the nominal inflection layer in CEx can be conditioned by the root when it is adjacent to the root. This is shown by the difference between *yndisauk-i* and the standard segmentation of *létt-ir* and *álitshnekk-ir*. While the “weak declension” masculine *-i* for nominative singular in *yndisauk-i* might be seen as a default, the exponent *-ir* is associated with specific roots and it is a rare pattern. The root-conditioned allomorphy is evidence against a verbal layer inside these nouns.

According to Embick (2010), the allomorphy contrast between derived nominals and gerunds is explained by the second version of Chomsky’s Phase Impenetra-

bility Condition (PIC2) (Chomsky 2001). The empirical picture is likely to have a parallel impact in other frameworks, but this approach is adopted here because it facilitates precise discussion of the relationship between syntax and realization at the interfaces. As presented in Section 2.2.2, the category-defining heads, at least *v*, *n*, *a* (Marantz 2001, 2007), as well as D and C, and possibly others, trigger Spell-Out of their complements; they are the phase heads. These phase heads are often realized as ‘derivational morphemes’. The cyclic Spell-Out means that only a sub-part of the structure is visible (active) at any given point. In this type of a theory, every syntactic terminal is a morpheme, and cyclicity constrains interaction between morphemes.

In this kind of a system, a phase head cannot see morphemes across the next phase head. A non-phase-head can see other non-phase-heads across the next phase head but not further than that. According to Embick (2010), conditions on contextual allomorphy cannot be stated in terms of invisible (inactive) material. When a category-defining head *n* is attached outside another category-defining head *v*, the root is inactive, and therefore no longer an identifiable morpheme, at the point in the derivation at which the phonological exponent of *n* is determined. Thus, *n* cannot make reference to the identity of the root in a gerund. However, derived nominals in English and Icelandic CEx predicates clearly allow root-specific phonological exponents of *n* and the allomorphy is evidence against such nouns being verbs on the inside.

### 3.2.2 The noun does not inherit properties from a verb

If a noun is derived from a verb, it is to be expected that the noun and the verb share certain properties. The current section considers cases where Icelandic CEx predicates fail to correspond with a verb. The evidence examined in the section supports the view that the nominal CEx predicate and the most closely corresponding verb are separate elements and the noun is not derived from the verb. The results of the section will be summarized for several predicates in a table in (110).

When considering a gerund type alternative to the current analysis, it is reasonable to be concerned with whether the hypothetical underlying verb exists. We find that sometimes it does, but not always. The noun *yndisauki* ‘pleasure, lit. pleasure-increase’ is compatible with the CEx construction (99), but there is no \**yndisauka* ‘to pleasure-increase’ verb as (100) shows. A non-compound verb *auka* ‘increase’ exists (3rd pers. plural past *juku*), but it does not allow for paraphrasing the CEx predicate (100b).<sup>8</sup>

- (99) *Þeir dönsuðu stelpunum til yndis-auka.*  
they.NOM danced girls.the.DAT for pleasure-increase.GEN  
‘They danced for the girls’ pleasure.’

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<sup>8</sup>Eiríkur Rögnvaldsson (p.c.) notes that a few examples that are similar to (100b) can be found in the online corpus at *timarit.is*. This suggests that such usage is possible for some speakers, or that it used to be historically. The relevant corpus mainly contains historical publications which might be an important fact.

- (100) a. \* *Þeir yndis-juku stelpunum.*  
 they.NOM pleasure-increased girls.the.DAT  
 Intended: ‘They gave the girls pleasure.’
- b. \* *Þeir juku stelpunum yndi.*  
 they.NOM increased girls.the.DAT pleasure.ACC  
 Intended: ‘They gave the girls pleasure.’

The case of *yndisauki* ‘pleasure’ demonstrates that the existence of a CEx predicate does not guarantee the existence of a verb that is made from the same root material. The CEx predicate *dægra-dvöl* ‘recreation, lit. day-dwelling’ in (101) is another informative example. As in the case of *yndisauki* ‘pleasure’ above, there is no \**dægradvelja* verb, but here it is possible to separate the roots as in (102c).

- (101) *Þeir dönsuðu sér til dægra-dvalar.*  
 they danced REFL.DAT for day-dwelling.GEN  
 ‘They danced for their own recreation.’

- (102) a. \* *Þeir dægradvöldu við að dansa.*  
 they.NOM day-dwelled at to dance  
 Intended: ‘They experienced recreation from dancing.’
- b. \* *Þeir dægradvöldu sér.*  
 they.NOM day-dwelled REFL.DAT  
 Intended: ‘They experienced recreation.’
- c. *Þeir dvöldu fáein dægur í skálanum.*  
 they.NOM dwelled few days.ACC in cabin.the  
 ‘They dwelled a few days in the cabin.’ (no recreation meaning)

Example (102c) shows that while it is possible in this case to construct a sentence and use the root material from the CEx construction in a verbal context, separating the roots makes the ‘recreation’ meaning unavailable.<sup>9</sup>

If the CEx predicate is made from a verb, the special meaning of ‘dwell’ in the CEx construction should be available in a verbal context. It is not, which provides another piece of evidence that *n* is the category-defining head which is closest to the root in CEx. An analysis of meaning dependencies between inner and outer category-defining heads is developed in Marantz (2013) in the context of the current type of a theoretical framework (see also Arad 2003; 2006). The meaning counterpart of phase locality in allomorphy is that a meaning of a root that has been excluded at an inner phase head is unavailable at an outer phase head. For example, the root  $\sqrt{\text{GLOBE}}$  can mean ‘abstract sphere, something spherelike’ or ‘the world’. Once the polysemy variation of the root has been restricted by a phase head (derivational morpheme), the excluded meanings are unavailable to outer phases. At the root, the range of possible meanings includes both of the above. Making *globe* a noun allows for both meanings, whereas the adjective *global* excludes the ‘spherelike’ meaning. This contrast is shown in (103).

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<sup>9</sup>Clause adjoined DP adjuncts are often accusative in Icelandic when they have a temporal or measure interpretation.



- (103)
- |   |   |   |
|---|---|---|
| <p><b>Noun:</b><br/>       ✓ ‘spherelike’<br/>       ✓ ‘world’</p> <p style="text-align: center;"><i>n</i></p> <p style="text-align: center;">       √GLOBE    <i>n</i><br/>                         -∅</p> | <p><b>Adjective:</b><br/>       * ‘spherelike’<br/>       ✓ ‘world’</p> <p style="text-align: center;"><i>a</i></p> <p style="text-align: center;">       √GLOBE    <i>a</i><br/>                         -al</p> | <p><b>Adjective-derived:</b><br/>       * ‘spherelike’<br/>       ✓ ‘world’</p> <p style="text-align: center;"><i>v</i></p> <p style="text-align: center;"> <i>a</i>    <i>v</i><br/>       √GLOBE    <i>a</i>    -ize<br/>                         -al</p> |
|---|---|---|

As the rightmost example shows, the meaning that is excluded at the *a* phase head remains unavailable at the outer *v* phase head. Once a possible meaning has been excluded from the range of options, it cannot be brought back. In the context of the Icelandic facts, this pattern indicates that a CEx predicate is not derived from a verb. If it were, we would predict the verb to be compatible with any special interpretation associated with the noun.

Another point of comparison comes from the compatibility of a predicate and a dative argument. If the mechanism that introduces thematic datives crucially depends on composition with a verb, we would expect verbs that correspond to CEx predicates to also take dative arguments. We find that sometimes they do, but not always. For example, consider the CEx predicate *hvatning* ‘encouragement’ in (104). It contrasts with the verb *hvetja* ‘to encourage’ which does not take dative arguments, as shown in (105).

- (104) *Peir hrópuðu stelpunum til hvatningar.*  
 they cheered girls.the.DAT for encouragement.GEN  
 ‘They cheered and there was an intention to encourage the girls.’

- (105) a. \* *Þeim hvatti húrrahrópin.*  
 they.DAT encouraged cheers.the.NOM  
 Intended: ‘They experienced encouragement from the cheering.’
- b. \* *Þeir hvöttu stelpunum.*  
 they.NOM encouraged girls.the.DAT  
 Intended: ‘They encouraged the girls.’
- c. *Þeir hvöttu stelpurnar.*  
 they.NOM encouraged girls.the.ACC  
 ‘They encouraged the girls.’

The verb *hvetja* ‘to encourage’ is a NOM-ACC verb and is appropriately used as in (105c). This non-compatibility with a dative argument further undermines any account that derives the noun from a verb. A parallel observation can be made for *niðurlæging* ‘humiliation’, where the verb *niðurlægja* ‘to humiliate’ does not take dative arguments:

- (106) *Forsetinn beitti neitunarvaldi ríkisstjórninni til niðurlægingar.*  
 president.the used veto-authority government.the.DAT for humiliation  
 ‘The president vetoed (the law) much to the government’s humiliation.’
- (107) a. \* *Þeim niðurlægði höfnunin.*  
 they.DAT humiliated rejection.the  
 Intended: ‘They experienced humiliation from the rejection.’
- b. \* *Forsetinn niðurlægði ríkisstjórninni.*  
 president.the.NOM humiliated government.the.DAT  
 Intended: ‘The president humiliated the government.’
- c. *Forsetinn niðurlægði ríkisstjórnina.*  
 president.the.NOM humiliated government.the.ACC  
 ‘The president humiliated the government.’

Examples (104–107) show that a dative-compatible CEx predicate does not entail that the most closely corresponding verb is also compatible with a dative argument. This fact provides convincing evidence to the effect that the ability of the noun to take a dative is not inherited from an underlying verb. A final point of our inquiry into CEx noun-verb correspondences involves compatibility with an experiencer. If the mechanism that introduces thematic datives depends on the immediate presence of a verb, we would expect verbal correspondences of CEx predicates to take arguments that can be interpreted as experiencers. Consider the noun *álits-hnekkir* ‘reputation-damage’, which takes a negative experiencer (or a malefactive argument, depending on terminology).<sup>10</sup>

- (108) *Slíkt væri stéttinni til álits-hnekkis.*  
 such.NOM be.PAST.SBJV profession.the.DAT for reputation-damage  
 ‘That would inflict damage on the reputation/image of (our) profession.’

The verb *hnekkja* by itself means ‘lift (a curse), overturn’ and the other root that is part of the noun, *álit*, can mean ‘reputation’ or ‘opinion’. The experiencer/malefactive reading is unavailable on the dative if we use these parts in a verbal context:

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<sup>10</sup>The glosses do not do justice to the meaning. The dative with the image problem needs to be a sentient experiencer who cares about their image, here a group of people.

- (109) a. *Þetta hnekti [álití stéttarinnar].*  
 this.NOM overturned [reputation/opinion.DAT profession.the.GEN]  
 \* ‘It inflicted damage on the reputation of the profession.’  
 ✓ ‘It overturned the opinion of the profession.’
- b. *Stoke City hnekti álögunum.*  
 Stoke City.NOM lifted curse.the.DAT  
 ‘Stoke City lifted the curse.’

Example (109b) also has a dative, and it differs with respect to the meaning on the verb *hnekkja*, here ‘lift (a curse)’. Again, in this verbal variant an experiencer/benefactive reading is unavailable. This finding casts doubts on any proposal where the introduction of a CEx dative with these thematic properties depends on an underlying verb. To wrap up this round of argumentation, we can examine whether the non-matching properties of CEx predicates and verbs correlate with each other or with allomorphs of the nominalizer. Table (110) gives an overview.<sup>11</sup>

<sup>11</sup> Jónsson (2005:402) gives the following for a *st*-middle of *dvelja* and Eiríkur Rögnvaldsson (p.c.) also finds the example acceptable:

- (i) *Honum dvaldist á bænum.*  
 he.DAT stayed/lingered at farm.the  
 ‘He stayed at the farm longer than intended.’

I do not control this usage so there seems to be some variation between speakers. I can imagine that there are difference between generations in this respect because many of the natural examples that I find are from older stages of the language. The meaning does not seem compatible with an experiencer reading. Even if some Modern Icelandic speakers have this, it does not impact the overall point here. For *auka* ‘increase’, compatibility with a dative seems to depend on specific nouns like *bjartsýni* ‘optimism’. While interesting, we do not pursue that construction here.

(110) **Lack of a pattern in potential verb/noun correspondences**

CEx predicate (-NMLZ)	gloss	closest verb	matching root(s)	dative argument	experiencer argument	meaning available
skemmt-un	entertainment	skemmta	+	+	+	+
létt-ir	relief	létta	+	+	+	+
hvat-ning	encouragement	hvetja	+		+	+
yndisauk-i	pleasure	auka		(+)	(+)	(+)
hress-ing	refreshment	hressa	+		+	+
dægradvöl-Ø	recreation	dvelja		(+)		
skapraun-Ø	annoyance	skaprauna	+	+	+	+
vonbrigð-i	disappointment	bregða		+	+	
niðurlæg-ing	humiliation	niðurlægja	+		+	+
álitshnekk-ir	reputation damage	hnekkja		+		

The first column shows the CEx predicate with the nominalizer split off, followed by a gloss and the most closely corresponding verb. The last four columns have a ‘+’ when the verb shares the respective property with the noun. The first of these columns indicates the existence of a verb with the same root material. The second column shows compatibility with a dative argument, and the third one whether an argument of the verb can have the thematic properties in question. The final column indicates when the meaning of the CEx construction can be paraphrased using the verb. The fact that there is no obvious pattern is easily explained if the noun is not derived from the verb.

- (ii) *Þessi fundur eykur okkur bjartsýni.*  
 this meeting increases us.DAT optimism  
 ‘This meeting makes us feel more optimistic.’

### 3.2.3 Section summary

This section presented evidence that the CEx predicate is a noun, not just externally, but also internally. The allomorphy facts show that the closest category-defining head to the noun is *n*, and there is no systematic mapping between the properties of such nouns and corresponding verbs. While we can imagine an analysis where an underlying verb loses all of its properties when nominalized, this does not serve an obvious purpose. A language learner therefore has to acquire compatibility of a root and this type of *n* independently of her learning which verbs go with particular verbal constructions, an analysis that we will discuss in more detail in the following section. Having determined the category of the predicate, we turn to the applicative analysis of the dative.

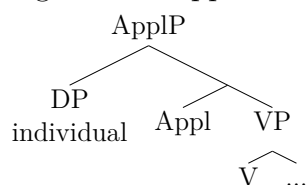
### 3.3 Applicatives are independent of verbs

Facts that are traditionally associated with the notion of an ‘indirect object’ are in current theoretical syntax often analyzed in terms of argument introducing Appl(icative) heads. The discussion that follows is framed with respect to the framework of Pykkänen (2008), and an extension of this framework is proposed to account for our facts. The first part of the section introduces the framework, then I argue that the current set of facts belongs in such a framework, and finally I show that Appl is internal to a structure that excludes the syntax of the clause.

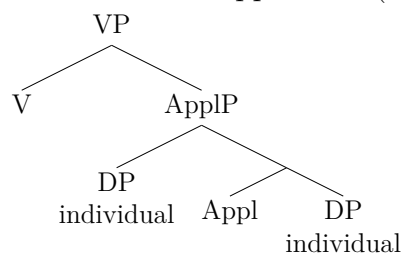
### 3.3.1 Framework

Dative experiencers/benefactives/malefactors are commonly analyzed as specifiers of Appl in clausal syntax (Pylkkänen 2002, 2008), see also McGinnis (2001); Cuervo (2003). A main distinction is made between High Event Applicatives (111) and Low Individual Applicatives (112).

(111) High Event Applicative (**individual-eventP**; Pylkkänen’s High Appl)



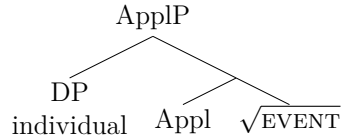
(112) Low Individual Applicative (**individual-individual**; Pylkkänen’s Low Appl)



The High/Low distinction loses some of its terminological appeal in the current analysis, and therefore I will refer to Event/Individual applicatives instead. Event Applicatives relate an individual to an event, and their specifier is typically interpreted as a benefactive or an experiencer by virtue of being merged into that position. Individual Applicatives relate an individual to another individual, where the specifier of Appl is typically interpreted as a recipient of the complement of Appl. Individual applicatives are used for true double object predicates and they are only included here for contrast; their analysis is orthogonal to the current discussion. Since we are focusing on the Icelandic CEx construction, we will only

be concerned with Event Applicatives here, the type selected by our  $n_{\text{cause}}$ .<sup>12</sup> To accommodate our facts, we propose an extension of the theory, a Root-Selecting Event Applicative which does not need to combine with a verb:<sup>13</sup>

(113) Root-Selecting Event Applicative (**individual- $\sqrt{\text{EVENT}}$** : CEx construction)



The Root-Selecting applicative relates an experiencer to an event described by the root before the category is determined. In this structure, the properties of a nominalization are not predictable from looking at an underlying verb, because there is none. The availability of a root in a particular construction depends on compatibility of this root and the relevant category-defining head, which in our analysis of the Icelandic CEx construction is  $n_{\text{cause}}$ . This compatibility is acquired separately for different category-defining heads.

It may seem undesirable to list such apparently non-local compatibility relationships that extend beyond the head-to-head selectional mechanism that is responsible

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<sup>12</sup>The causative analysis is described in detail in section 3.4.

<sup>13</sup>An alternative theoretical approach would be to say that the nominalizer is merged above the root and below Appl. Such an analysis is within the bounds of the current proposal in that the closest category-defining head to the root is still nominal. Different theoretical issues arise under such an analysis. In that case, Appl would sometimes have to be the highest element of the nominal spine and the complement of P. The analysis of the causative semantics below would also be affected as would displacement mechanics. To the extent that such an analysis satisfies other theoretical commitments, it is compatible with the core of the current proposal. We do not pursue this avenue here.



for the basic structure building, but in the current type of a theory, machinery with such capabilities is unavoidable. For example, see Wood (2015) on the compatibility of specific roots and flavors of Voice. A root-to-Voice dependency involves a compatibility configuration that is even more prima-facie non-local than the current root-to-category setting since it extends beyond the category-defining phase head, but it is nevertheless crucially phase-local under the spell-out system outlined in the preceding section because Voice is not a phase head. We will assume for the present purpose that the compatibility of a root with a given surrounding structure is determined within a domain which is restricted by phase locality.

The types of denotations that implement the argument introduction are given in (114). Event Appl is a function of type  $\langle\langle s,t \rangle, \langle e, \langle s,t \rangle \rangle\rangle$  and the predicate is of type  $\langle s,t \rangle$ . Following a commonly used convention, I use the variable name  $x$  for individuals and  $e, e', e'', e'''$  for events.

- (114) a.  $\llbracket \mathbf{Appl}_{\text{exp}} \rrbracket = \lambda P_{\langle s,t \rangle} . \lambda x . \lambda e . \text{experiencer}(e,x) \ \& \ P(e)$   
 b.  $\llbracket \sqrt{\text{ENTERTAIN}} \rrbracket = \lambda e . \text{entertaining}(e)$

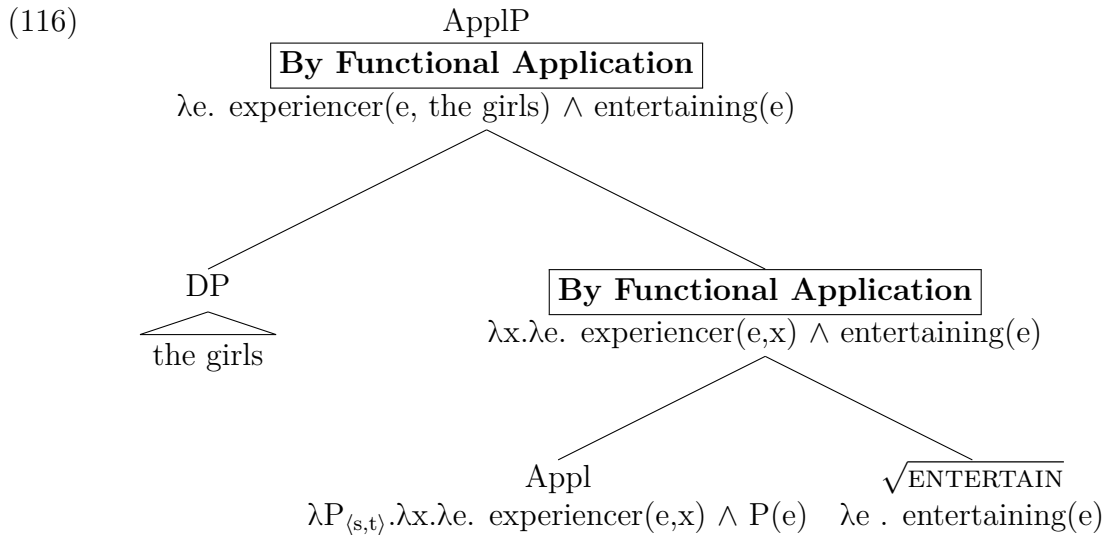
This formulation of Appl derives the same truth conditions as the high event applicative of Pylkkänen (2008) without needing the operation Event Identification from Kratzer (1996). The composition is driven by Functional Application. The choice is motivated by theoretical parsimony and the practical fact that Functional Application is more widely known than Event Identification. Functional Applica-

tion is defined in (38), repeated as (115) and it applies when the semantic type of an element is an appropriate input to the function its sister denotes.

(115) **Functional application**

If  $\alpha$  is a branching node,  $\{\beta, \gamma\}$  is the set of  $\alpha$ 's daughters, and  $\llbracket \beta \rrbracket$  is a function whose domain contains  $\llbracket \gamma \rrbracket$ , then  $\llbracket \alpha \rrbracket = \llbracket \beta \rrbracket (\llbracket \gamma \rrbracket)$ .

For our syntax in (94), the LF derivation proceeds as below.



ApplP therefore denotes the set of events  $e$  where the girls are experiencers of  $e$  and  $e$  is an entertaining event. The semantic effect of the Root-Selecting Event Applicative is exactly the same as what is commonly described as a “High” Appl. The only difference here is that Appl combines with a root (rather than a verb) in the syntax before its syntactic category is determined. This means that Appl can introduce an experiencer with a noun as in the CEx construction. We will focus on the noun phrase, but in principle this type of analysis may carry over to adjectives

in languages that have the relevant Appl head. In fact, Icelandic adjectives also take dative experiencers:

- (117) a. *Stelpurnar eru kaldar.*  
girls.the.NOM are.3PL cold.3F  
'The girls are cold.' (a fact about their skin temperature)
- b. *Stelpunum er kalt.*  
girls.the.DAT is.3SG cold.3N  
'The girls feel cold.' (experience being cold)

The contrast in (117) highlights the relationship between case and thematic interpretation. The temperature of the nominative subject is cold, regardless of how or whether the subject feels anything; the girls might as well be dead. In contrast, the dative girls feel cold; they are experiencers and therefore (117b) is infelicitous if they are dead. We leave it for future work to further explore the syntax of experiencer adjectives. Now that we have introduced the applicative framework, the following section turns to showing that the CEx dative is an applied argument.

### 3.3.2 The dative is an applied argument

The dative experiencer in CEx is always interpreted as an individual that experiences or benefits from the event described by the predicate, thus patterning empirically with the theoretical notion of an Appl specifier. A basic observation to that effect is that the meaning of CEx can be naturally paraphrased using words like 'experience, feel, enjoy', for example, 'the girls experienced entertainment'. Moreover, the dative argument in the CEx position cannot be an agent:

- (118) a. \* *Þeir sendu vopn óvininum til eyðileggingar.*  
 they sent weapons enemy.the.DAT for destruction  
 Intended: ‘They sent weapons for the (agentive) enemy’s destruction.’
- b. *Þeir dönsuðu [stelpunum til skemmtunar].*  
 They danced [girls.the.DAT for entertainment.GEN]  
 \*‘They danced such that the girls entertained somebody.’  
 \*‘The girls used their dancing to entertain.’

In (118a), an agent cannot be merged into the dative position. For a sentence like (118b), where the CEx type experiencer interpretation is available, any interpretation where ‘the girls’ have an agentive role is impossible. This is in line with generalizations that relate meaning and case morphology in the Icelandic clause and have been amply discussed in the literature (see, e.g., Zaenen et al. 1985; Yip et al. 1987; Jónsson 1997–98, 2003; Barðdal 2008). An example that involves Facebook is illustrative.

- (119) a. *Mér líkaði hundurinn.*  
 me.DAT liked dog.the.NOM  
 ‘I experienced liking the dog.’ /  
 #‘I clicked the like button on Facebook (for the dog picture, etc.)’
- b. *Ég líkaði hundinn.*  
 I.NOM liked dog.the.ACC  
 #‘I experienced liking the dog.’ /  
 ‘I clicked the like button on Facebook (for the dog picture, etc.)’

The Icelandic verb for ‘like’ is historically a strictly dative subject verb. Facebook has changed this because liking things on Facebook is an agentive activity where the subject must be realized with nominative morphology as in (119b). The facts we have just reviewed therefore show that (i) the CEx dative patterns with Appl specifiers with respect to generalizations about thematic properties and case, and (ii) these same generalizations are a productive part of Modern Icelandic grammar.

One alternative to an Appl analysis that we can consider is to treat the CEx dative as a dative possessor. The Icelandic poetic dative possessor is a useful comparison in this respect (see Thráinsson 2007). An example of the poetic dative from the IcePaHC corpus is given in (120a). Importantly, these datives alternate with less poetic, but truth-conditionally equivalent genitives, as in (120b).<sup>14</sup>

- (120) a. *Er það komið til eyrna mér ...*  
 is it come to ears.GEN me.DAT  
 ‘It has come to my ears ...’
- b. *Er það komið til eyrna minna ...*  
 is it come to ears.GEN my.GEN  
 ‘It has come to my ears ...’

Unlike the poetic possessors, the experiencer datives do not alternate with genitives.

- (121) \* *Þeir dönsuðu stelpnanna til skemmtunar.*  
 they danced girls.the.GEN to entertainment.GEN  
 Intended: ‘They danced for the girls’ entertainment.’

The lack of a dative/genitive alternation shows that CEx datives are different from possessors. It also emphasizes how the CEx dative patterns with other Appl specifiers, because in general Appl-associated dative case is resistant to alternations

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<sup>14</sup>Example (120a) is from an older stage of the language and it was retrieved from IcePaHC (Wallenberg et al. 2011); ID: 1260.JOMSVIKINGAR.NAR-SAG,.1377. The poetic dative possessors sound quite bookish in some cases in the modern language and their usage can be subject to idiosyncracies of certain fixed expressions. I believe they are nevertheless common enough to have a fairly robust status in the modern grammar. Whatever their present status, they are presented here in order to contrast them with other types of datives. Thanks to Eiríkur Rögnvaldsson (p.c.) for offering comments on such constructions.

by syntactic context, even where other datives alternate (Wood 2015:226). The comparison with dative possessors strongly suggests that an Appl analysis is appropriate.

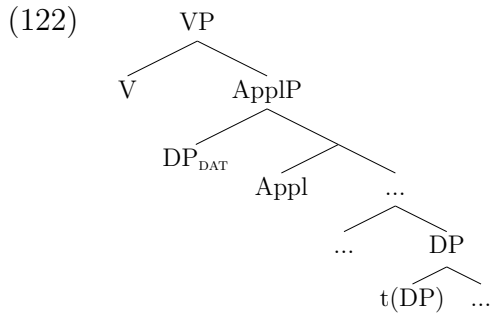
A final alternative to an Appl analysis is to say that these dative experiencers are in fact arguments of some other morpheme and not of a special argument-introducing head. However, if we want to maintain the Appl theory for clausal syntax, it seems unattractive to treat experiencers differently in the noun phrase even if experiencer datives otherwise pattern together empirically, in a way that is distinct from possessors. We might bundle the properties of Appl and *n* in the noun phrase if we wanted to avoid an Appl projection in the noun, but this would simply be another way of writing down that the noun introduces a dative experiencer and it needlessly obscures a compositional semantics for Appl which is already available in the theory.

Now that we have provided evidence that an applicative analysis is appropriate, we turn to showing that the Spec,Appl position is part of the noun phrase, and that it is not associated with the clausal syntax.

### **3.3.3 The dative is part of the noun phrase**

Summarizing the preceding discussion, the CEx dative is an applied argument which is the experiencer of an event denoted by a noun. We analyzed these facts in terms

of a noun phrase internal applicative. This section argues against an alternative analysis where the dative case depends on some position in the clause.



Trees in the spirit of (122) where a DP moves out of a noun phrase are sometimes discussed for other cases of non-nominative experiencers associated with nouns, and in the context of possessor raising (see Adger and Ramchand 2006; Preminger 2009). I argue that such an analysis is not appropriate for the CEx construction. The argument is based on (i) constituency tests, and (ii) facts about the dative’s base position, and (iii) the lack of a plausible external source of the dative case.

Looking at the CEx variant where the construction is embedded under a sentence-adjoined prepositional phrase, we can show that this whole unit is a constituent, based on topicalization (123), clefting (124) and replacement by a wh-word (125).<sup>15</sup>

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<sup>15</sup>There can be some variation in whether it is more natural to have the dative in Spec,*til* or in Spec,Appl to the right of the predicate. This issue is orthogonal to the constituency. It should also be noted that these are fairly minimal examples of the relevant constructions and it can be made easier to imagine them in natural everyday use by adding a little bit of context and making them more interesting or informative. For example Eiríkur Rögnvaldsson (p.c.) notes that it is easier to get a natural reading by adding that ‘they danced all night’ or something like that instead of just ‘danced’. Again, these issues are orthogonal to the constituency.

- (123) *[Stelpunum til skemmtunar] dönsuðu þeir.*  
 [girls.the.DAT for entertainment.GEN] danced they  
 ‘They danced for the girls’ entertainment.’
- (124) *Það er [stelpunum til skemmtunar] sem þeir dansa.*  
 it is [girls.the.DAT for entertainment.GEN] that they dance  
 ‘It is for the girls’ entertainment that they dance.’
- (125) *[Hvers vegna] dönsuðu þeir? [Stelpunum til skemmtunar].*  
 [why] danced they? [girls.the.DAT for entertainment.GEN]  
 ‘Why did they dance? For the girls’ entertainment.’

In contrast, the ‘for entertainment’ PP excluding ‘the girls’ is not a constituent. This is shown by the unavailable topicalization below.

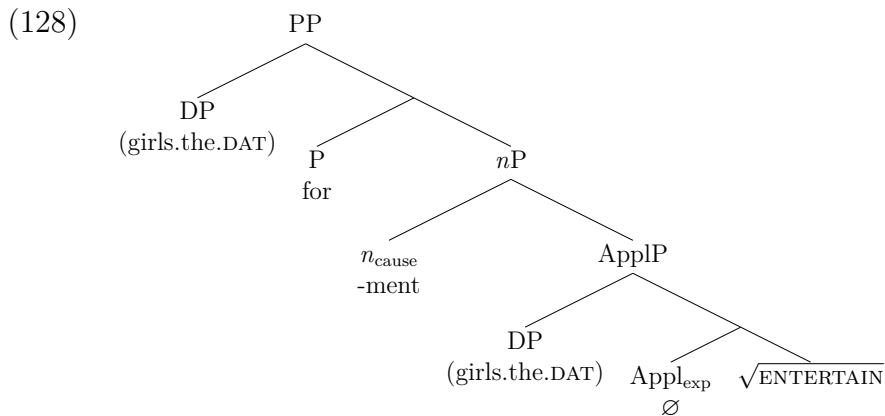
- (126) \**[Til skemmtunar] dönsuðu þeir stelpunum*  
 for entertainment.GEN danced they girls.the.DAT  
 Intended: ‘The danced for the girls’ entertainment’

The constituency facts support the proposal that the dative is part of the noun phrase and they speak against an analysis in the spirit of (122). An *nP*-internal analysis receives further support from examining the base-generated position of the dative. When the dative appears with *til* ‘for’, it often precedes this word, but it can also surface to the right of the predicate as (127) shows, where the position to the right can be bad/acceptable/preferable, depending on the usual heaviness/discourse reasons. A movement relationship between the two positions is supported by quantifier floating as will be shown below.



- (127) a. *Þeir dönsuðu [(mér) til skemmtunar (\*mér)].*  
they danced [(me.DAT) for entertainment.GEN (\*me.DAT)]  
‘They danced for my entertainment.’
- b. *Þeir dönsuðu [(stelpunum) til skemmtunar (stelpunum)].*  
they danced [(girls.the.DAT) for entertainment.GEN (girls.the.DAT)]  
‘They danced for the girls’ entertainment.’
- c. *Þeir dönsuðu [til skemmtunar*  
they danced [for entertainment.GEN  
*stelpunum sem þeir hittu á hátíðinni].*  
girls.the.DAT that they met at festival.the]  
‘They danced for the entertainment of the girls that they met at the  
festival.’ (low position preferred)

The optionality in where to realize the dative plausibly reflects a base-generated Spec,Appl position and some type of an EPP movement to the specifier of *til* ‘for’.



Quantifier floating supports the view that the variability in (127) is due to a movement relationship in the CEx construction. Under a commonly adopted analysis (Sportiche 1988), the entire dative is base generated in the lower position.

- (129) *Þeir dönsuðu [stelpunum til skemmtunar [öllum t(stelpunum)]]].*  
they danced [girls.the.DAT for entertainment.GEN [all.DAT t(girls.the)]]  
‘They danced for all the girls’ entertainment.’

Moreover, the dative case is not tied to *til* in *til*-CEX, since there is no *til* in the non-*til* variants like (130).

- (130) *Stelpunum var góð skemmtun af dansinum.*  
girls.the.DAT was good entertainment.NOM by dance.the  
'The girls were well entertained by the dancing.'

The dative is also not tied to *vera* 'be', because there is no such verb in (92), repeated as (131).

- (131) *Þeir dönsuðu [stelpunum til skemmtunar].*  
they danced [girls.the.DAT for entertainment.GEN]  
'They danced for the girls' entertainment.'

Putting together the pieces of evidence examined in this section, there are no good alternatives to our analysis that associate the dative with a position outside the noun phrase.

### 3.3.4 Section summary

In this section we reviewed the applicative theory and proposed an extension of it in the form of a Root-Selecting Event Applicative. I presented evidence that the dative in the CEX construction is an applied argument, and I showed that it is part of the noun phrase. A previous section showed that the noun which is the CEX predicate is a noun internally as well as externally, and therefore the overall message to be taken from the discussion so far is that applied arguments are indeed independent of verbal morphosyntax, at least in Icelandic. The remaining part of

the puzzle involves accounting for the range of possible external environments under which the CEx construction can be embedded, and this is the topic of the following section.

### 3.4 A causative nominalizer

This section gives some background on a bieventive causative semantics and shows how such an analysis can be applied to the CEx construction to explain the environments in which it appears.

#### 3.4.1 Bieventive CAUSE

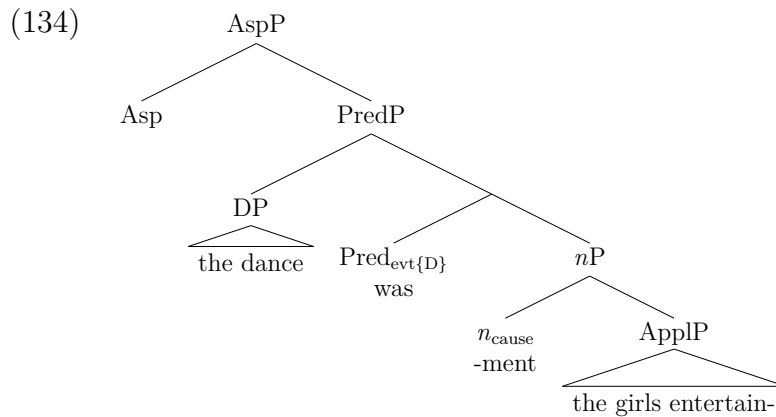
One common approach to causatives assumes that CAUSE is a relationship between two events, a causing event and a caused event (Parsons 1990; Pylkkänen 2008). I will adopt this semantics without modification, but in the current analysis it will (unconventionally) be associated with the nominalizer. The denotation of  $n_{\text{cause}}$  is as follows:

$$(132) \quad \llbracket n_{\text{cause}} \rrbracket = \lambda P_{\langle s,t \rangle} . \lambda e . \exists e' [P(e') \wedge \text{CAUSE}(e, e')]$$

I will first spell out the mechanics of the semantics for a sentence of type (89), repeated as (133). The syntax of this variant is given in (134). The tree focuses on base-generated positions and abstracts away from TP. The subject moves to Spec,T and the finite verb to T as is generally the case in the language. I assume that the surface position of ‘the girls’ results from ‘the girls’ moving to the specifier

of some functional projection FP above *nP* which is omitted from the tree because it is not important for the semantics below. The link between the surface position and the base position is detectable by floating a quantifier in Spec,Appl. The curly bracket subscript notation  $\text{Pred}_{\text{evt}\{D\}}$  indicates that this variant of Pred requires an externally merged DP in its specifier.<sup>16</sup>

- (133) *Dansinn var stelpunum góð skemmtun.*  
 dance.the.NOM was girls.the.DAT good entertainment.NOM  
 ‘The dancing entertained the girls well.’

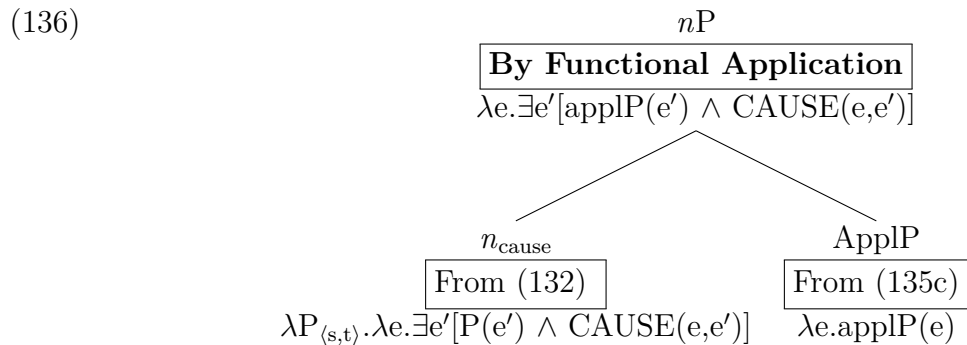


The denotations of the nodes in the tree are given below.

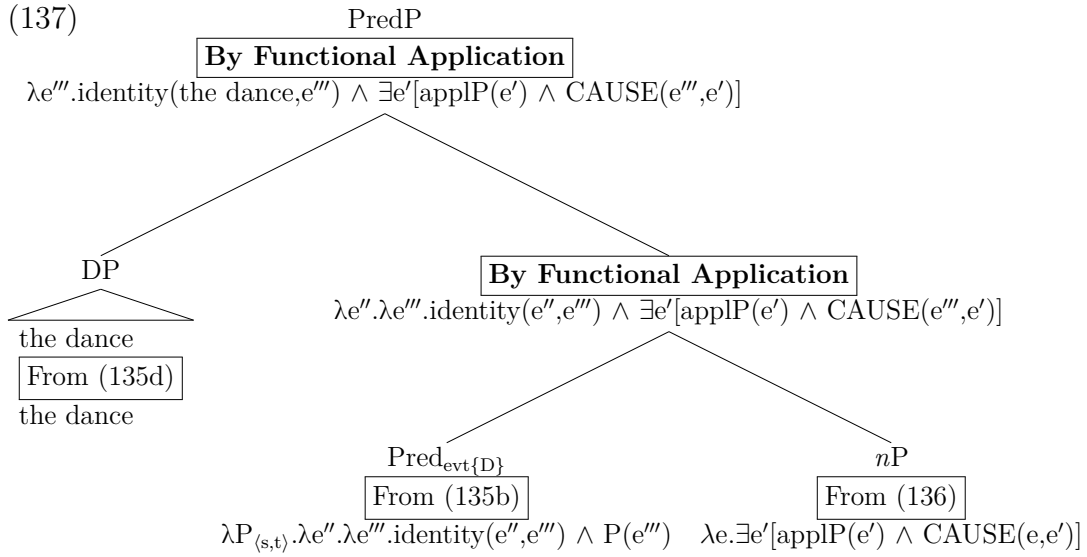
- (135) a.  $\llbracket \mathbf{Asp} \rrbracket = \lambda P_{\langle s,t \rangle} . \exists e [P(e)]$   
 b.  $\llbracket \mathbf{Pred}_{\text{evt}\{D\}} \rrbracket = \llbracket \mathbf{Pred}_{\text{evt}\{\}} \rrbracket$   
 $= \lambda P_{\langle s,t \rangle} . \lambda e'' . \lambda e''' . \text{identity}(e'', e''') \wedge P(e''')$   
 c.  $\llbracket \mathbf{ApplP} \rrbracket = \lambda e . \text{experiencer}(e, \text{the girls}) \wedge \text{entertaining}(e)$   
 $= \lambda e . \text{applP}(e)$  (Shorthand notation)  
 d.  $\llbracket \mathbf{the\ dance} \rrbracket = \text{the dance}$

<sup>16</sup>The curly subscript notation is adopted from Schäfer (2008); Wood (2015).

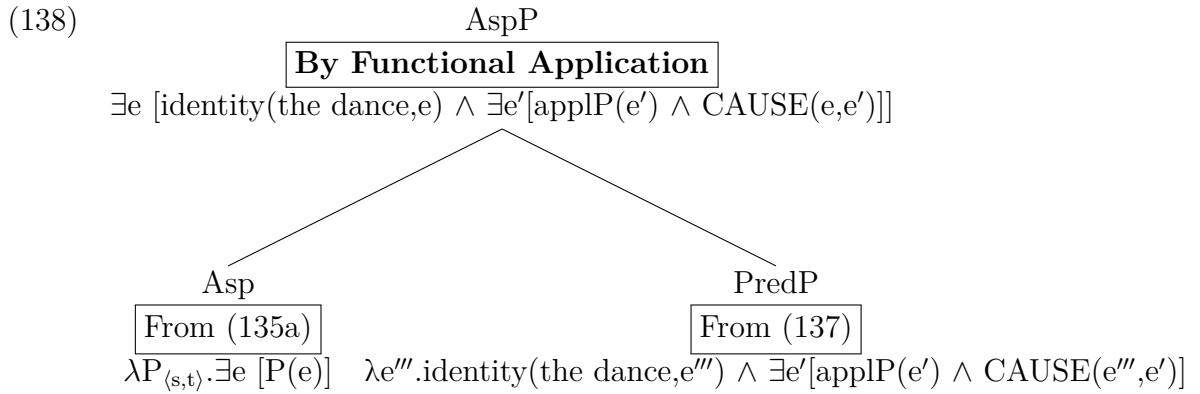
The Asp head in (135a) denotes the assumed default aspect which is the existential closure of events. Other aspectual operators could be merged in the same syntactic position but this basic flavor of Asp is sufficient for the purpose of the derivations below.  $\text{Pred}_{\text{evt}}$  in (135b) is an argument introducer for event denoting arguments and it can vary with respect to whether it requires an externally merged D in its specifier,  $\text{Pred}_{\text{evt}\{D\}}$ , or not,  $\text{Pred}_{\text{evt}\{\}}$ . This flavor of Pred introduces an element that can be appropriately used to identify an event. The role of identity will become clear in the derivations below. The mechanism is similar to the Restrict operation of Chung and Ladusaw (2004) in providing information about a variable without closing it off. The semantics of Pred is not affected by the purely syntactic specifier requirement. The entry in (135c) repeats the ApplP semantics that was derived in (116) and provides the shorthand notation  $\lambda e.\text{applP}(e)$ . Entry (135d) abstracts away from the internal structure of the DP. The LF derivation is shown in (136–138).



The  $nP$  which is derived above is a causative structure which has closed off the caused event and is still building the causing event. The  $nP$  combines with  $\text{Pred}_{\text{evt}\{D\}}$  as shown below.



Pred<sub>evt\{D\}</sub> establishes an identity relation between its specifier and the causing event without closing off the event. Existential closure is provided by Asp as shown below.



The effect of (135b) is that ‘the dance’ names the identity of the causing event before it is closed off existentially. Because the DP refers to the causing event, not all nouns are appropriate in this position. For example, the sentence in (133) is infelicitous if ‘the dance’ is replaced with ‘John’:

- (139) # *Jón var stelpunum góð skemmtun.*  
 John.NOM was girls.the.DAT good entertainment.NOM  
 ‘John entertained the girls well.’

With some pragmatic effort it is possible to coercively accept (139), but then ‘John’ refers to ‘something that John did’ or ‘some property of John’ rather than the individual John. This type of a situation is not unusual for a DP. The English example below enforces a similar interpretation of *John*.<sup>17</sup>

- (140) John concerned me.

Empirically, it seems that the subject in (133) needs to name an event. The need to account for event denoting DP’s arises independently in other work. Pylkkänen (2008) invokes a similar event identity analysis for Japanese adversity constructions, and Wood (2015) has a special interpretation mechanism for interpreting a DP as an appropriate argument to CAUSE. We assume that nouns which fit into event frames of type (141) have a root of type  $\langle s,t \rangle$  and that the definite article is dynamically typed as in (142). Therefore, *the dance* denotes an event. In contrast, *the cat* is an individual because the root is of type  $\langle e,t \rangle$ . There is more to be said about event-denoting nouns, especially in the case of more complex morphology (see Grimshaw 1990 for discussion), but for the present purpose empirical compatibility with positions like (141) diagnoses the case where  $\phi$  in (142) is  $s$  (an event).

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<sup>17</sup>Thanks to Jim Wood for discussions on this point and for bringing the English example to my attention.

- (141) a. the ✓dance/#cat took place yesterday.  
 b. the duration of the ✓dance/#cat was 2 hours.

$$(142) \quad \llbracket D \rrbracket = \lambda P \in D_{\langle \phi, t \rangle} . \iota x \in D_{\phi} . P(x) \quad (\phi \text{ is a type and } \phi \neq t)$$

In the CEx construction, at least one of the events of CAUSE, and sometimes both of them, are expressed as nouns. A bieventive analysis of such strongly nominal structures should of course not be taken for granted.<sup>18</sup> To demonstrate independently that there are two events in the structure, we can apply antonymous adverbial modification to the two events, first focusing on the case where the causing event is a sentence:

- (143) a. *Strákarnir dönsuðu á hættulegan hátt gegnum eldinn stelpunum*  
 boys.the danced in dangerous manner through fire.the girls.the.DAT  
*til skemmtunar á hættulausan hátt.*  
 for entertainment in safe manner  
 ‘The boys danced in a dangerous manner through the fire for the girls’  
 entertainment in a safe manner.’
- b. # *Strákarnir dönsuðu á hættulegan hátt gegnum eldinn á*  
 boys.the danced in dangerous manner through fire.the in  
*hættulausan hátt.*  
 safe manner  
 ‘The boys danced in a dangerous manner through the fire in a safe  
 manner.’

We take the difference in pragmatic naturalness in (143) to stem from the fact that the first example is a causative with two event variables, whereas the second example only describes one event which is not easily interpreted as both dangerous

<sup>18</sup>Thanks to Rajesh Bhatt for discussions on this matter.



and safe. The examples below which involve antonymous adjectives are also most straightforwardly a manifestation of the same pragmatic contrast.

- (144) a. *Hættulegi dansinn var stelpunum hættulaus skemmtun.*  
 dangerous dance.the was girls.the.DAT safe entertainment  
 ‘The dangerous dancing caused safe entertainment for the girls.’
- b. # *Hættulegi dansinn var hættulaus iðja.*  
 dangerous dance.the was safe activity  
 ‘The dangerous dancing was a safe activity.’

The CEx construction can naturally include both dangerous and safe. In contrast, the simple equivalence denoting copula usage in (144b) is infelicitous with the same modifiers. The difference between the two examples in (144) must be related to the fact that the antonymous modifiers need to target distinct objects in the world, which in these cases are events. Although adjectives like *dangerous* can modify individuals, as in *the dangerous cat*, ‘the dance’ and ‘entertainment’ in (144) clearly have a different status as shown by the event frames in (141).

### 3.4.2 CEx requires an overt causing event

The hypothesis that  $n_{\text{cause}}$  is a special flavor of a nominalizer with a causative semantics is the part of the analysis which accounts for the range of possible environments in which the CEx construction can appear. In terms of restrictions on external environments, one of the notable facts is that the causing event can be expressed as a *by*-phrase adjunct, but this adjunct cannot be omitted.

- (145) *Stelpunum var skemmtun \*(af dansinum).*  
 girls.the.DAT was entertainment.NOM \*(by dance.the)  
 ‘The girls were entertained by the dancing.’

Empirically, the attested pattern can be subsumed under the broader generalization in (146).

- (146) **Causing event requirement:**

Whenever a dative experiencer/benefactive argument co-occurs with a CEx predicate, a causing event must be overtly expressed.

The ungrammaticality of (145) with the *by*-phrase omitted needs to be explained. Syntactically, adjuncts are not expected to be obligatory, and superficially similar *by*-phrases in clausal passives never are.<sup>19</sup>

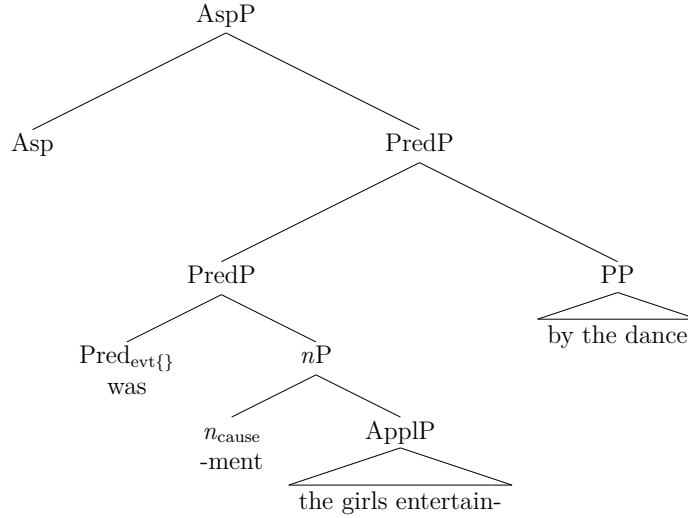
- (147) *Stelpunum var skemmt (af Jóni).*  
 girls.the.DAT was entertained (by John)  
 ‘The girls were entertained (by John).’

I hypothesize that the obligatory adjunct in (145) is explained by the causative semantics. Let us assume that the syntax is as below, where the *by*-phrase is adjoined to PredP. In this case, we have  $\text{Pred}_{\text{evt}\{\}}$ , the variant of Pred which does not require an externally merged D in its specifier. Here, the dative is the highest argument and therefore ‘the girls’ will move to Spec,T.

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<sup>19</sup>There might be interesting parallels to explore in discussions about *by*-phrases being syntactic arguments rather than adjuncts. The “smuggling” analysis of the passive by Collins (2005) is one such proposal. We do not pursue this possibility here, but any solution along these lines would have to motivate why some *by*-phrases are obligatory and not others.

(148)



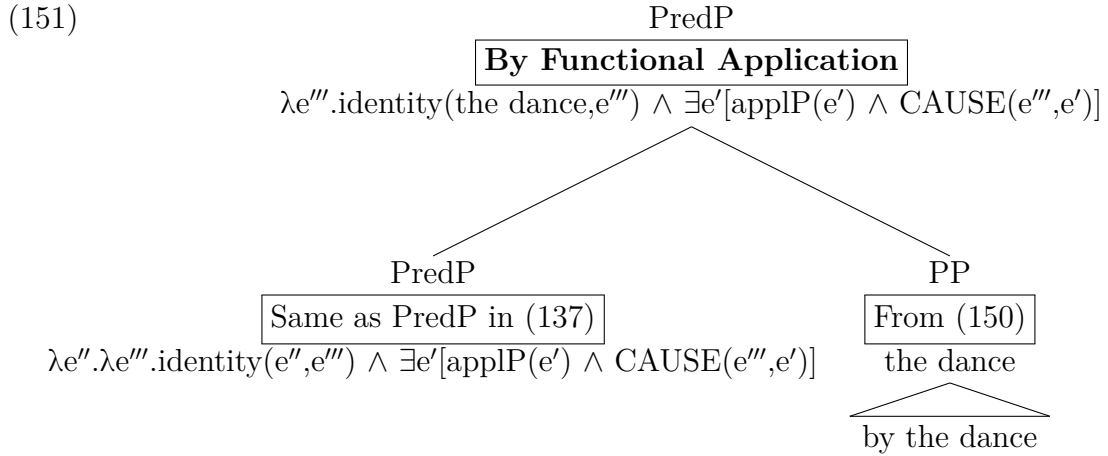
The status of the dative that raises from the noun phrase is interesting in the context of non-nominative subjects (see Thráinsson 1979; Zaenen et al. 1985; Sigurðsson 1989; Jónsson 1996; Eythórsson and Barðdal 2005; Thráinsson 2007), but exploring this matter is beyond the scope of the chapter. I merely note in passing that for me the dative passes the usual tests for subjecthood, including the ability to be PRO.<sup>20</sup>

- (149) *Stelpurnar vonuðust til að vera skemmtun af dansinum.*  
 girls.the.NOM hoped for to be entertainment.NOM by dance.the  
 ‘The girls hoped to be entertained by the dance.’

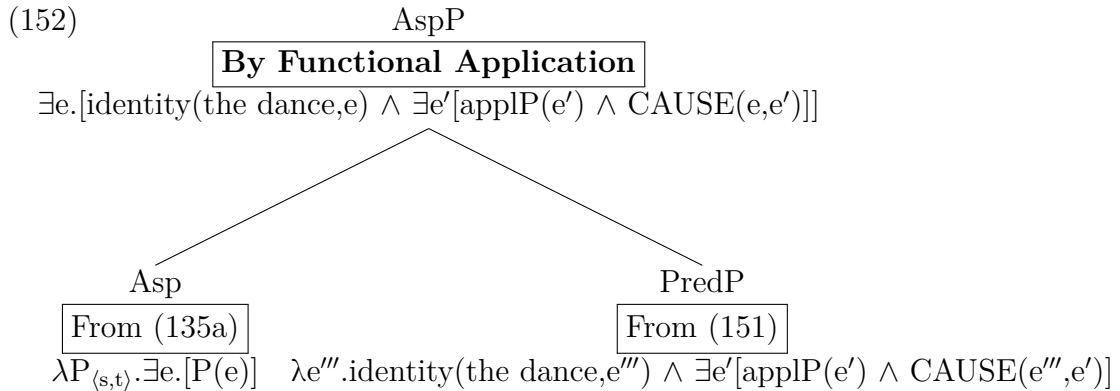
In order to calculate the truth conditions for the sentence, we will need to clarify the semantic status of the *by*-phrase. I will simply assume that (at least this) *by* is a semantically vacuous piece of syntactic glue, λe.e, and therefore (150) holds. The LF derivation of (148) proceeds as in (151–152).

<sup>20</sup>Eiríkur Rögnvaldsson (p.c.) notes that he find the example more natural with *verða* ‘become’ than *vera* ‘be’. I leave it for future work to look into this matter.

(150)  $\llbracket \text{the dance} \rrbracket = \llbracket \text{by the dance} \rrbracket = \text{the dance}$



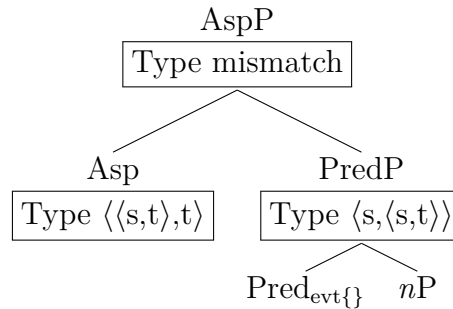
The above step shows how PredP and PP combine semantically via Functional Application and derive the set of events which are identified as the dance and cause the event described by the lower Appl structure. The step below shows how Asp combines with PredP.



The *by*-phrase provides the identity of the causing event in (151) in exactly the same way as the specifier of PredP did in the  $\text{Pred}_{\text{evt}\{D\}}$  variant of the sentence and existential closure of the causing event takes place at Asp (152). The truth conditions are equivalent. We can now also observe that the *by*-phrase is predicted

to be obligatory. Syntactically, the adjunct in (148) can be omitted as shown in the partial tree in (153), but then Asp, which is of type  $\langle\langle s,t \rangle, t\rangle$ , cannot combine semantically with PredP which is of type  $\langle s, \langle s,t \rangle \rangle$ . The type mismatch leads to a crash at LF, appropriately predicting the ungrammaticality of omitting the *by*-phrase.

(153)



While the analysis makes the correct predictions about the construction under investigation, it does not explain why this type of a *by*-phrase is obligatory when the *by*-phrase of the passive is always optional. I leave it for future work to develop a motivated account of the relevant differences but note that the passive involves an individual, the agent, whereas the CEx construction, perhaps importantly, involves a relationship between two events. The general issue of understanding exactly when and why elements are obligatory and when they are not is complicated. I am unable to provide conclusive answers to such general questions here but I hope that the present discussion and analysis will provide fruitful inspiration for future work on the topic.

It should be noted that the empirical generalization in (146) can also be fulfilled by a causing event that is described by an entire sentence. This is exemplified by (92), repeated as (154), where the CEx construction is part of a clause-adjoined PP.

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

Syntactically, *til* ‘for’ takes the CEx construction as its complement and is itself able to right-adjoin to a sentence. I take the adjunction site to be VoiceP; crucially lower than the existential closure of the event. Semantically, *til* adds an intensional purpose component as captured semi-formally below:<sup>21</sup>

- (155) a.  $\llbracket \mathbf{P}_{\text{plan}} \rrbracket = \lambda P_{\langle s,t \rangle} . \lambda e . \text{plan}(w_{\text{evt}}, p(e))$   
 b.  $\text{plan}(w_{\text{evt}}, p(e)) =$  in all worlds  $w'$  compatible with a salient plan in  $w_{\text{evt}}$ ,  
 $p(e)=1$

This plan semantics has the effect that successful causation is restricted to possible worlds compatible with some plan in the world of the event. We will also need another composition rule, Predicate Conjunction (Kratzer 2009; Wood 2015), repeated here from (43).

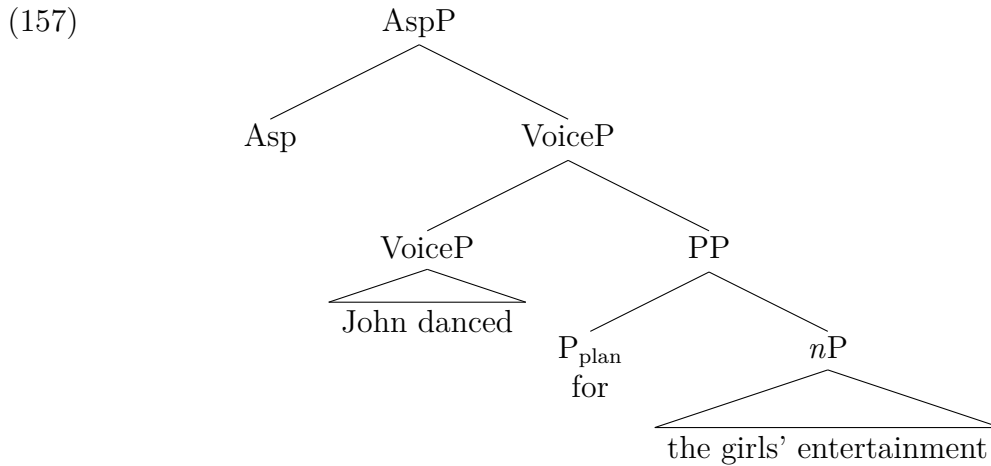
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<sup>21</sup>This could be translated into a more proper intensional treatment in the type of system which is developed in von Stechow and Heim (2011), but this would lead to unnecessary notational complications in the current discussion.

(156) **Predicate Conjunction**

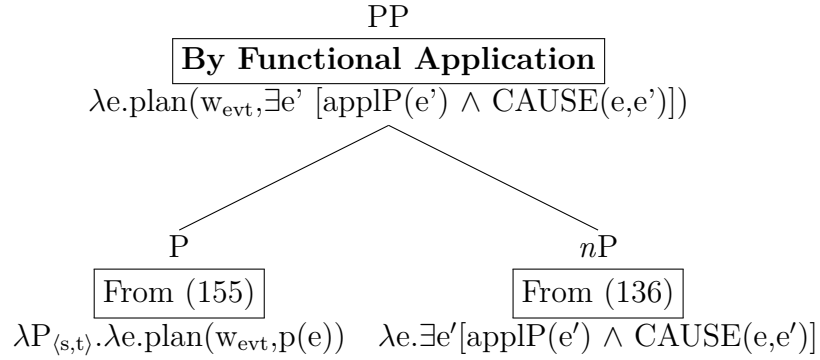
If  $\alpha$  is a branching node,  $\{\beta, \gamma\}$  is the set of  $\alpha$ 's daughters, and  $\llbracket \beta \rrbracket$  and  $\llbracket \gamma \rrbracket$  are both in  $D_f$ , and  $f$  is a semantic type which takes  $n$  arguments, then  $\llbracket \alpha \rrbracket = \lambda(a_1, \dots, a_n). \llbracket \beta \rrbracket \lambda(a_1, \dots, a_n) \wedge \llbracket \gamma \rrbracket \lambda(a_1, \dots, a_n)$ .

Predicate Conjunction is a generalized type-independent version of Predicate Modification (Heim and Kratzer 1998) which applies whenever two sisters are of the same semantic type. The operation conjoins their meaning. Now consider the syntax of (154) as analyzed in (157).



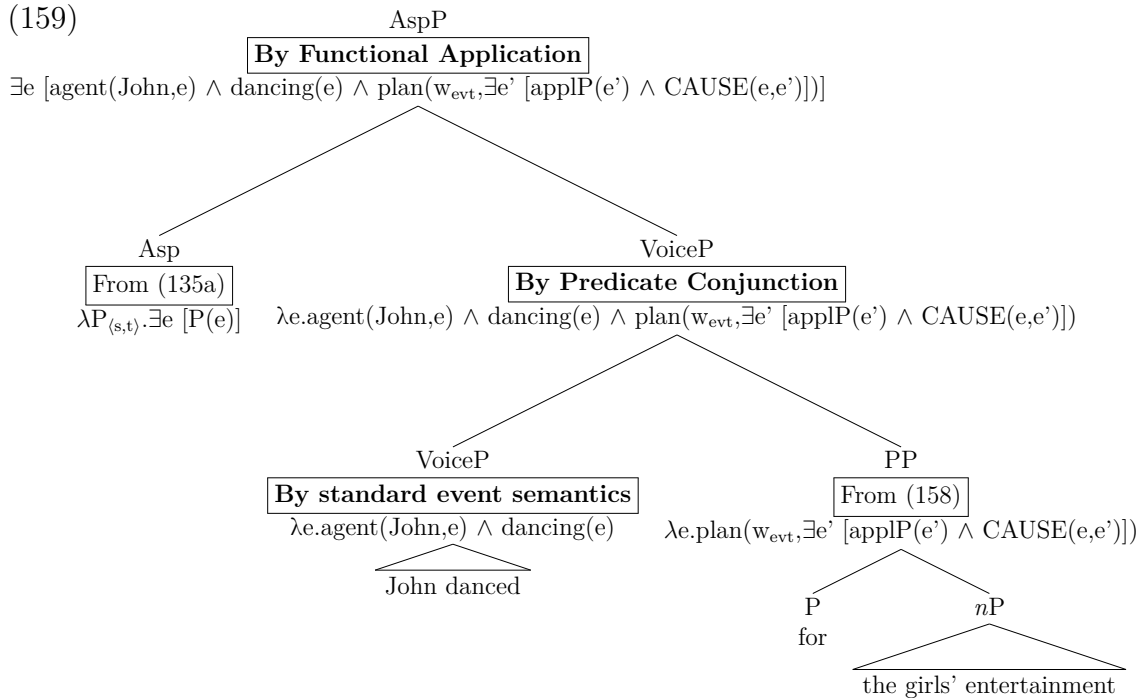
The causing event is now interpreted to be the dancing of John. At the level where the purpose adjunct combines with the clause, we have two functions of type  $\langle s, t \rangle$ , and they are conjoined in the semantics before the combined event is closed off existentially.

(158)



An abbreviated LF derivation demonstrates the crucial mechanics. The purpose PP is derived by Functional Application in (158) and it combines with VoiceP in (159) by Predicate Conjunction. Here, both events are closed off existentially, the caused event at  $n$ , and the causing event at Asp.

(159)



The sentence is true if there was a dancing event where John was the agent, and if everything went according to the plan there was an entertainment event where



the girls were experiencers and the dancing event caused the entertainment. This reflects the intuitive meaning of the sentence quite well. The causative analysis captures the truth conditions of (89–92) and it explains the obligatory *by*-phrase.

Furthermore, the analysis that  $n_{\text{cause}}$  is a distinct type of a nominalizer, motivated by its distinct semantics, allows us to state further restrictions on the distribution of CEx in terms of syntactic selection. Notably, CEx cannot combine syntactically with the definite article (160) and the CEx  $n\text{P}$  cannot appear as the direct object of a verb (161).

- (160) \**Þeir dönsuðu [stelpunum til skemmtunarinnar]*  
 they danced [girls.the.DAT to entertainment.the.GEN]  
 ‘They danced for the girls’ entertainment’

- (161) *Jón skildi skemmtun (\*stelpunum).*  
 John understood entertainment.ACC (\*girls.the.DAT)  
 ‘John understood entertainment (\*for the girls).’

The ungrammaticality of (160) is accounted for if D selects  $n$  but not  $n_{\text{cause}}$ . In syntactic positions where the  $n$  cannot be causative, compatibility with Appl selection is lost, hence the unavailability of the dative argument in (161).

### 3.4.3 Section summary

This section gave an account of the positions where the CEx  $n\text{P}$  can appear. We motivated a bivalent causative analysis, and adapted it to the noun phrase by associating CAUSE with  $n$ . An obligatorily overt expression of a causing event was

accounted for in terms of the causative  $n$ , and in terms of a type of Pred which requires the identity of an event to be named overtly. Spelling out the details of the formal semantics explained an obligatory *by*-phrase adjunct which is surprising from a purely syntactic point of view. The analysis correctly predicts that  $n_{\text{cause}}$  can have a different distribution from  $n$  because the two are different syntactic objects.

### 3.5 Chapter summary

In this chapter, I argued that dative experiencers can be introduced as part of noun phrases that are not internally verbal. Applying the locality theory as implemented in DM, I argued that the predicates in the Icelandic Caused Experience construction are nouns, internally as well as externally. I showed that the dative experiencer in the CEx construction patterns empirically with other Spec,Appl datives and it is introduced as part of the CEx nominal structure. Finally, I accounted for the external environments under which CEx can be embedded by developing a causative analysis where the CAUSE semantics is associated with the nominalizer.

This case study on applicatives in the noun phrase is crucially constrained by observations about surface phenomena in morphology and interpretation. The fact that we see root-conditioned allomorphy in the CEx noun shows that there is no internal verbal layer. The closest category head to the root is nominal. Interpretive realization also speaks against an internal verbal layer because the CEx noun sometimes expresses a root meaning which cannot be expressed by a correspond-

ing verb. The overall result is that Event Applicatives are independent of verbal morphosyntax, at least in Icelandic.

## Chapter 4

### Suffixation under adjacency

The second case study in this dissertation provides support to the proposal by Schwarz (2009, 2013) that there are two types of definite articles in natural language and it extends this view to include complex morphological interactions.<sup>1</sup> The study is based on evidence from Icelandic which has not previously been examined in terms of Schwarz's proposal. The findings lend support to the hypothesis that the two articles are distinct morphemes and that the realization of these morphemes can interact in distinct ways with structural locality conditions. One of the two articles has a morphological distribution which is structurally similar to English T(ense) in *do*-support. I outline an analysis of the Icelandic facts in terms of a morphological operation of local dislocation under linear adjacency. I contrast the local dislocation approach with the use of morphological lowering. In addition to supporting the distinctness of two definite articles, this part of the dissertation aims to address the question of whether local dislocation and lowering (see §2.2.3) should

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<sup>1</sup>This chapter is based on Ingason (2016).

both be part of our theoretical toolkit or whether the relevant empirical cases should be reduced to local dislocation.

## 4.1 Introduction

Recent work provides several pieces of semantic evidence for two definite articles across languages and language families (Schwarz 2009; Arkoh and Matthewson 2013; Simonenko 2013).<sup>2</sup> A weak article  $D_{\text{weak}}$  expresses situational uniqueness and a strong article  $D_{\text{strong}}$  expresses anaphoricity/familiarity. This chapter provides evidence from Icelandic which supports the reality of the  $D_{\text{weak}}/D_{\text{strong}}$  distinction in a novel way. Specifically, Icelandic  $D_{\text{weak}}$  shows a morphological interaction which I refer to as *the*-support because the relevant structural configurations are similar to English *do*-support. Because of the striking similarities between the Icelandic and English phenomena, it is a general implication of this work that theories of suffixation under adjacency would benefit from considering Icelandic *the*-support and English *do*-support as related phenomena at a deep abstract level.

Let us introduce the core data, focusing first on the  $D_{\text{weak}}/D_{\text{strong}}$  contrast studied by Schwarz (2009) in German. In Standard German, certain  $P+D_{\text{weak}}$  combi-

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<sup>2</sup>The judgments reported in the chapter are originally my own unless otherwise noted. The empirical generalizations involved have been confirmed with multiple native speakers of Icelandic. Many of the examples are constructed by adapting German examples from Schwarz (2009) to the Icelandic context under discussion.

nations contract but P+D<sub>strong</sub> does not contract. This is illustrated for a unique definite and an anaphoric definite below.

- (162) a. *Armstrong flog als erster [PP zum Mond].*  
 Armstrong flew as first one [PP to-the<sub>weak</sub> moon]  
 ‘Armstrong was the first one to fly to the moon.’ (Schwarz 2009:40)
- b. (Previous discourse: Hans interviewed a writer and a politician.)  
*Er hat [PP von dem Politiker] keine interessanten Antworten*  
 He has [PP from the<sub>strong</sub> politician] no interesting answers  
*bekommen.*  
 gotten  
 ‘He didn’t get any interesting answers from the politician.’ (Schwarz 2009:30)

Example (162a) shows that a unique definite like ‘the moon’ contracts with the preceding preposition, resulting in *zum* rather than *zu dem*. Example (162b) shows that an anaphoric definite for the second mention of ‘the politician’ does not contract, resulting in *von dem* rather than *vom*. The weak/strong contrast is well disguised in German because the environments which allow for contraction are quite restricted, but Schwarz shows evidence that the distinction is clearly attested in these environments.

The same distinction between weak and strong articles is also morphophonologically neutralized in a wide range of cases in Icelandic because the definite article, whether D<sub>weak</sub> or D<sub>strong</sub>, is usually a suffix. The following are Icelandic examples of the relevant DP with a context given in English. The examples show the masculine dative form of the article, *-num*. The form varies by gender and case as described in the paradigm in (176) below but the gender and case facts will generally be

omitted from the examples as they are orthogonal to the  $D_{\text{weak/strong}}$  contrast under discussion.<sup>3</sup>

- (163) a. (Context: First mention of the World Wide Web)  
 Tim Berners Lee introduced the world to ...  
 ... ✓ [ $_{DP}$  *veraldarvef-**num***].  
 ... ✓ [ $_{DP}$  world.wide.web-**the**<sub>weak</sub>]
- b. (Previous discourse: Mary talked to a writer and a politician.)  
 She got no interesting answers from ...  
 ... ✓ [ $_{DP}$  *stjórnámálamanni-**num***].  
 ... ✓ [ $_{DP}$  politician-**the**<sub>strong</sub>]

The examples above demonstrate that the article is commonly a suffix regardless of whether definiteness is licensed by uniqueness or anaphoricity. However, a pre-evaluative position within the DP distinguishes the licensing mechanisms. I use the descriptive label pre-evaluative for the position immediately to the left of an evaluative adjective.  $D_{\text{weak}}$  is realized as a free form *hi-*nn** when evaluative adjectives intervene between  $D/n$  (164a). The free form article is never a realization of  $D_{\text{strong}}$ ; it is never anaphoric (164b).<sup>4</sup>

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<sup>3</sup>When discussing weak and strong definite articles in this chapter, I show the morphological segmentation between the noun and the suffix in the noun phrase which is crucial for the example. When I give a larger context in Icelandic, other definite noun phrases which simply happen to be a part of the context are glossed as definite without showing the segmentation.

<sup>4</sup>For some speakers, the Icelandic verb for ‘introduce’ requires that ‘the amazing world wide web’ precedes ‘the world’ in examples of this type (Eiríkur Rögnvaldsson p.c.). This difference is orthogonal to the issues under investigation in the chapter.

- (164) a. (Context: First mention of the World Wide Web)  
 Tim Berners Lee introduced the world to ...  
 ... ✓ [DP **hinum** ótrúlega veraldarvef].  
 ... ✓ [DP HI-**the**<sub>weak</sub> amazing<sub>evaluative</sub> world.wide.web]
- b. (Previous discourse: Mary talked to a writer and a terrible politician.)  
 She got no interesting answers from ...  
 ... # [DP **hinum** hræðilega stjórnámálamanni].  
 ... # [DP HI-**the**<sub>strong</sub> terrible<sub>evaluative</sub> politician]

As in German, D<sub>strong</sub> can be paraphrased with a demonstrative, but D<sub>weak</sub> cannot.

Thus, the pre-evaluative position is incompatible with a demonstrative in a discourse context where definiteness is licensed by uniqueness but a demonstrative can be used felicitously in the same position for a second mention of a discourse referent.

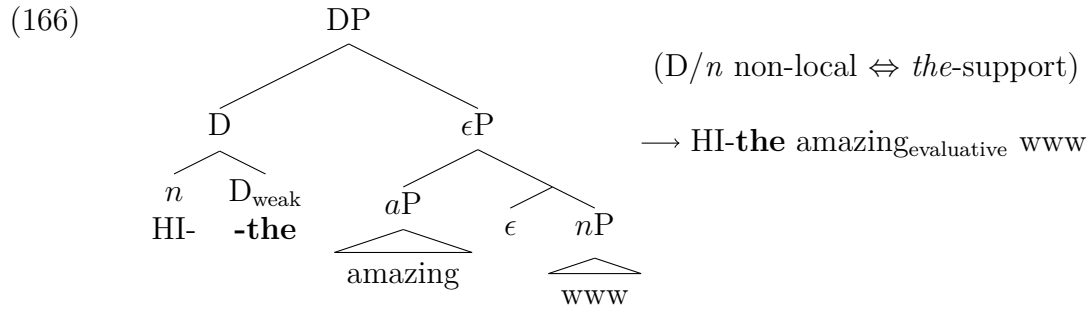
- (165) a. (Context: First mention of the World Wide Web)  
 Tim Berners Lee invented ...  
 ... # [DP **bennan** ótrúlega veraldarvef].  
 ... # [DP **this** amazing<sub>evaluative</sub> world.wide.web]
- b. (Previous discourse: Mary talked to a writer and a terrible politician.)  
 She got no interesting answers from ...  
 ... ✓ [DP **þessum** hræðilega stjórnámálamanni].  
 ... ✓ [DP **this** terrible<sub>evaluative</sub> politician]

Combined, the Icelandic examples above indicate that while the definite article is usually a suffix, determiners to the left of certain adjectives alternate between a weak free form article *hinn* and a demonstrative *þessi* depending on how definiteness is licensed.

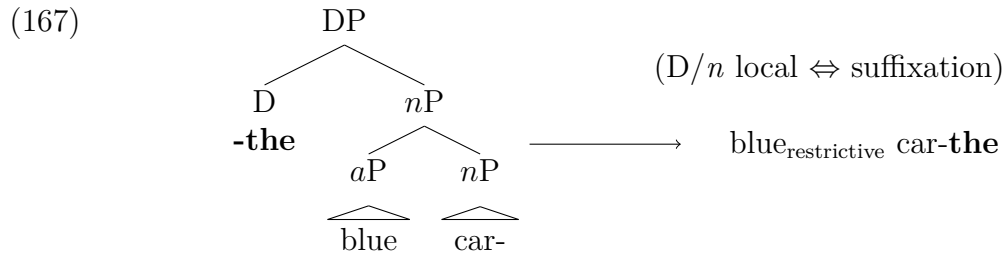
I will refer to the distribution of D<sub>weak</sub> in Icelandic as *the*-support because of how strongly it resembles English *do*-support. The syntactic analysis I will develop for the Icelandic phenomenon is outlined below. D<sub>weak</sub> is realized with *the*-support, i.e., the free article, when interveners block D/*n* locality. I assume that evaluative



adjectives are introduced in the specifier of a functional projection  $\epsilon$ . Therefore,  $D/n$  are non-local when such adjectives intervene and then  $D_{\text{weak}}$  is realized as a suffix on a support morpheme *hi-*.



In contrast, D is suffixed onto the noun when no adjectives appear in the noun phrase or only restrictive adjectives. The proposed analysis is that restrictives are not  $D/n$  interveners because they are adjoined to  $nP$ .



The chapter is organized as follows. Section 4.2 provides theoretical and empirical background on weak and strong definite articles. Section 4.3 elaborates on the description of definite articles in Icelandic. Section 4.4 is a comparative study of definite articles in German and Icelandic which provides evidence that the two languages have the same weak/strong distinction. Section 4.5 develops an analysis of Icelandic *the*-support. Section 4.6 connects the present analysis with general theories about suffixation under adjacency. Section 4.7 concludes.

## 4.2 Weak and strong definite articles

The goal of this section is to present a brief theoretical and empirical introduction to weak and strong definite articles.

### 4.2.1 What do definite articles express?

The meaning of the definite article is an old puzzle. One hypothesis is that definite articles express uniqueness (Russell 1905; Frege 1892; Strawson 1950). This approach works well for expressions like *the sun* but contextual domain restriction is needed in the absence of global uniqueness to ensure situational uniqueness. Such domain restriction for definite articles is arguably well motivated because the same mechanism is independently needed elsewhere in natural language (Neale 1990).

(168) Everyone came to the party. (Not everyone in the world)

Example (168) shows that we can use a universal quantifier *everyone* for a smaller set of individuals than everyone in the world by focusing our attention to a situation which is relevant in the context.

A second hypothesis about definiteness, going back to Christophersen (1939), states that definite articles express anaphoricity (or familiarity) (Heim 1982; Kamp 1981). This approach works well for previously mentioned discourse referents as in the second mention of *the book* in (169) but in the absence of a previous mention,

one needs to appeal to global familiarity of referents like *the sun* or admit some kind of accommodated familiarity.

(169) John bought a book and a magazine. The book was expensive.

The preceding discussion exemplifies how the uniqueness hypothesis and the anaphoricity hypothesis are both tailored to certain types of examples but need elaborations for other cases.

A third hypothesis is that there are two definite articles in natural language,  $D_{\text{weak}}$  for uniqueness and  $D_{\text{strong}}$  for anaphoricity (Schwarz 2009). According to this view, the denotation of a weak article (170) expresses situational uniqueness (Schwarz 2009:264) but a strong article (171) includes an additional anaphoric index argument.<sup>5</sup>

(170)  $\llbracket D_{\text{weak}} \rrbracket = \lambda s_r . \lambda P . \iota x . P(x)(s_r)$

(171)  $\llbracket D_{\text{strong}} \rrbracket = \lambda s_r . \lambda P . \lambda y . \iota x . P(x)(s_r) \wedge x=y$

The two article approach is conceptually inferior because it fails to reduce all definite articles to either uniqueness or anaphoricity. However, it is supported empirically by systematic morphological correlates with the two interpretations and therefore it is more accurate.

---

<sup>5</sup>These denotations can be thought of as an LF realization of distinct syntactic objects which are related in their feature composition, e.g.,  $D_{\text{unique}}$ : [+UNIQUE] and  $D_{\text{strong}}$ : [+UNIQUE, +ANAPHORIC]. See Goodwin Davies (2016) on the feature analysis of the two articles.

## 4.2.2 Cross-linguistic realization

Evidence from Germanic and beyond suggests that different phonological exponents of definite articles correspond to licensing definiteness by uniqueness vs. anaphoricity. In addition to the Icelandic data under discussion in the present chapter, Ebert (1971) describes a correlation between two article forms and interpretation in Fering Frisian and Schwarz (2009) develops his theory of two articles based on evidence from Standard German. The analysis of Simonenko (2013) builds on a distinction between a full anaphoric article and a reduced unique article in Austro-Bavarian and Arkoh and Matthewson (2013) study a parallel phenomenon in Akan, thus reaching beyond Germanic.

(172) Cross-linguistic realization of the weak/strong distinction

	D <sub>weak</sub>	D <sub>strong</sub>
Fering Frisian	<i>a</i> -form	<i>d</i> -form
Austro-Bavarian	reduced form	full form
Standard German	some P+D combinations contract	no contraction
Akan	null (or not present)	<i>nv</i>
Icelandic	free form with D/ <i>n</i> interveners	always a suffix
Standard English	<i>the</i>	<i>the</i>

The realization of D<sub>weak</sub> and D<sub>strong</sub> in the above-mentioned languages is summarized in the table in (172). Note that a language may or may not manifest the distinction in its morphology, Standard English, for example, uses *the* for both interpretations. To show some of these data in context, the reduced Austro-Bavarian D<sub>weak</sub> is contrasted with its D<sub>strong</sub> counterpart in (173) (see Simonenko 2013; Wiltschko

2012:109-110). Akan has a  $D_{\text{strong}}$  form  $n\bar{u}$  but no (overt)  $D_{\text{weak}}$  as shown in (174)

(Arkoh and Matthewson 2013:2).

- (173) a.  $[_{DP} \mathbf{D} \quad \text{Sun}] \text{ geht heit um hoib sechs auf}$   
 $[_{DP} \text{the}_{\text{weak}} \text{ sun}] \text{ rises today at half six up}$   
 ‘Today, the sun rises at 5.30.’
- b. *In da Stodtbücherei gibt’s a Buach über Kanada. Letzens woa I doat*  
 in det town.library exists it a book about Canada recently was I there  
*und hob ma  $[_{DP} \mathbf{des} \quad \text{Buach}] \text{ ausboagt.}$*   
 and have me  $[_{DP} \text{the}_{\text{strong}} \text{ book}]$  borrowed  
 ‘In the public library, they have a book about Canada. Recently, I was  
 there and borrowed that book.’
- (174) a. *Ármstròŋ nyí nyínpà áà ó-dzí-ì kán tú-ù kó-ò*  
 Armstrong is person REL 3SG.SUBJ-eat-PAST first fly-PAST go-PAST  
 $[_{DP} \text{òsìrán } \emptyset] \quad \text{dò}$   
 $[_{DP} \text{moon } \mathbf{the}_{\text{weak}}] \text{ top}$   
 ‘Armstrong was the first person to fly to the moon.’
- b. *M̄-ť-ò èkùtú.  $[_{DP} \text{Èkùtú } \mathbf{nó}] \quad \text{yè d̄w pápá}$*   
 1SG.SUBJ-buy-PAST orange  $[_{DP} \text{orange } \mathbf{the}_{\text{strong}}]$  be nice good  
 ‘I bought an orange. The orange was really tasty.’

Schwarz (2013) discusses further potential manifestations of the  $D_{\text{weak}}/D_{\text{strong}}$  distinction and ongoing work is exploring related phenomena cross-linguistically. For example, Jenks (To appear) pursues an analysis in which numerical classifier languages manifest the weak/strong distinction even if they do not have definite articles in the Germanic sense. Furthermore, work is being carried out on potential connections with the so-called double definiteness in Mainland Scandinavian (Goodwin Davies 2016) as well as American Sign Language (Irani 2015; Irani and Schwarz 2016) and Lithuanian (Šereikaitė 2015).

### 4.2.3 Section summary

To summarize the section, there are two definite articles in natural language,  $D_{\text{weak}}$  is licensed by situational uniqueness and  $D_{\text{strong}}$  by anaphoricity. The two kinds of uses are illustrated by the English example below.

(175) Amy bought a book about the<sub>weak</sub> sun. The<sub>strong</sub> book was expensive.

The article with the sun is weak because definiteness is licensed by the global uniqueness of the sun. The article with the second mention of the book is strong because definiteness is licensed by familiarity. Although English uses *the* to realize both, this difference in interpretation is systematically reflected in different phonological exponents of D across languages and language families.

## 4.3 Icelandic definite articles

The goal of this section is to give an empirical overview of Icelandic definite articles, focusing on facts that are important in the context of the distinction between weak and strong articles.

### 4.3.1 Basic facts

Let us review some of the basic facts about Icelandic definite articles which are relevant to the phenomenon under investigation. First, Icelandic has a suffixed article and a free form article; the free article looks as if the suffixed article has

been suffixed to *hi-* which I describe as a support morpheme.<sup>6</sup> The paradigm of the Icelandic definite article is shown for all combinations of gender, number and case below.

(176) The suffixed definite article in Icelandic

		<i>hestur</i> ‘horse’	<i>nál</i> ‘needle’	<i>barn</i> ‘child’
		MASC	FEM	NEUT
SING	NOM	hestur-inn	nál-in	barn-ið
	ACC	hest-inn	nál-ina	barn-ið
	DAT	hesti-num	nál-inni	barn-inu
	GEN	hests-ins	nálar-innar	barns-ins
PLUR	NOM	hestar-nir	nálar-nar	börn-in
	ACC	hesta-na	nálar-nar	börn-in
	DAT	hestu-num	nálu-num	börnu-num
	GEN	hesta-nna	nála-nna	barna-nna

(177) The free form definite article in Icelandic

		MASC	FEM	NEUT
SING	NOM	hi-nn	hi-n	hi-ð
	ACC	hi-nn	hi-na	hi-ð
	DAT	hi-num	hi-nni	hi-nu
	GEN	hi-ns	hi-nnar	hi-ns
PLUR	NOM	hi-nir	hi-nar	hi-n
	ACC	hi-na	hi-nar	hi-n
	DAT	hi-num	hi-num	hi-num
	GEN	hi-nna	hi-nna	hi-nna

I assume for the purpose of this chapter that the suffixed article is sometimes *i-* initial and that any two adjacent *i*'s are pronounced as one in the phonology. A segmentation where the support morpheme is only *h-* would also work for the present

<sup>6</sup>The description and analysis of the old and modern Icelandic noun phrase and definite article has a long history, including Nygaard (1905); Delbrück (1916); Noreen (1923); Magnússon (1984); Delsing (1993); Sigurðsson (1993); Julien (2005); Sigurðsson (2006); Thráinsson (2007); Harðarson (2014); Pfaff (2015).

analysis as in *h-inn* rather than *hi-nn* although slightly different statements about allomorphy and/or morphophonology would have to be made. I will however not dwell on morphophonological details here. The point to be made based on the paradigm above is simply that apart from the support morpheme, the suffixed and free articles look like they are the same phonological exponent and I will treat them as such. Note that because the definite article itself shows nominal inflection, distinctly from the noun, it can be split into a D exponent and an nominal inflection exponent. I will present this option when I discuss concord in Chapter 5 but I will put it to the side for now.

The distribution of the free article *hinn* is constrained by other elements in the noun phrase. Specifically, the free article is only grammatical if certain elements intervene between D/*n*. Therefore, it cannot be used in the absence of modifiers, regardless of context.

- (178) a. (Context: First mention of the World Wide Web)  
 Tim Berners Lee introduced the world to ...  
 ... \* [<sub>DP</sub> **hinum** *veraldarvef*]  
 ... \* [<sub>DP</sub> HI-**the** world.wide.web]
- b. (Previous discourse: Mary talked to a writer and a politician.)  
 She got no interesting answers from ...  
 ... \* [<sub>DP</sub> **hinum** *stjórnámálananni*].  
 ... \* [<sub>DP</sub> HI-**the** politician].



In the absence of interveners, the suffixed article must be used:

- (179) a. (Context: First mention of the World Wide Web)  
 Tim Berners Lee introduced the world to ...  
 ... ✓ [*DP veraldarvef-**num***]  
 ... ✓ [*DP world.wide.web-**the**<sub>weak</sub>*]
- b. (Previous discourse: Mary talked to a writer and a politician.)  
 She got no interesting answers from ...  
 ... ✓ [*DP stjórnmálamanni-**num***].  
 ... ✓ [*DP politician-**the**<sub>strong</sub>*].

Restrictive adjectives are not *D/n* interveners and therefore the following examples of weak and strong articles are both realized with a suffixed article.

- (180) a. (Context: First mention of the last binding principle)  
 Chomsky invented ...  
 ... ✓ [*DP síðasta bindilögmál-**ið***]  
 ... ✓ [*DP last binding.principle-**the**<sub>weak</sub>*]
- b. (Previous discourse: Mary talked to a young politician and an old politician.)  
 She got no interesting answers from ...  
 ... ✓ [*DP unga stjórnmálamanni-**num***].  
 ... ✓ [*DP young politician-**the**<sub>strong</sub>*].

*D/n* interveners include at least evaluative adjectives and those suffice for distinguishing  $D_{\text{weak}}$  and  $D_{\text{strong}}$  so I will focus on them. However, other elements can also appear between *D/n*, notably cardinals (Julien 2005). See also Pfaff (2015) for further discussion of different types of modifiers in the context of an alternative analysis of modifiers in the Icelandic noun phrase.

- (181) *hinn*      *ótrúlegi*      *veraldarvefur*  
 HI-**the**<sub>weak</sub>    amazing<sub>evaluative</sub>    world.wide.web  
 ‘the amazing world wide web’ (amazing by the standards of the speaker)

### 4.3.2 A note on “bookishness”

The free article is sometimes described as literary, bookish, archaic, etc. (Sigurðsson 1993, 2006) but it has emerged that use of the free form correlates with certain semantic properties. Given the right structure and discourse context, the free article is in fact used in any register. I will not devote much discussion here to reasons for the emphasis on bookishness in some of the earlier literature but note that some of the examples of free articles which are used in earlier discussions are difficult to coerce into an interpretation and discourse context which licenses the free article. Consider, for example, the following example and judgement from Sigurðsson (2006).

- (182) ?? [<sub>DP</sub> *hinn nýji bíll*] var dýr.  
          [<sub>DP</sub> HI-**the** new car] was expensive

In order to be grammatical, ‘the car’ has to be situationally unique and ‘new’ needs to be evaluative. The sentence therefore has to mean something like: ‘The unique entity in the situation under discussion which is a car is new by my standards and it was expensive’. No context is given and it is much easier to imagine a context where ‘car’ is used anaphorically or ‘new’ restrictively. Sigurðsson gives the sentence two question marks and relates it to formal written style. Consider a more elaborate context.

- (183) (Context: The speaker lives in a small town on an island which has only used horses for transportation until now. The first car has been brought into town by the mayor and the speaker saw it today and she and her friend have been wondering how much this remarkable item cost. The car is quite a novelty by her standards. This is a conversation later that day in which the car has not been mentioned before.)

? [<sub>DP</sub> **hinn** *níji bíll*] var dýr.  
 [<sub>DP</sub> HI-**the** new car] was expensive

‘The unique car which is a novelty by my standards was expensive.’

The example is more natural with all of that context added, but it still depends on our ability to read ‘new’ as something like ‘novelty by the standards of the speaker’ which is not the most salient reading of ‘new’. In such cases it is sometimes easier to get the evaluative component out of an ironically intended opposite meaning. The context below adds an explicitly ironic interpretation to ‘new’.

- (184) (Context: The speaker lives in a small town on an island which has only used horses for transportation until now. The first car has been brought into town by the mayor and the speaker saw it today and she and her friend have been wondering how much this remarkable item cost. *Furthermore, cars are so expensive that the mayor actually had to buy an old used car because the town’s budget would not allow for a new one.* This is a conversation later that day in which the car has not been mentioned before.)

[<sub>DP</sub> **hinn** ⟨*airquotes*⟩ *níji*                    ⟨*/airquotes*⟩ *bíll*] var dýr.  
 [<sub>DP</sub> HI-**the**                                    new<sub>evaluative</sub>                                    car] was expensive

‘The unique car which is “new” by my standards was expensive.’

If we have made properly sure that the car is situationally unique, has not been mentioned before in the conversation and if ‘new’ gets an ironic reading, which is emphasized by the air quotes, the sentence is fine in any register, including an informal chat between friends. Of course, because so much context is needed to make the free article natural, the choice of the example is not ideal for studying

the free article. In fact Sigurðsson (2006) also gives an example which is easier to imagine in an appropriate context for the free article.

- (185) *Ég aðhyllist* [<sub>DP</sub> **hina** *athyglisverðu hugmynd um færslur*].  
 I adhere-to [<sub>DP</sub> **HI-the** interesting<sub>evaluative</sub> idea about movements]  
 ‘I adhere to the (evaluatively) interesting idea about movements.’

Sigurðsson suggests that, in addition to formal written style, abstractness of the noun is important. However, as we will see below, this correlation with abstractness is a result of such nouns often picking out situationally unique referents. Other uniquely denoting *nP*'s like proper names and larger situation uniques serve the same purpose, while being concrete. The example in (185) about the idea that movement exists is easily unique in the context of an article about theoretical syntax. Also, ‘interesting’ is easily interpreted as evaluative. Thus, on first mention of the ‘interesting idea about movements’, the free article is not only preferable in a sentence like (185), it is obligatory. The suffixed variant in (186) requires a context in which there are at least two alternative ideas about movements and in which ‘interesting’ is a non-intervening restrictive element which selects a unique referent for the DP out of a non-singleton set of ideas (some of which are uninteresting).

- (186) *Ég aðhyllist* [<sub>DP</sub> *athyglisverðu hugmynd-ina um færslur*].  
 I adhere-to [<sub>DP</sub> interesting<sub>restrictive</sub> idea-**the** about movements]  
 ‘I adhere to the (restrictively) interesting idea about movements.’

For the above reasons, I will consider several examples in which the appropriate structure and discourse context is obviously compatible with the free article. That

includes globally unique nouns like ‘the world wide web’ and straightforwardly evaluative adjectives like ‘amazing’.

Despite some of the earlier comments on bookishness, it has become clear through various observations about the semantics of free form *hinn* that usage of the free form article is correlated with semantic properties. It has been noted that *hinn* is incompatible with “deictic reference” (Delsing 1993). Some instances of *hinn* have been described as “false definites” (Jónsson 2000; Thráinsson 2007:326) and those escape the definiteness effect for existential constructions (Milsark 1977). The meaning of adjectives matters for *hinn*, e.g., restrictive adjectives in the absence of evaluatives are not compatible with it (Árnason 1983; Thráinsson 2007:4) whereas evaluatives are.<sup>7</sup> The proposal of the present study is that the  $D_{\text{weak}}/D_{\text{strong}}$  distinction is crucial to understanding the distribution of the free article *hinn* in Icelandic.

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<sup>7</sup>The importance of evaluative interpretation of the adjective has been noted independently by Pfaff (2015)

### 4.3.3 The free article *hinn* is never anaphoric

Recall that the free  $D_{\text{weak}}$  article is used for first mention of a globally unique entity, not demonstratives:

(187) (Context: First mention of the World Wide Web)

*Tim Berners Lee kynnti heiminn fyrir* [ $DP$  *hinum*/*#þessum*  
Tim Berners Lee introduced world.the to [ $DP$  HI-*the*<sub>weak</sub>/*#this*  
*ótrúlega veraldarvef*].  
amazing<sub>evaluative</sub> world.wide.web]

‘Tim B. Lee introduced the world to the amazing World Wide Web.’

Demonstratives are anaphoric and nearly synonymous with  $D_{\text{strong}}$ , hence unavailable for first mention. An interesting situation arises when a unique definite is referred to for the second time. On second mention of the world wide web, use of the free article is disallowed in Icelandic and in this case a demonstrative must be used instead:

(188) (Context: Response to (187))

*Þú veist svo mikið um* [ $DP$  *#hinn/þennan* *ótrúlega*  
you know so much about [ $DP$  *#HI-the*<sub>weak</sub>/*#this* amazing<sub>evaluative</sub>  
*veraldarvef*].  
world.wide.web]

‘You know so much about this amazing World Wide Web.’

Just as in the case of the free article, the prenominal evaluative adjective between  $D/n$  blocks suffixation. Therefore a demonstrative must be used instead. If the response involves no  $D/n$  intervener, the article is suffixed:

(189) (Context: Alternative response to (187))

*Þú veist svo mikið um [DP veraldarvef-**inn**].*  
you know so much about [DP world.wide.web-**the**<sub>strong</sub>]

‘You know so much about the World Wide Web.’

The suffix is morphologically ambiguous between  $D_{\text{weak}}$  and  $D_{\text{strong}}$ . However, (188) suggests the  $D_{\text{weak}}$  is not used for second mention in Icelandic and therefore I assume that the suffix in (189) is an exponent of the strong article.

Note that the second mention of a unique definite is in principle compatible with both  $D_{\text{weak}}$  and  $D_{\text{strong}}$ . It is still unique and it is potentially anaphoric because it has been brought up before. In such a case it seems like languages may employ different defaults. Icelandic chooses the strong article for second mention uniques but German seems to prefer the weak article again in a comparable situation. P+D contraction is widely used for unique entities like ‘the moon’ in German, even on second mention. Thus, German speakers would use *zum Mond* ‘to-the moon’ for a second mention rather than the uncontracted *zu dem Mond*. I leave it for future work to uncover any explanation there may be for the two languages patterning differently in this respect.

#### 4.3.4 Section summary

The morphology of the free article *hinn* has the form *hi*+D and the free article is never anaphoric. Although some of the earlier literature described the free article as bookish, those descriptions may be mostly due to the choice of examples. The free

article is in fact used in any register if three conditions are met: First, definiteness has to be licensed by uniqueness. Second, there has to be an intervener between D/*n* like an evaluative adjective. Finally, there must be no antecedent available in the discourse for anaphoric interpretation.

## 4.4 Comparing German and Icelandic

This section shows that German and Icelandic  $D_{\text{weak}}/D_{\text{strong}}$  pattern the same. Given a discourse context which unambiguously licenses definiteness by uniqueness or anaphoricity and a structural configuration which reveals the difference between the two licensing mechanisms overtly, German  $D_{\text{weak}}$  patterns with the free article in Icelandic and German  $D_{\text{strong}}$  patterns with the absence of the free article. The relevant structural configuration in German is a P+D combination which has morphological potential for contraction, like *zu dem*  $\rightarrow$  *zum* ‘to the’, and in Icelandic the distinction between the articles is manifested in the pre-evaluative position, to the left of adjectives like ‘amazing’ when they express an evaluation of the DP referent relative to the standards of the speaker.

### 4.4.1 Contexts for the weak article

The weak article is licensed by situational uniqueness. In this section, I show a series of examples from German and Icelandic in which uniqueness is satisfied as well as the structural configuration which can reveal an overtly weak article in each



language. The point of the section is that German and Icelandic pattern together in using  $D_{\text{weak}}$  in the same types of discourse contexts. The empirical generalization to be captured can be schematized as follows. The correlation between the languages holds in all cases except for the second mention uniques described above.

(190) **Empirical generalization for situational uniqueness**

German $D_{\text{weak}}$	$\iff$	Icelandic:	
		$\checkmark$ free article	(in pre-evaluative position)
		$\#$ demonstrative	

In a context where German uses the weak contracted article, Icelandic uses the free article in the pre-evaluative position. In such contexts, a demonstrative is not a felicitous determiner because demonstratives are anaphoric. Each of the examples below pairs two sentences. The first sentence is always a German sentence with a unique definite with a contractable P+D combination. The second sentence of the pair is always a unique definite in Icelandic modified by an evaluative adjective. Let us first consider the globally unique entities in (191), repeated from above, as well as reference to kinds (192):

- (191) a. *Armstrong flog als erster [PP **zum** Mond].*  
 Armstrong flew as first one [PP to-**the**<sub>weak</sub> moon]  
 ‘Armstrong was the first one to fly to the moon.’ (Schwarz 2009:40)
- b. *Tim Berners Lee kynnti heiminn fyrir [DP **hinum***  
 Tim Berners Lee introduced world.the to [DP HI-**the**<sub>weak</sub>  
*ótrúlega veraldarvef].*  
 amazing<sub>evaluative</sub> world.wide.web]  
 ‘Tim B. L. introduced the world to the amazing World Wide Web.’

- (192) a. [<sub>PP</sub> **Am** Zebra] kann Mann sehen dass die Natur symmetrisch  
 [PP on-**the**<sub>weak</sub> zebra] can one see that the nature symmetrical  
 ist.  
 is  
 ‘The zebra shows us that nature is symmetrical.’ (Schwarz 2009:65)
- b. [<sub>DP</sub> **Hinn** dularfulli sebrahestur] sýnir okkur að  
 [DP HI-**the**<sub>weak</sub> mysterious<sub>evaluative</sub> zebra] shows us that  
 náttúran er samhverf.  
 nature.the is symmetrical  
 ‘The mysterious zebra shows us that nature is symmetrical.’

The examples show that global uniques and kinds, both of which are types of unique definites, license  $D_{\text{weak}}$  in German and Icelandic. German uses contraction and Icelandic uses the free article. Note that in (192), the intended reading involves the species and not individuals thereof, a distinction which will be revisited in Section 4.5.

Unique dates as in (193) are also environments for the weak article and so are proper names as in (194).

- (193) a. *Die Mauer fiel* [<sub>PP</sub> **am** 9. November 1989].  
 the wall fell [PP on-**the**<sub>weak</sub> 9th November 1989]  
 ‘The wall fell on November 9, 1989’ (Schwarz 2009:21)
- b. *Múrinn féll* [<sub>DP</sub> **hinn** eftirminnilega 9. nóvember 1989].  
 wall.the fell [DP HI-**the**<sub>weak</sub> memorable<sub>evaluative</sub> 9. November 1989]  
 ‘The wall fell the memorable November 9, 1989.’

- (194) a. *Ich müsste mal wieder [PP **beim**<sub>weak</sub> Hans] vorbeischauen.*  
 I must once again [PP by-**the** Hans] stop.by  
 ‘I should stop by Hans’s place again some time.’ (Schwarz 2009:65)
- b. *Ég er [DP **hinn** frægi Jón].*  
 I am [DP HI-**the**<sub>weak</sub> famous<sub>evaluative</sub> John]  
 ‘I am the famous John.’

It is worth noting that the Icelandic example in (193b) illustrates nicely that the distribution of the weak article is based on a generalization which refers to uniqueness. Here, the free weak article must be used even if a child is not likely to hear many, if any, tokens of dates modified by evaluative adjectives during language acquisition.

Furthermore, individuals can be interpreted as unique in the context of a larger situation even if the noun which describes them does not yield global uniqueness. For example, the mayor in (195) licenses  $D_{\text{weak}}$  in both German and Icelandic when uttered in the context of some city which is understood to have a unique mayor.

- (195) a. *Peter hat [PP **beim** Bürgermeister] angerufen.*  
 Peter has [PP by-**the**<sub>weak</sub> mayor] called  
 ‘Peter called the mayor.’ (Schwarz 2009:23)
- b. *Móttakan var haldin af [DP **hinum** stórfyndna borgarstjóra].*  
 reception.the was held by [DP HI-**the**<sub>weak</sub> big-funny<sub>evaluative</sub> mayor]  
 ‘The reception was held by the hilarious mayor.’

The interpretation of superlatives is inherently well suited to yield weak articles because they select a unique individual out of a set. This can be seen in (196) where the highest mountain in the world is used with  $D_{\text{weak}}$  in German as well as Icelandic.

- (196) a. *Auf unserer Reise nach Tibet sind wir natürlich auch [PP zum  
on our trip to Tibet are we of course also [PP to-the<sub>weak</sub>  
höchsten Berg der Welt] gefahren.  
highest mountain the world] driven  
'On our trip to Tibet, we of course went to visit the highest mountain  
of the world.'* (Schwarz 2009:42)
- b. *Í ferð okkar til Tíbet heimsóttum við [DP hið fræga  
in trip our to Tibet visited we [DP HI-the<sub>weak</sub> famous<sub>evaluative</sub>  
hæsta fjall í heiminum].  
highest<sub>restrictive</sub> mountain in world.the]  
'On our trip to Tibet, we visited the highest mountain of the world.'*

Notice that in the Icelandic example in (196b) we have two adjectives. The superlative is restrictive and selects a unique mountain which is furthermore modified by an evaluative adjective 'famous'.

It is also possible for the superlative to be an intervener which triggers use of the free article but in that case the superlative must be interpreted as evaluative (or relative).

- (197) *Við fengum [DP hina bestu máltíð] á veitingastað.num.  
we got [DP HI-the<sub>weak</sub> best<sub>evaluative</sub> meal] at restaurant.the  
'We got a really good meal at the restaurant.'*

The example above corresponds to a usage of the superlative which is also available to many native speakers of English, at least in colloquial speech. The evaluative superlative is not restrictive but rather expresses the evaluation of the DP referent that this was a very good meal according to the standards of the speaker.

The above examples describe canonical unique definites and how they pattern together in German and Icelandic. There are also more nuanced ways of establishing

situational uniqueness. Uniqueness can for example be inferred. As an introduction to such examples, consider the canonical unique definites in (198).

- (198) (Context: There is one particular analysis of PRO subjects in Icelandic that everyone knows about and this theory is the topic of syntax class today.)
- a. *Als nächstes kommen wir [PP **zur** beruehmten PRO-Analyse].*  
 as next come we [PP to-**the**<sub>weak</sub> famous PRO-analysis]  
 ‘Now we will move on to the famous PRO-analysis.’ (Florian Schwarz p.c.)
- b. *Nú ætla ég að segja ykkur frá [DP **hinni** frægu*  
 now will I to tell you about [DP HI-**the**<sub>weak</sub> famous<sub>evaluative</sub>  
*PRO-greiningu].*  
 PRO-analysis]  
 ‘Now I will tell you about the famous PRO-analysis.’

Theories and analyses are generally unique and therefore the two languages use  $D_{\text{weak}}$  to refer to them. This general property of analyses makes it felicitous to use the weak article with them even if some participants in the conversation have never heard about a particular analysis before. Examples of inferred (global) uniqueness are shown below. The examples are inspired by the Goosh-examples of Hawkins (1978) and the analyses-examples of Sigurðsson (1993):

- (199) (Context: At the beginning of class. No student has learned about the Goosh-analysis before.)
- a. *Als nächstes kommen wir [PP **zur** beruehmten Goosh-Analyse].*  
 as next come we [PP to-**the**<sub>weak</sub> famous Goosh-analysis]  
 ‘Now we will move on to the famous Goosh-analysis.’ (Florian Schwarz p.c.)
- b. *Nú ætla ég að segja ykkur frá [DP **hinni** frægu*  
 now will I to tell you about [DP HI-**the**<sub>weak</sub> famous<sub>evaluative</sub>  
*gúsgreiningu].*  
 goosh.theory]  
 ‘Now I will tell you about the famous Goosh-analysis.’

Speakers are assumed to understand analyses as unique and the examples demonstrate that this is sufficient for licensing  $D_{\text{weak}}$  for unknown analyses.

As Schwarz (2009) shows for German, definite descriptions with the weak article can receive a covarying interpretation when they are embedded under quantification over situations.

- (200) a. *Jedes Mal, wenn eine Runde vorbei ist, werden die Karten*  
 Every time when a round over is are the cards  
 [<sub>PP</sub> **vom** Gewinner] *neu gemischt und verteilt*  
 [PP by-**the**<sub>weak</sub> winner] newly shuffled and dealt.  
 ‘Every time when a round is over, the cards are shuffled and dealt anew by the winner’ (Schwarz 2009:43)
- b. (Context: The speaker is annoyed that she always loses. There is only one winner per round.)  
*Alltaf eftir hverja umferð eru spilin gefin aftur af* [<sub>DP</sub> **hinum**  
 always after each round are cards.the given again by [<sub>DP</sub> HI-**the**<sub>weak</sub>  
*óþolandi sigurvegara*].  
 intolerable<sub>evaluative</sub> winner]  
 ‘Always after each round, the cards are dealt again by the intolerable winner.’

In the examples in (200), the sentence quantifies over situations each of which has a unique winner. Therefore, German uses the contracted P+D combination *vom* and Icelandic uses the free article *hinum* in the pre-evaluative position. Schwarz relates covarying use of the weak article to the phenomenon of part-whole bridging and the winner who is a unique part of each round is a clear example of this. Covarying use of the weak article has implications for the formal situation semantics developed by Schwarz but for the purpose of the present study, this final example of the parallelism between  $D_{\text{weak}}$  in German and Icelandic is important because the

two languages pattern together even in such nuanced mechanisms for establishing situational uniqueness.

#### 4.4.2 Contexts for the strong article

The strong article  $D_{\text{strong}}$  is used for anaphoric interpretation. When referring back to an established discourse referent, German does not use contraction and Icelandic disallows the free article. An empirical generalization for anaphoricity is schematized below.

- (201) **Empirical generalization for anaphoricity in Icelandic**
- |                            |        |                             |                              |
|----------------------------|--------|-----------------------------|------------------------------|
| German $D_{\text{strong}}$ | $\iff$ | Icelandic:<br>#free article | (in pre-evaluative position) |
|                            |        | ✓ demonstrative             |                              |

The pre-evaluative position in Icelandic is incompatible with the free article in discourse contexts where German articles do not contract. Because the pre-evaluative position in Icelandic prevents suffixation and strong articles cannot be free in the language, the alternative strategy is to use demonstratives in definite contexts with an anaphoric interpretation. Thus, the pre-evaluative position manifests an alternation between free articles and demonstratives depending on the licensing mechanism for definiteness.

The canonical case of anaphoric interpretation involves an explicit linguistic antecedent as in the repeated examples below.

- (202) a. (Previous discourse: Hans interviewed a writer and a politician.)  
*Er hat* [<sub>PP</sub> von **dem** *Politiker*] *keine interessanten Antworten*  
 He has [<sub>PP</sub> from **the**<sub>strong</sub> politician] no interesting answers  
*bekommen.*  
 gotten  
 ‘He didn’t get any interesting answers from the politician.’ (Schwarz 2009:48)
- b. (Previous discourse: Mary talked to a writer and a terrible politician.)  
*Hún fékk engin góð svör frá* [<sub>DP</sub> #**hinum**/√**þessum**  
 She got no good answers from [<sub>DP</sub> #HI-**the**/√**this**  
*hræðilega stjórnámamanni*].  
 terrible<sub>evaluative</sub> politician].  
 ‘She got no good answers from the terrible politician.’

Note that the use of the demonstrative in (202b) can be thought of as a rescue strategy for anaphoricity when suffixation is ruled out due to the D/*n* intervener which is the evaluative adjective. The close relationship between demonstrative uses and the strong, but not the weak, article are noted by Schwarz (2009).

Anaphoric usage does not have to be based on a second mention of the exact same noun phrase. A general description can be used to refer back to a more specific description.

- (203) a. (Previous discourse: Maria has invited an ornithologist to the seminar.)  
*Ich halte* [<sub>PP</sub> von **dem**<sub>strong</sub> *Mann*] *nicht sehr viel.*  
 I hold [<sub>PP</sub> of **the**<sub>strong</sub> man] not very much  
 ‘I don’t think very highly of the man.’ (Schwarz 2009:31)
- b. (Previous discourse: Mary sent a fan letter to a movie star from America.)  
*Að mínu mati er* [<sub>DP</sub> #**hin**/√**þessi** *frægi listamaður*]  
 to my opinion is [<sub>DP</sub> #HI-**the**<sub>weak</sub>/√**this** famous<sub>evaluative</sub> artist]  
*ekki mjög áhugaverður.*  
 not very interesting  
 ‘In my opinion, the famous artist is not very interesting.’



Furthermore, anaphoric usage can also be covarying. The examples in (204) show how an anaphoric link can be established within each situation which is quantified over in the sentence. In the German example, ‘ornithologist’ serves as an antecedent for ‘the man’ and in the Icelandic example, ‘movie star’ is an antecedent for ‘this famous artist’.

- (204) a. *Jedes Mal, wenn ein Ornithologe im Seminar einen Vortrag*  
 every time when an ornithologist in-the<sub>weak</sub> seminar a lecture  
*halt, wollen die Studenten [PP von dem Mann] wissen, ob*  
 holds want the students [PP of the<sub>strong</sub> man] know whether  
*Vogelsang grammatischen Regeln folgt.*  
 bird singing grammatical rules follows  
 ‘Every time an ornithologist gives a lecture in the seminar, the students want to know from the man whether bird songs follow grammatical rules.’ (Schwarz 2009:33)
- b. *Alltaf þegar kvikmyndastjarna heimsækir skólann spyrja*  
 always when movie.star visits school.the ask  
*nemendurnir [DP #hinn/√ þennan fræga listamann] hvort*  
 students.the [DP #HI-the<sub>weak</sub>/√ this famous<sub>evaluative</sub> artist] whether  
*listamenn fá góð laun.*  
 artists get good salary  
 ‘Always when a movie star visits the school, the students ask the famous artist whether artists get a good salary.’

The ways in which German licenses definiteness by anaphoricity are used in a parallel manner in Icelandic. In such a discourse context, Icelandic disallows the free weak article and offers the demonstrative as an alternative strategy.

#### 4.4.3 Section summary

German and Icelandic pattern the same with respect to  $D_{\text{weak/strong}}$  contexts. The discourse contexts which trigger P+D contraction in German, trigger *the*-support in

Icelandic. Non-contracting discourse contexts in German are not compatible with Icelandic *the*-support.

## 4.5 Icelandic *the*-support

This section develops an analysis of Icelandic *the*-support, which is the structural phenomenon which realizes the free article when definiteness is licensed by uniqueness.

### 4.5.1 Syntactic analysis for *the*-support

The basic case of a definite article is a simple noun with the definite suffix like the following example. In such a case, D suffixes onto the local noun immediately to its right regardless of its status as weak or strong. Our analysis is illustrated in (206).

(205) *bill-inn*  
 car-**the**<sub>weak/strong</sub>

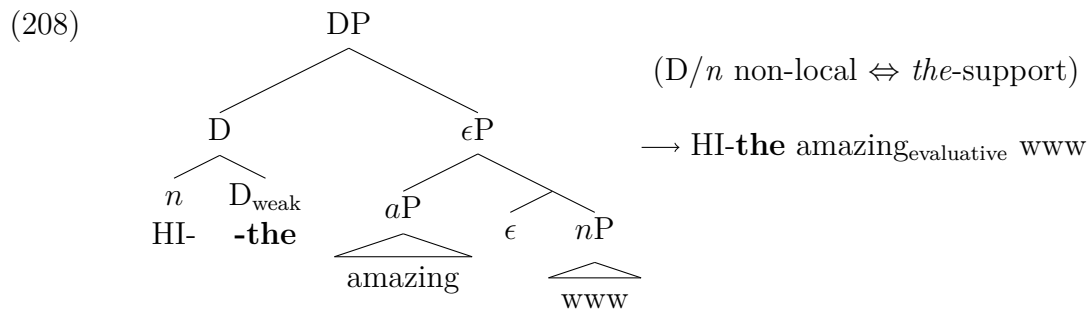
(206) 
$$\begin{array}{ccc}
 & \text{DP} & \\
 & \swarrow \quad \searrow & \\
 \text{D} & & \text{nP} \\
 \text{-the} & & \swarrow \quad \searrow \\
 & & \text{car}
 \end{array}
 \longrightarrow \text{car-**the**}$$
(D/n local  $\Leftrightarrow$  suffixation)

I will argue below that the suffixation is a case of local dislocation under linear D/n adjacency in the sense of Embick and Noyer (2001). D<sub>weak</sub> is realized with *the*-support (i.e., the free article) when interveners, notably evaluative adjectives, block D/n locality, as below. The proposed analysis is that evaluative adjectives

are introduced in the specifier of a functional projection  $\epsilon$ . When  $\epsilon$  appears between  $D/n$ , the article and the noun are non-local and therefore *the*-support is triggered.

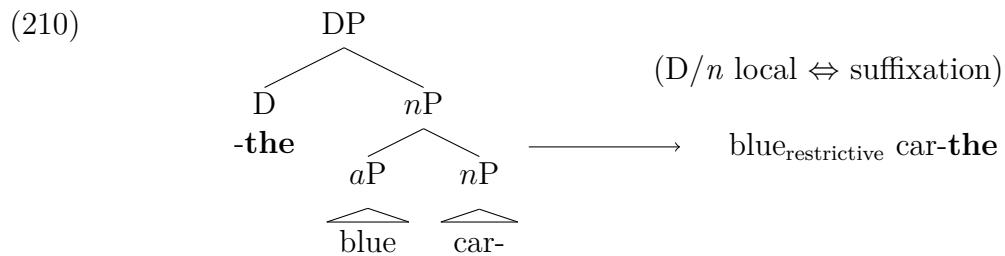
- (207) *hinn ótrúlegi veraldarvefur*  
 HI-**the**<sub>weak</sub> amazing world.wide.web

Under this analysis, the phenomenon of *the*-support involves merging a support morpheme *HI-* with a determiner which would otherwise not be local to an appropriate host noun.



D is realized as a suffix when local to the noun. This includes the case when there are no adjectives in the DP or only restrictive adjectives. The analysis for restrictive adjectives like ‘blue’ in (209) is that they are adjoined to *nP*. Therefore,  $D/n$  are local, as shown in the tree in (210).

- (209) *blái bíll-inn*  
 blue car-**the**



I hypothesize that adjuncts are not visible for the purpose of the type of adjacency involved and therefore ‘the’ can suffix onto ‘car’ despite modification by restrictive ‘blue’.

#### 4.5.2 Motivation for the adjunct/specifier structural contrast for adjectives

It is often possible to use the same adjective in a restrictive manner or in a manner which encodes a richer meaning like evaluative usage. The structural contrast which I propose between adjuncts and specifiers alleviates the need for lexical ambiguity in such cases. Restrictive adjectives adjoin to  $nP$  and their denotation combines directly with  $nP$  whereas added meaning like ‘evaluative’ is contributed by functional projections like  $\epsilon$ . This structural distinction is also a possible partial answer to the question whether Icelandic (or Scandinavian, etc.) adjectives are adjoined phrases (Svenonius 1994), heads (Sigurðsson 1993, cf. Abney 1987), or specifiers (Julien 2005, cf. Cinque 1994). Here, adjectival structure reflects interpretation.

According to our analysis, the denotation of  $\epsilon$  relates an adjective in its specifier to the  $nP$  which is its complement:

$$(211) \quad \llbracket \epsilon \rrbracket = \lambda P_{\langle e, \langle s, t \rangle \rangle} \cdot \lambda G_{\langle e, \langle s, t \rangle \rangle} \cdot \lambda x \cdot \lambda s \cdot P(x)(s) \wedge \text{Rel}(G)(x)(s)$$

In this denotation,  $\text{Rel}(G)(x)(s)$  expresses the relation that  $G$  ( $\text{Spec}, \epsilon$ ) is the opinion of the speaker about  $x$  (DP referent) in situation  $s$ .<sup>8</sup> Now, all adjective phrases are of the syntactic category  $aP$  and their denotations are not ambiguous along the restrictive/evaluative dimension. An adjective like ‘mysterious’ is merged in different structural positions depending on how it is to be interpreted.

- (212) ‘mysterious by the standards of the speaker’      (213) ‘in the set of mysterious individuals’



The prediction is that  $mysterious_{\text{evaluative}}$  triggers *the*-support, but  $mysterious_{\text{restrictive}}$  does not. Consider first the evaluative reading demonstrated by example (214).

- (214) [<sub>DP</sub> **Hinn** *dularfulli* *sebrahestur*] *sýnir okkur að náttúran*  
 [DP **HI-the**<sub>weak</sub> *mysterious*<sub>evaluative</sub> *zebra*] shows us that nature.the  
*er samhverf.*  
 is symmetrical  
 ‘The mysterious zebra shows us that nature is symmetrical.’  
 $\implies$  ‘The species zebra is mysterious.’

The free article above is only grammatical if the adjective is evaluative and the zebra  $nP$  denotes uniquely, giving rise to a kind reading. Evaluative adjectives express

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<sup>8</sup>I remain agnostic about orthogonal implementation details of encoding evaluativity because the only important aspect here is that a certain structural contrast reflects a contrast in interpretation. There may be promising avenues in the literature on predicates of personal taste which I will not explore here (see Lasersohn 2005; Stephenson 2007).

the commitment that they describe the opinion of the speaker. Therefore, it is infelicitous to continue example (214) with “... but I do not consider it mysterious”.

In contrast, consider the restrictive reading of ‘mysterious’ which is demonstrated by the example below.

- (215) (Context: There are 9 zebras in the zoo and some consider one of them mysterious because it has been gaining weight lately.)

[<sub>DP</sub> *Dularfulli*            *sebrahestur-**inn***]    *hvarf*            *á miðnætti*.  
 [DP mysterious<sub>restrictive</sub> zebra-**the**<sub>weak/strong</sub>] disappeared at midnight  
 ‘The mysterious zebra disappeared at midnight.’  
 ⇒ ‘One of the zebra individuals is mysterious.’

The suffixed article above is only grammatical if the adjective is restrictive, giving rise to an individual reading. Restrictive adjectives do not have to express the opinion of the speaker and therefore it is a possible continuation to say: “... but I do not consider it mysterious”, for example if the speaker is the person who has been secretly feeding the mysterious zebra and thus does not find its weight gain mysterious.

### 4.5.3 Section summary

According to the analysis in this section, D/*n*-intervening adjectives are introduced in specifiers that express additional meaning contribution while the denotation of adjoined restrictives combines directly with *n*P. This means that adjectives are not uniformly adjuncts, specifiers or heads. Rather, their structural position reflects their interpretation.

## 4.6 Suffixation under adjacency

I have argued above that suffixation of the definite article targets an immediately local noun. The goal of the final main section is to clarify the notion of ‘local’ for the purpose of suffixation.

### 4.6.1 Comparing English *do*-support and Icelandic *the*-support

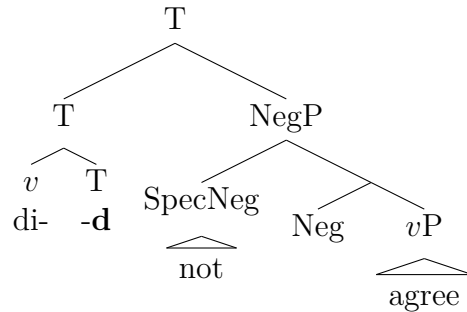
The term *the*-support is intended to emphasize similarities between the weak article in Icelandic and the morphosyntax of English *do*-support. The basic ingredients of the English phenomenon are the following. Tense is often a suffix on the verb as in (216a). However, such suffixation is ungrammatical if negation intervenes between T(ense) and the *v*(erb) as shown in (216b). When such interveners are part of the sentence, Tense is realized with a support morpheme *do* as in (216c). Even though elements like negation block T/*v* locality, *v*-adjoined adverbs do not. For example, *completely* in (216d) does not block suffixation.

- (216) a. John agree-**d**. (T(ense) is a suffix)
- b. \* John not agree-**d**. (Negation is an intervener for suffixation)
- c. John di-**d** not agree. (In which case, *do* is inserted)
- d. John completely agree-**d**. (*v*-adjoined adverb: non-intervener)

An analysis of the English facts, adapted from Embick and Noyer (2001:587) is shown in (217–218).<sup>9</sup> The analysis is then compared with the present analysis of Icelandic in (219–220).

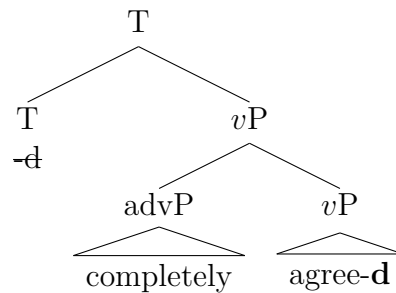
Intervention in English

- (217) Neg intervenes between T/*v*:  
Support morphology



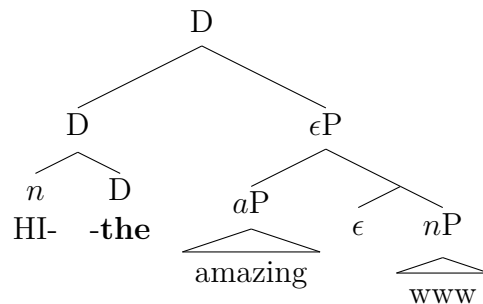
Non-intervention in English

- (218) Adjoined adverb is not a T/*v* intervener:  
Suffixation



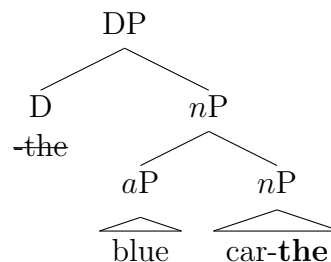
Intervention in Icelandic

- (219)  $\epsilon$  intervenes between D/*n*:  
Support morphology



Non-intervention in Icelandic

- (220) Adjoined adjective is not a D/*n* intervener:  
Suffixation



The important point here is that the English and Icelandic phenomena look similar and treating them as the same at a deep abstract level is the obvious null hypothesis.

<sup>9</sup>Embick and Noyer base their discussion on two types of suffixation operations, local dislocation and lowering. These build on earlier work on Morphological Merger (Marantz 1984, 1988). The relationship between syntactic structures and affixation in English was already an object of inquiry in Chomsky (1957).



If they are in fact comparable, then evidence from *do*-support may inform the analysis of *the*-support and vice versa.

#### 4.6.2 Zeroing in on the relevant type of locality

What counts as immediately local for suffixation? Embick and Noyer (2001) discuss two types of analyses for the English suffixation facts. First, they consider head-to-head lowering where T lowers onto its *v* complement at PF. Adjuncts do not affect the head-complement relation between T/*v* but Neg does and therefore *completely* does not count as an intervener even if *not* does. The second potential analysis involves a so-called local dislocation under linear adjacency. Under this alternative, T suffixes onto the *v* which is linearly to its right (Bobaljik 1995). Here, adjuncts do not count as interveners for the relevant type of PF adjacency. For example, adjuncts might be invisible due to a countercyclic adjunction mechanism (see Lebeaux 2000; Stepanov 2001). We can, for example, say that an adjunct is only an unpronounced placeholder in the structure to which it attaches until it is evaluated late at the interfaces.

Embick and Noyer analyze *do*-support as head-to-head lowering at PF for lack of motivation for adjunct invisibility but these two analyses are in fact hard to distinguish empirically in English. However, Icelandic *nP* can move to the left of

evaluatives as in (221) and this movement may serve as a clue to the proper analysis of support morphology:<sup>10</sup>

- (221) *veraldarvefur-**inn** ótrúlegi*  
 world.wide.web-**the**<sub>weak</sub> amazing<sub>evaluative</sub>  
 ‘the amazing world wide web’

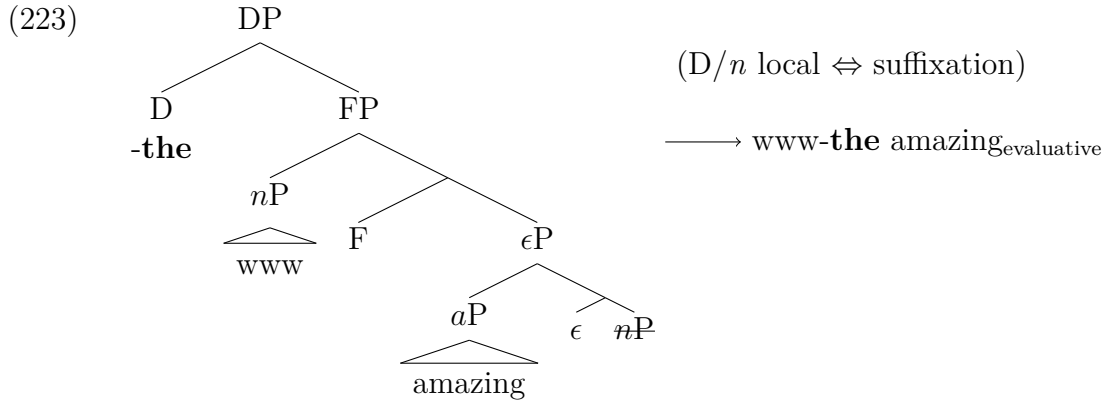
Importantly, the free article is ungrammatical with *nP* in this position:

- (222) \* ***hinn** veraldarvefur ótrúlegi*  
 HI-**the**<sub>weak</sub> world.wide.web amazing<sub>evaluative</sub>  
 Intended: ‘the amazing world wide web’

The important point here is that this looks like an effect of linear adjacency. To the extent that the English and Icelandic distribution are structurally the same, the Icelandic distribution favors reducing both to Local Dislocation under linear adjacency, contra Embick and Noyer. Our analysis of (221) is shown below. *nP* moves to a position Spec,F above  $\epsilon$  and D suffixes onto the *n* immediately to its right like it normally does.

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<sup>10</sup>A similar distribution appears with cardinals which are also between D/*n* and pattern as ‘amazing’ in (221–222). To account for this, a part of the noun phrase moves leftward in Vangsnes (1999:144–146), Julien (2005), Harðarson (2014) and Pfaff (2015). Magnússon (1984:104) assumes rightward movement of adjectives. Sigurðsson (1993) applies a head movement analysis.



I do not speculate about the identity of FP here. It is simply assumed to be some functional projection on the nominal spine. The important fact is that *nP* moves to the left of the position which hosts the evaluative adjective.

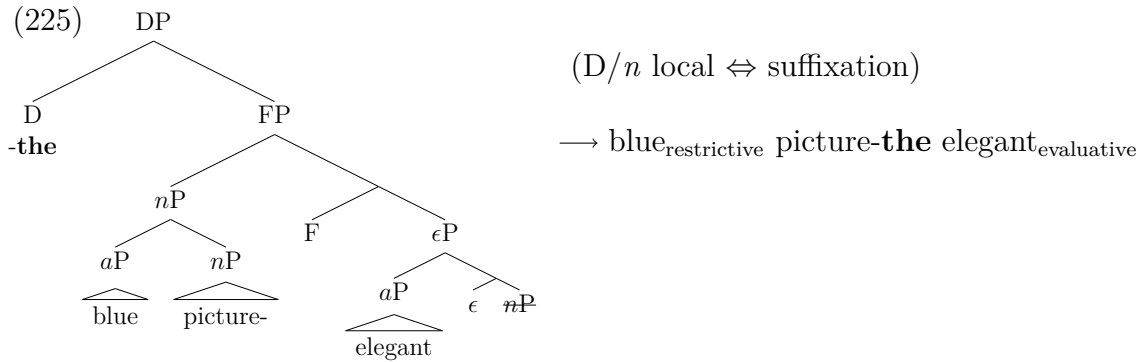
### 4.6.3 Residual issues

The reader may have noted that the postnominal adjective might have been derived by head movement. However, there is in fact clear evidence that this word order is the consequence of phrasal movement. The evidence for *nP* movement is that restrictives move along with *nP* when such movement takes place (see Vangsnes 1999:144–146). The base generated structure is shown in (224a) and the *nP* movement in (224b):

(224) (Context: There is a blue picture and a yellow picture in the present situation. First mention.)

- a. **hin**      *glæsilega*      [<sub>nP</sub> *bláa*      *mynd*]  
 HI-**the**<sub>weak</sub> elegant<sub>evaluative</sub> [<sub>nP</sub> blue<sub>restrictive</sub> picture]  
 ‘the elegant blue picture’
- b. [<sub>nP</sub> *bláa*      *mynd-in*] *glæsilega*  
 [<sub>nP</sub> blue<sub>restrictive</sub> picture-**the**] elegant<sub>evaluative</sub>  
 ‘the elegant blue picture’

The analysis of (224b) is given below. The *nP* moves with its *aP* adjunct and D suffixes onto the now adjacent ‘picture’. The adjunct ‘blue’ is again linearly invisible due to late adjunction.



The *nP* movement analysis also accounts for additional word order facts regarding postnominal material (see also Harðarson 2014 on this and related issues). The *nP* movement to the Spec,F position explains the word order (226a) and extraposition of the PP to the DP edge accounts for (226b).

- (226) a. [<sub>*nP*</sub> *bláa mynd-**in*** [<sub>PP of honum</sub>]] *glæsilega*  
 [<sub>*nP*</sub> blue<sub>restrictive</sub> picture-**the** [<sub>PP of him</sub>]] elegant<sub>evaluative</sub>  
 ‘the elegant blue picture of him’
- b. [<sub>*nP*</sub> *bláa mynd-**in***] *glæsilega* [<sub>PP of honum</sub>]  
 [<sub>*nP*</sub> blue<sub>restrictive</sub> picture-**the**] elegant<sub>evaluative</sub> [<sub>PP of him</sub>]  
 ‘the elegant blue picture of him’

Pattern (226a) is evidence that *nP* movement to Spec,D is not sufficient to derive the suffixed article. According to such an analysis, a postnominal PP should be able to appear linearly between the *nP* in Spec,D and the D head. The fact that D appears as a suffix on the noun even with such postnominal PP material supports an approach in terms of our Spec,F landing site and local dislocation at PF. Example (226b) is treated as PP extraposition because a heavy PP must appear in this

position. This is illustrated in (227), a typical distribution for exceptionally heavy elements which have the structural possibility of appearing in a position to the right.

- (227) a. \* *mynd-in* [<sub>PP</sub> af öllum nemendunum í bekknum] glæsilega  
 picture-**the** [<sub>PP</sub> of all students in class.the] elegant<sub>evaluative</sub>
- b. *mynd-in* glæsilega [<sub>PP</sub> af öllum nemendunum í bekknum]  
 picture-**the** elegant<sub>evaluative</sub> [<sub>PP</sub> of all students in class.the]  
 ‘the elegant picture of all the students in the class’

A final residual issue is the question of *why* there is no *the*-support with the strong definite article. Why is the anaphoric interpretation expressed with a demonstrative in the pre-evaluative position? One possibility is that the reason is that demonstratives express the meaning of the strong definite article quite well and support morphology is dispreferred on independent grounds, e.g., due to economy considerations. Another possibility is that the demonstrative and the strong article are related in their feature composition and that the demonstrative is in fact a phonological exponent of  $D_{\text{strong}}$  when it appears in the pre-evaluative position. I leave these questions for future research.

#### 4.6.4 Section summary

English *do*-support and Icelandic *the*-support look suspiciously similar and it is a useful null hypothesis to treat them the same. If the two phenomena are in fact of the same type, the linear nature of *the*-support speaks in favor of reducing head-to-head lowering to local dislocation under linear adjacency with non-intervening

adjuncts, perhaps due to late adjunction. The section also discussed some residual issues like the motivation of *nP* movement which is supported by restrictives moving along with the noun phrase as well as some patterns involving postnominal modification. Although the focus of the chapter is strictly on supporting the  $D_{\text{weak}}$  vs.  $D_{\text{strong}}$  distinction and discussing its realization in Icelandic, the analysis developed also shows promising compatibility with the general word order facts of the Icelandic DP which have been thoroughly investigated in previous work on the topic.

## 4.7 Chapter summary

In this chapter, I showed that the  $D_{\text{weak}}/D_{\text{strong}}$  distinction of Schwarz (2009) is supported by facts about Icelandic definite articles. The distribution of  $D_{\text{weak}}$  in Icelandic was shown to be remarkably similar to English *do*-support. This means that if the current line of work is on the right track, Icelandic *the*-support can inform the theory of suffixation under adjacency.

## Chapter 5

### Morphemes and morphophonology

#### 5.1 Introduction

The final main chapter of the dissertation presents further case studies which demonstrate how locality at different derivational stages affects surface realization of morphemes at PF. A wide range of theoretical approaches is currently being developed on several fronts to account for the ways in which morphophonology is constrained in natural language. The core issues include the role of linear adjacency (Embick 2010, 2012; Merchant 2015; Ingason 2015), the availability of Vocabulary Insertion at non-terminal nodes (Caha 2009; Bye and Svenonius 2012), the proper characterization of cyclic domains and their phonological consequences (Embick 2010; Lowenstamm 2010), and the derivation and status of word-like elements (Shwayder 2015). The present approach takes the position that *morphemes* are essential to the theory of interactions which take place in the realm of phenomena associated with the notion of *morphophonology* – in a broad sense.

The *morpheme* was the crucial component of the previous chapters. The cyclic Spell-Out of phases in the syntax constrains interactions between *morphemes* in pronunciation and meaning. Suffixation onto a host requires one affixal *morpheme* to be immediately local to another host *morpheme*. This chapter develops the idea that we need morphemes to capture generalizations about the organization of phonological material within words. Furthermore, the chapter argues in favor of the view that the morphological component of natural language requires morpheme-specific phonological processes in addition to Vocabulary Insertion.

The theory of morphophonology is essentially a theory of interactions between morphemes in which the key aspect of an analysis is to understand where a particular interaction takes place. There is no single solution which captures all of the complexity in the final product. Rather, we have a few interacting systems and while each system is simple, complexity arises from the fact that language must respect the limits imposed by each component.

In the present system, three types of locality constrain the way in which morphophonology, in a broad sense, is able to realize the phonological form of morphemes. These are (i) phase locality, (ii) locality imposed by the mechanism of Vocabulary Insertion, and (iii) phonological locality. Each type of a locality effect is characterized by its own empirical signature. Therefore, the locality effects which are attested in the data can sometimes reveal how an alternation must be analyzed.



(228) **Locality imposed by cyclic Spell-Out of phases**

The requirement that a morpheme is phase theoretically active at a given point in the derivation when it is referred to as a morpheme.

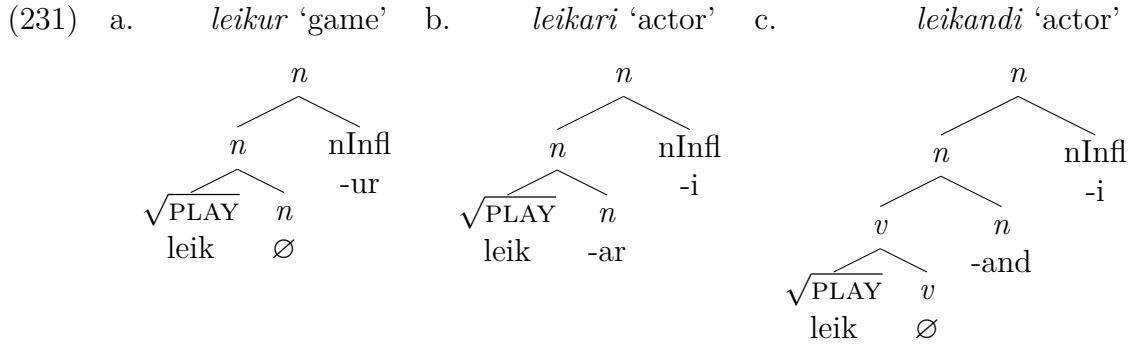
(229) **Locality imposed by the process of Vocabulary Insertion**

PF effects in which two morphemes are referred to as morphemes (as opposed to a purely phonological representation) take place at the level of concatenation and therefore require linear adjacency between the two morphemes. Such effects may not skip intervening morphemes.

(230) **Locality imposed by phonology**

PF effects which operate on a phonological representation are subject to phonological locality such as adjacency on an autosegmental tier. Such effects may skip intervening morphemes if phonological locality is satisfied.

The difference between (228) and (229) is illustrated by the following three Icelandic nouns. The nouns in (231a) and (231b) are structurally equivalent but they differ in whether the phonological exponent of *n* is overt. Therefore nInfl is root-adjacent for the purpose of Vocabulary Insertion in (231a) but not in (231b). Only the root adjacent nInfl morpheme can see the root  $\sqrt{\text{PLAY}}$  as a morpheme.



In contrast, the nouns in (231b) and (231c) both have the same overt manifestation, i.e.,  $\sqrt{\text{ROOT-}n\text{-nInfl}}$ , but they differ because the latter has an internal  $v$ -layer. Category-defining morphemes are phase heads and this means that the nominalizer is phase local to the root in (231b) but not in (231c). Only the phase local nominalizer can see the root  $\sqrt{\text{PLAY}}$  as a morpheme.

The difference between VI locality and phonological locality can be illustrated by the phonological effect of the Icelandic  $u$ -umlaut when it is triggered by  $-\emptyset$  [FEM,NOM,SG]. An underlying /a/ surfaces as /ö/ when this morphemic trigger follows as in the feminine form of *rakur* ‘moist’.

- (232) ‘moist’
- a. rak-ur [MASC,NOM,SG]
  - b. rök- $\emptyset$  [FEM,NOM,SG]

Although the effect has a morpheme-specific trigger, the process is phonological and obeys phonological locality. This can be seen when the nationality suffix *-sk* ‘-ish, -ese’ intervenes between the root and the nInfl trigger.

(233) ‘Assamese’

a. *assam-sk-ur* [MASC,NOM,SG]

b. *assöm-sk-∅* [FEM,NOM,SG]

Morphemic intervention is irrelevant here because the effect is phonological rather than driven by Vocabulary Insertion. This does not mean that the effect is unbounded. It is subject to phonological locality and is blocked by an intervening vowel. There is some variation in whether the ‘-ish, -ese’ morpheme is realized with *-sk* or *-ísk*, particularly with recently adapted loanwords like ‘Assamese’. If the syllabic *-ísk* exponent is used, the umlaut is blocked.

(234) ‘Assamese’

a. *assam-ísk-ur* [MASC,NOM,SG]

b. *assam-ísk-∅* [FEM,NOM,SG]

This was a brief introduction to the three types of locality which condition morphophonology in natural language. The following sections will further illustrate and elaborate on these. We find that when an effect appears complex or unusual from the point of view of one level of representation, it can often be explained by examining other levels. For example, morphemes which are linearly adjacent for the purpose of Vocabulary Insertion may not be able to interact if they are not part of the same Spell-Out domain in the sense of phase theory.

## 5.2 Phase locality

### 5.2.1 Being close to the root or not

This section analyzes phenomena in Icelandic agent nominals in which surface realization of morphemes is constrained by the *prima facie* unrelated deep structural principles of phase theory.<sup>1</sup> It is a general finding that in the terminology of a framework like Distributed Morphology, interactions close to the root are different from interactions further away from the root; see for example Harley (1995, 1996, 2008) on Japanese causatives. A present formulation of such effects proposes an important role for phase theory in arbitrating special realization of morphemes (Marantz 2001, 2007). In particular, an active research program currently investigates the hypothesis that phases impose constraints on contextual allomorphy (Embick 2010) and polysemy resolution (Marantz 2013).

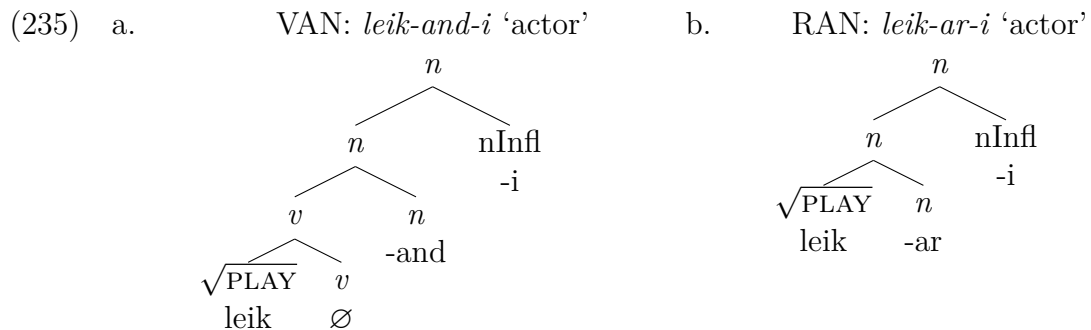
The present case study on verb-derived agent nominals (VAN) (235a) and root-derived agent nominals (RAN) (235b) in Icelandic supports this line of research and provides a novel type of argument by showing that Icelandic palatalization applies if and only if the undergoing morpheme is phase-local to the trigger. If such an analysis is on the right track, any analysis of segmental phonology like palatalization potentially requires an understanding of syntax and semantics. The findings are interesting because they suggest that surface-oriented phonological processes within

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<sup>1</sup>The section is based on Ingason and Sigurðsson (2015).

a word are constrained by the same universal principles as superficially unrelated phenomena like locality constraints on syntactic displacement; island constraints and palatalization may play by the same rules.

The core data and their analysis are shown in (235). The study focuses on Icelandic agent nominals with the *n*(ominalizer) *-and*, as in *leik-and-i* ‘actor’ (235a), and they are contrasted with other agentive nominalizers such as *-ar* in *leik-ar-i* ‘actor’ (235b). Crucially, *-and* is the phonological exponent of a nominalizer which merges outside a  $\emptyset$  *v*(erbalizer) even if other agent nominals in the language do not (always) involve a verbal layer.



It is crucial for the analysis that Icelandic agent nominals with *-and* always contain *v* as in (235a) and the section reviews several pieces of evidence in support of this proposal. However, it should be noted that it is not crucial that the absence of *-and* entails the absence of *v*.<sup>2</sup>

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<sup>2</sup>This case study is concerned with the structural distinction in (235). There is much more to be said about various aspects of the structure of agent nominals within and across languages and many of the relevant issues are beyond the scope of the section (see, for example, Grimshaw 1990, Alexiadou and Schäfer 2010, Roy and Soare 2013, 2014).

## 5.2.2 Deriving interface consequences of phases

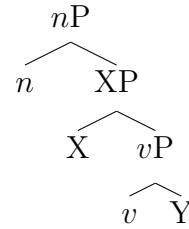
In the current kind of a theory, syntactic structures are sent cyclically to the interfaces, by phase (Chomsky 2000, 2001). Phase boundaries are defined by specific morphemes, or heads.

### (236) **Phases**

Category-defining heads, at least *v*, *n*, *a* (Marantz 2001, 2007), and *C*, and possibly others, trigger Spell-Out of their complements; they are the phase heads. These phase heads are often realized as “derivational morphemes”.

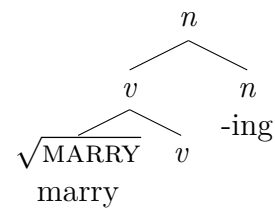
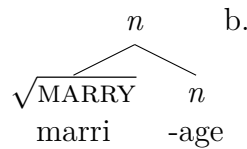
The operation Spell-Out causes the complement of a phase head to be pronounced and interpreted. Spell-Out deactivates the material which was spelled out. Deactivated material has no syntactic features and the rest of the derivation can only interact with such featureless material in very restricted ways. We say that a head *Y* is invisible to a head *X* if *Y* has been deactivated when the derivation is working on *X*. This invisibility effect is referred to as the Phase Impenetrability Condition (PIC) (Chomsky 2000). Let us assume the second version of PIC (PIC2) from Chomsky (2001). According to this version, Spell-Out is triggered when the next higher phase head is merged. The overall visibility effects of PIC2 can be illustrated with an example.

(237)



In 237, *n* and *v* are cyclic (phase) heads, whereas X and Y are not. Because of PIC2, *n* sees X and *v* but it does not see Y. In contrast, X sees *v* and Y. According to Embick (2010), conditions on contextual allomorphy can only be stated in terms of phase-theoretically active material. This means that category-defined heads which are close to the root can make reference to the identity of the root when determining their phonological exponent, but category-defining heads which are merged outside other category-defining heads do not see the root as a morpheme. If *n* is merged directly with the root in a derived nominal (238a) but outside *v* in a gerund (238b), as in Marantz (1997); Embick (2010), building on observations from Chomsky (1970), this analysis explains why there can be root-specific exponenets of *n* in the former but not the latter; see (239).

(238) a.



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

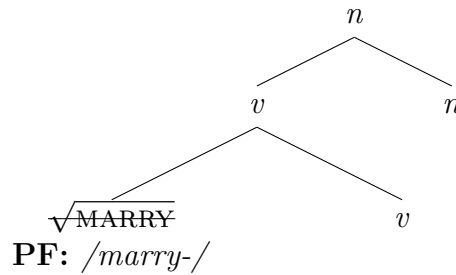
Vocabulary Items like (240) implement morpheme-specific insertion of the exponent for *n*. However, when the derivation is working on *n* in a gerund, no reference can

be made to the identity of the root because it is phase-theoretically inactive as demonstrated in (241). By the time the derivation reaches  $n$ , the internal structure of the  $v$  phase has been translated to representations which are specific to the PF and LF interfaces. At that point, there is no object  $\sqrt{\text{MARRY}}$  to condition the form of  $n$ . Here, I use a strikethrough notation to express phase inactivity.

(240) a.  $n \leftrightarrow \text{-age} / \{\sqrt{\text{MARRY}}, \dots\} \frown \_$

b.  $n \leftrightarrow \text{-al} / \{\sqrt{\text{REFUSE}}, \dots\} \frown \_$

(241)



Phases are not only important for PF realization. At the LF interface, phases are hypothesized to be the locus of restricting options in polysemy resolution (Marantz 2013). Roots can be associated with polysemy sets of denotations and a meaning of a root that has been excluded at an inner phase head is unavailable at an outer phase head. The effect can be illustrated with an example from Marantz. The English root  $\sqrt{\text{GLOBE}}$  has (at least) the two interpretations below.

(242) a.  $\sqrt{\text{GLOBE}}$  ‘abstract sphere, something spherelike’

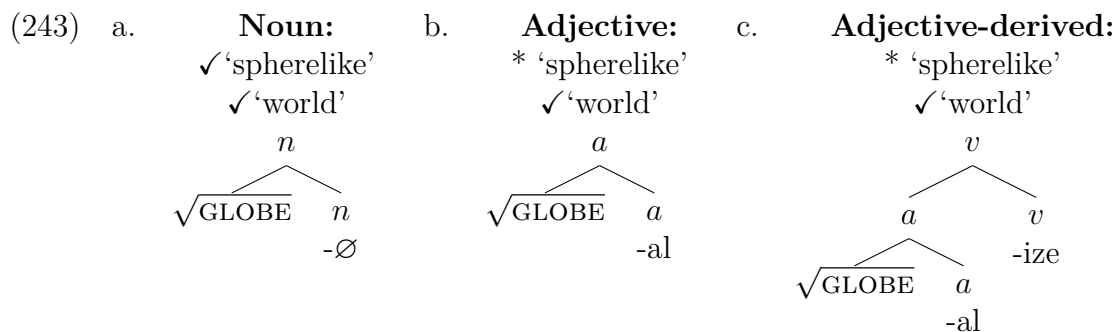
b.  $\sqrt{\text{GLOBE}}$  ‘the world’

We can make the noun *globe* from  $\sqrt{\text{GLOBE}}$  by merging a nominalizer as in (243a).

Both meanings are available for the nominalized structure. In contrast, the adjective



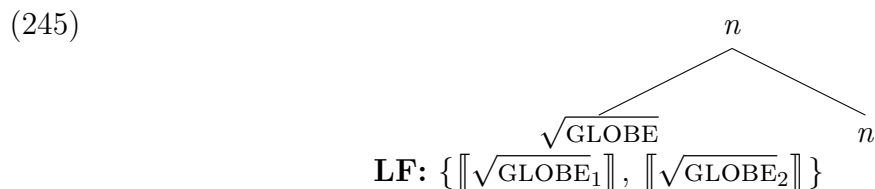
*global* in (243b) only retains the ‘world’ meaning. Once a particular interpretation of the root has been ruled out at a phase head, it cannot be brought back. This means that any structure derived from the adjective is restricted to the ‘world’ meaning. The meaning of the verb *globalize* in (243c) is consistent with this prediction. It does not mean ‘make something spherelike’.



We formalize the analysis by saying that a root is associated with a polysemy set. We can write this set as  $\{ \llbracket \sqrt{\text{GLOBE}}_1 \rrbracket, \llbracket \sqrt{\text{GLOBE}}_2 \rrbracket \}$  and the respective denotations as follows.

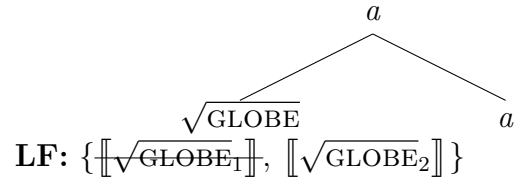
- (244) a.  $\llbracket \sqrt{\text{GLOBE}}_1 \rrbracket = \lambda x . \text{spherelike}(x)$   
          b.  $\llbracket \sqrt{\text{GLOBE}}_2 \rrbracket = \lambda x . \text{world}(x)$

Both denotations are compatible with *n* and therefore the nominal structure below can be interpreted in either of the two ways.

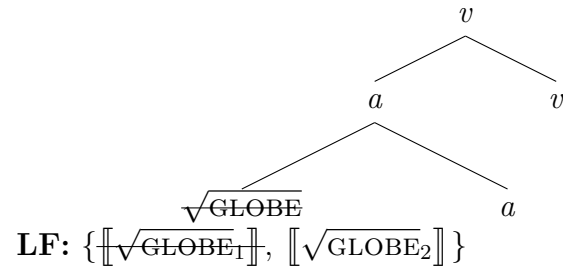


In contrast, the *a* head reduces the entropy of the polysemy set, excluding the denotation  $\llbracket \sqrt{\text{GLOBE}_1} \rrbracket$  from the range of possibilities. Any larger structure which embeds (246a) is constrained by this fact.

(246) a.



b.

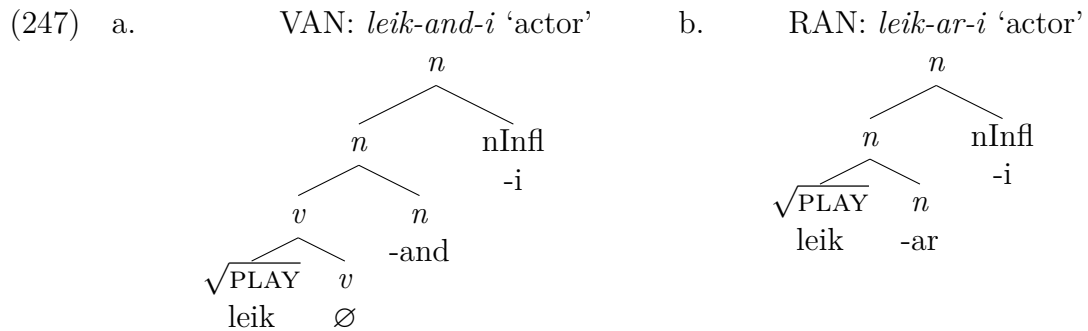


The system which I have outlined above makes predictions about the surface consequences of phase heads for morphology and meaning. The explicit formalization of the relevant effects is furthermore an appropriate tool for developing a precise future discussion. We will now turn to a case study of a nominalizer in Icelandic which is attached outside *v*.

### 5.2.3 The *v*-layer in *and*-nominals

Our case study involves Icelandic agent nominals and the proposed structures are repeated in (247) below. As shown, the nominalizer *-and* is analyzed as being outside a *v* and the nominalizer *-ar* as being the closest category-defining head to the root. The crucial property of the analysis is the presence of a  $\emptyset$  *v*(erbalizer) inside agent nominals with *-and* morphology. The analysis is compatible with there

being more functional structure in agent nominals (see Alexiadou and Schäfer 2010) as long as the added structure does not introduce phase heads other than *v* and *n*. This section presents evidence in support of this *v*-layer.



Some commonly used arguments for a verbal layer inside nouns have been developed for the English gerund type. However, it should be noted that the kinds of diagnostics which are available are constrained by the fact that we are analyzing agent nominals. Certain types of evidence for *v* in English gerunds are unavailable for our data, including verb-adjoined adverbs and accusative objects. It will be assumed throughout the discussion that the range of appropriate diagnostics is affected by independent differences between gerunds and agent nominals.

The first argument for the *v*-layer in VAN comes from argument structure. Agent denoting nouns do not in general inherit requirements for thematic arguments from verbs but agent nominals with *-and* do. If a verb demands a thematic direct object and the object is not recoverable from the context, the corresponding VAN requires that the object must be expressed somehow. I will focus on object incorporation here but the thematic object might also be provided by a genitive, a PP or by designing an informative context. For example, the verb *selja* ‘to sell’ requires

a direct object which expresses the entity being sold. Therefore, omitting object incorporation is infelicitous in the VAN in (248a) (note that *-end* is the plural form of *-and*). In contrast, it is acceptable in (248b) to omit the incorporated object with *söllumenn* ‘salesmen’.

(248) (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. *Pessir #(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. *Pessir (bók-a-)söllumenn 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 above are evidence that Icelandic agent nominals with the *-and* nominalizer inherit thematic properties with corresponding verbs even if other nouns with a similar meaning do not necessarily pattern the same. It should be noted that the discourse context is important for the examples in (248). Recoverability from context correlates with the availability of implicit objects of verbs and the same holds for our VAN. If it is easy to guess what the object is, it is relatively easier to omit the object. For this reason, (249) is infelicitous out of the blue but more natural if Mary and John just walked into the office of a real estate agent.

(249) Mary and John are here to sell.

The context in (248) is designed to guarantee that it is difficult to guess what is being sold in order to exclude situations in which implicit objects are natural. See Glass (2014) for references and an insightful empirical study of this effect.

In the present system, the requirement for a direct object can be derived from the formal semantics. Let us assume that the root  $\sqrt{\text{SELL}}$  is compatible with an implicit object as well as an explicit object. In the present system, this can be analyzed by stating that the polysemy set of the root contains the following two denotations.

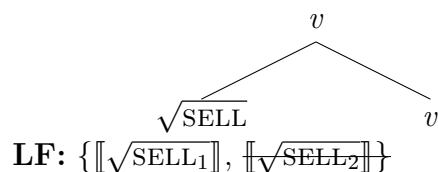
- (250) a.  $\llbracket \sqrt{\text{SELL}}_1 \rrbracket = \lambda x . \lambda e . \text{sale}(e) \wedge \text{theme}(e,x)$  (With explicit theme)  
 b.  $\llbracket \sqrt{\text{SELL}}_2 \rrbracket = \lambda e . \exists x [\text{sale}(e) \wedge \text{theme}(e,x)]$  (With implicit theme)

We find variation between roots in the requirements that they have for thematic objects and these variable requirements cannot always be easily explained by independent phenomena. I will view it as an argument in favor of the above approach to these denotations that it seems to correlate sensibly with the empirical picture to have such requirements encoded at the level of individual root morphemes. In particular, it seems promising to associate demands for a theme with the root rather than in terms of a general syntactic mechanism of existential closure at an independent level in the structure.

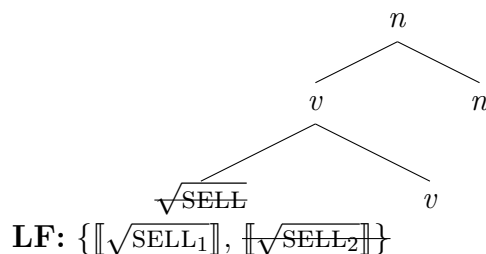
Words like ‘salesman’ would on the present analysis allow for a derivation where the semantics does not require that the syntax provides a node which saturates the theme argument of the selling event. In contrast, the verb *selja* ‘to sell’ requires a

thematic object which is encoded by excluding  $[\sqrt{\text{SELL}_2}]$  at  $v$ . This, in turn, means that our VAN *selj-and-i* ‘seller’ is equally constrained by the same exclusion.

(251) a.



b.



This implementation of the semantics means that requirements for thematic objects are derived by the same mechanism as polysemy resolution in general, a theoretical reduction which is conceptually pleasing because root interpretations with and without explicit themes are intuitively closely related to each other.

The second piece of evidence in favor of a  $v$ -layer comes from studying hypothetical underlying verbs. For every VAN, there exists a corresponding verb. This is predicted if the verb-derived agent nominal (VAN) is in fact derived from the verb. In contrast, although a corresponding verb exists for many root-derived nominals (RAN), this is not always the case. The table in (252) shows nouns with the *-ar n* exponent for which there is no corresponding verb.

(252) 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 examples show that a nominalizer with the form *-ar* is used in, for example, *apótek-ar-i* ‘pharmacist’ and *pönk-ar-i* ‘punk rocker’, but no corresponding verb exists, *\*apóteka*, *\*pönka*. However, we find these roots,  $\sqrt{\text{APÓTEK}}$  and  $\sqrt{\text{PÖNK}}$ , in other nouns such as *apótek* ‘pharmacy’ and *pönk* ‘punk’.

The third argument for the *v*-layer comes from root allomorphy. The form of the root in VAN is always identical to the verb root, as in *leik-and-i* for *leik-a* ‘to play’. In RAN, on the other hand, the root can have the same form, as in *leik-ar-i*, but it can also be different as in *söngv-ar-i* ‘singer’ vs. *syngj-a* ‘to sing’. This is predicted by our analysis if contextual allomorphy requires phase locality as in the system presented above.

In each of the following examples, we see a verb in the infinitive. For some of these verbs there exists an *-and* nominal (VAN); these are shown next to the verb. As predicted, the verb and the *-and* nominal have the same root allomorph. In the next line below each verb, we see a noun with a distinct noun allomorph of the same root, and also a root-derived *-ar* nominal (RAN). These *-ar* nominals do not pattern with the verbs in their morphology.

- (253) 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’

These examples show that agent nominals with the *-ar* exponent are often realized with the noun form of the root and not the verb form. For example, in (253e), we see the root allomorph *lyg-*, found in the noun *lyg-i* ‘lie’ and in the *-ar* nominal *lyg-ar-i* ‘liar’ (but not *\*ljúg-ar-i* as in the verb *ljúg-a* ‘lie’). In contrast, an *-and* nominal contains the verb allomorph. For example, *gef-and-i* ‘giver’, in (253b), has the same root allomorph, *gef-*, as the verb *gef-a* ‘give’.

A few comments on the availability and status of VAN-RAN doublets are in order at this point. The *-and* nominals are derived from verbs in our system by a general mechanism and therefore we predict that many VAN-RAN doublets are grammatical. Our *leik-and-i* and *leik-ar-i* in (247) are an example of this. In principle, it is possible to form an *-and* nominal from any verb. However, there is a general tendency in language to avoid doublets in linguistic usage if the relevant



pair of elements occupies exactly the same semantic space. For this reason, the pair *cook-er* and *chef* in English is most naturally available if *cook-er* refers to something which is not a *chef*, for example a rice cooker, a type of a kitchen appliance. The same tendency holds for VAN-RAN in Icelandic and that means that in some cases only one of the two structures may be used in everyday language, even if both can be derived by the grammar. In cases where a RAN already expresses what a VAN would express, the VAN may come across as redundant, even if it is well formed.

There are good reasons to believe that agent nominals which are well formed but perhaps not used have a distinct status from forms which are truly ungrammatical. Consider, for example, the pair *söngvari* ‘singer’ and *?syngjandi* ‘singer’. While use of the latter invokes thoughts that perhaps one should have used the former instead, this reaction is fairly mild in nature compared to something like using the wrong nominal inflection exponent. Thus, saying *\*söngvarur* ‘intended: singer’ using the strong masculine declension is sharply ruled out in a much more forceful manner than the slightly redundant *?syngjandi*.

To sum up, this section presented evidence that *-and* agent nominals are verb-derived and they were contrasted with agent nominals which are root-derived. The evidence is threefold:

1. *-and* nominals inherit requirements for thematic objects from corresponding verbs. Root-derived agent nominals do not.
2. For every *-and* nominal, there exists a corresponding verb. This is not always the case for root-derived agent nominals.
3. The form of the root is always identical to the verb-root in *-and* nominals, but this is not always the case for root-derived agent nominals.

We have now seen evidence that *-and* nominals are verbs on the inside and the evidence has been examined in the context of the theoretical framework which is being assumed. The findings are consistent with the theory. The following section builds on the present conclusion that *-and* nominals are built from verbs and investigates the consequences of this analysis in segmental phonology.

#### 5.2.4 Phase-cyclic palatalization

The main point of the final part of the case study on agent nominals is to show that a generalization in terms of phase theory explains the distribution of Icelandic palatalization in a well-motivated way. In the general case, the process causes an underlying /k/ to be pronounced [c] when immediately followed by /e/ or /i/ (adjacent segments). This phonological contrast is demonstrated by the following pair of examples; further examples of this type will be given in (257) below.

- (254) a. ví[k] ‘bay’  
       b. ví[c]ingur ‘viking’

The core data to be considered are drawn from the plural form of Icelandic *-and* nominals. In VAN like *leik-and-i*, the *n* morpheme whose phonological exponent is *-and* in the singular is *-end* in the plural. The declension of *leikandi* is shown in the singular and the plural for all four cases in (255) below. The plural form of the nominalizer is underlined.

(255) Realization of Root-*n*-*n*Infl 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

Rögnavaldsson (1990b) points out a puzzle that the *n*-initial /e/ never triggers palatalization (256) even though /e/ and /i/ are robust palatalizers in the language. In other environments, /k/ is pronounced [c] when immediately followed by /e/.

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

The analysis to be pursued here is that the phonological representation of the root is not phase-theoretically active when the phonological exponent of *n*, *-end*, enters the derivation as a potential trigger of palatalization. Phase inactivity does not mean that the deactivated representation is completely inert for the purpose of PF computation. By hypothesis, the inactive material “has a phonological representation but it cannot be identified as a particular morpheme”. Furthermore, it can

be “seen or altered by non-cyclic or phrasal phonological rules, but not by cyclic phonological rules” (Embick 2014). I propose that palatalization is part of the cyclic phonology of Icelandic and thus subject to phase locality.

The diversity of the environments for palatalization can be illustrated by Indriðason’s (1994) Lexical Phonology classification of triggering environments (257).

- (257) 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)

In the above examples, /k/ alternates between [c]/[k] as determined by the palatalization process. One exception is that recent loanwords occasionally resist palatalization. For example, the word *disk[et]etta* ‘diskette (an obsolete type of electronic storage)’, did not stay in the language long enough to fully adapt to the native phonology. It is reasonable to assume that those are facts about loanwords rather than palatalization. When we have taken loanword phenomena into account, the generalization is that palatalization is triggered by any suffix with *-e/-i* which is not *-end*. The process is *wug*-productive and there is neurolinguistic evidence of its productivity from a patient who suffered a stroke which damaged his ability to palatalize, as reported in the Icelandic medical journal (Magnúsdóttir and Sighvatsdóttir 2009).

In contrast, palatalization does not apply across major derivational boundaries such as in compounds (258) and between words (259). Note that if we assume that every root must be categorized by its own category-defining head (Embick and Marantz 2008) and if every category-defining head is a phase head, we expect the individual roots of compounds to be spelled out in distinct phase cycles. This view of compounds is supported by the findings of Shwayder (2015:148-160) who argues that each part of a compound is effectively its own “word” in his analysis of Spanish; see also Harðarson (2016) for a thorough study of Icelandic compounds.<sup>3</sup>

- (258) a. bla[k]-innviðir ‘volleyball-infrastructure’  
 b. strá[k]-ermar ‘boy-sleeves’

- (259) a. *María hittí strá[k] inni í bókabúð.*  
 Mary met boy inside bookstore  
 ‘Mary met a boy inside a bookstore.’  
 b. *Jón spilar bla[k] eftir vinnu.*  
 John plays volleyball after work  
 ‘John plays volleyball after work.’

The proposed analysis is that Icelandic palatalization requires the target to be phase-active, explaining its underapplication in VAN. This hypothesis is interesting and useful because it accounts for the palatalization facts based on locality conditions which are independently motivated.

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<sup>3</sup>There are some exceptional cases in which palatalization is used across compound boundaries, e.g., Indriðason (1994:63) on variable palatalization in *fis[k/c]eldi* ‘fish farming’ but these are rare and truly exceptional and not likely to have an important status.

(260) **Analysis**

Palatalization requires phase locality.

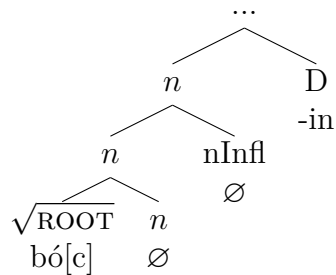
The idea behind the analysis is not that all phonological processes operate in terms of locality over a representation which requires phase activity. As hypothesized above, non-cyclic and phrasal phonology may apply freely to inactive representations in which morphemes are not identifiable as morphemes and there are indeed many cases in language of phonological interactions between pieces which are not phase-local to each other. For example, contracted auxiliaries in English interact with their host even if the host is clearly spelled out in a different phase cycle (see MacKenzie 2012 for a detailed up-to-date investigation of contraction). Ideally, the part of the phonology which must obey phase locality will have clearly distinguishable properties and the cyclic phonology is a prime candidate; see Embick (2014).

### **5.2.5 An apparent counterexample – the definite suffix**

We will now address one apparent counterexample to our analysis. The analysis accounts for the Icelandic facts as long as the suffixed article in Icelandic is not the phonological exponent of a phase head. It has been proposed that there is a phase boundary at the edge of the noun phrase (Svenonius 2004) and such phases have been used to analyze phenomena involving extraction out of the noun phrase (Bošković 2005). The definite suffix on nouns is a challenge for the analysis if it

realizes D and if D is a phase, because that would incorrectly predict the absence of palatalization in configurations like (261), e.g., *bó[c]-in* ‘book-the’.

(261)



Why might the definite suffix not be a phase? One possibility is that D and *n* are phase-local because the phase-cyclic locality domain at the edge of the noun phrase is determined by a higher functional projection such as KP (case phrase) above DP. In that case there is a phase boundary at a high point in the noun phrase even if D is not a phase. I will adopt this view here because it fits well with the general theory in the dissertation.

However, it is also possible to pursue different alternatives for those who wish to analyze the Icelandic DP differently. One possibility is that the definite suffix is expressing a subpart of the meaning of the definite article, perhaps specificity. This option is in line with analyses which decompose the definite article. Work on double definiteness in the closely related mainland Scandinavian languages develops promising avenues along these lines (see Julien 2005). In that case, Icelandic has a D phase but the definite suffix is not itself a realization of a D head. A second possibility is that the definite suffix is a concord morpheme. Definiteness concord is independently needed for adjectives in Icelandic. Again, Icelandic has a D phase, but the definite suffix does not realize D. A third possibility is that Icelandic noun

phrases have less phase structure than languages like English, as perhaps reflected in extraction possibilities of type (262), cf. Bošković 2005 on Slavic.

- (262) *Rosalega<sub>i</sub> er hún [t<sub>i</sub> góður málfræðingur].*  
extremely is she t good linguist.  
'She is an extremely good linguist.'

These types of effects are admittedly limited in Icelandic but at least certain adverbs can be extracted out of predicative noun phrases (Rögnvaldsson 1990a, 1996). This is a real difference between Icelandic and English and this difference may reflect differences in phase structure. Work by Talić (2015) which relies on insights about agreement suggests ways of uncovering the status of such extraction in Icelandic.

A final avenue one might pursue is that the *nP* moves out of the D phase as is assumed in some analyses of the Icelandic noun phrase (e.g., Pfaff 2015). To the extent that this kind of movement keeps the root phase-theoretically active in all of the relevant syntactic configurations, it might explain why D and the root are able to see each other for the purpose of palatalization.<sup>4</sup>

These analytical possibilities demonstrate that it is plausible that the definite suffix is not the exponent of a phase head and more importantly they highlight the fact that our phase-theoretic generalization for Icelandic palatalization has independent consequences which interact with other phenomena and can be pursued empirically. We could, if we wanted, derive the lack of palatalization in *-and* nominals by appealing to a phonological diacritic or by saying that *-and* is the only

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<sup>4</sup>Thanks to Jim Wood for discussions about this point.



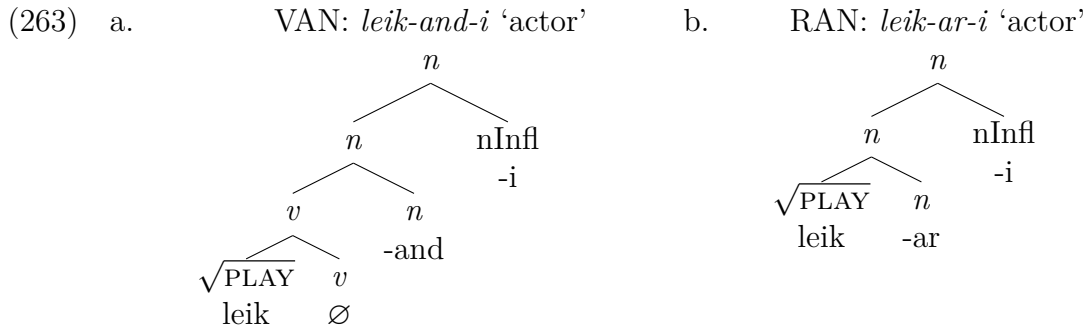
potentially palatalizing suffix in the language which is Level II;<sup>5</sup> see for example Indriðason's (1994) levels-based approach to Icelandic phonology. However, the present phase-theoretic account is more useful because the tools of phase theory are available to anyone who wishes to prove it wrong. Arbitrary idiosyncratic switches do exist in language and we should be concerned about them. Nevertheless, in cases where the evidence is compatible with strong hypotheses about deep and unifying explanations, such hypotheses are useful to entertain.

### 5.2.6 Section summary

The findings in this section support the view from DM that phases constrain contextual allomorphy and polysemy resolution. Furthermore, it was shown that amply motivated phase structure accounts for palatalization facts in Icelandic, and any analysis which fails to admit phase locality at PF will therefore miss an important generalization. The crucial piece of the analysis was a proposed *v*-layer between the root and the nominalizer in agent nominals whose nominalizer is realized as *-and* and is not found in agent nominals in general. The analysis of the two types of structures which we focused on is repeated below.

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<sup>5</sup>Thanks to David Pesetsky for commenting on the issue of levels-based analyses.



In terms of the big picture, the section provides evidence in favor of the view that phase structure matters in the realization of morphemes at the interfaces.

### 5.3 Vocabulary Insertion and nominal inflection

#### 5.3.1 Linear adjacency

Although phase locality is required in order for a morpheme to be visible, it is not sufficient for all interactions. This section is concerned with the realization of nominal inflection, focusing on the constraint that conditions on contextual allomorphy require linear adjacency (Embick 2010) as well as the role of the notions gender and declension class. We refer to the linear adjacency effect as the BLAC.

(264) **Bidirectional Linear Adjacency Constraint (BLAC)**

Conditions on contextual allomorphy require linear adjacency. Therefore, Vocabulary Insertion at a morpheme X can only refer to properties of the context if they are a part of the morpheme immediately to the left and/or immediately to the right of X.

The BLAC means that Vocabulary Insertion of a phonological exponent for morpheme X can only make reference to the morphemes which are adjacent to X. The empirical focus of the section is on the nominal inflection in Icelandic nouns with and without an overt nominalizer and we find that the data support the reality of the BLAC. These findings are interesting because Icelandic declension involves a great variety of declension patterns (96 by one count, see below!) and considerable variation is attested in their use. Despite this apparently chaotic situation, there are no exceptions to the BLAC. Because the BLAC is crucially stated in terms of morphemes, it is a consequence of these facts that theories with morphemes are supported, but not theories which lack morphemes.

Schematically, the section compares nouns whose overt phonological exponents manifest the two following patterns.

- (265) a.  $\sqrt{\text{ROOT-nInfl}}$   
 b.  $\sqrt{\text{ROOT-n-nInfl}}$

The nouns *læknir* ‘doctor’ and *leikari* ‘actor’ are concrete examples of the respective patterns and their morphological segmentation is given below.<sup>6</sup>

- (266) a. lækn-ir  $\sqrt{\text{HEAL-MASC.NOM.SG}}$  ‘doctor’  
 b. leik-ar-i  $\sqrt{\text{PLAY-NMLZ-MASC.NOM.SG}}$  ‘actor’

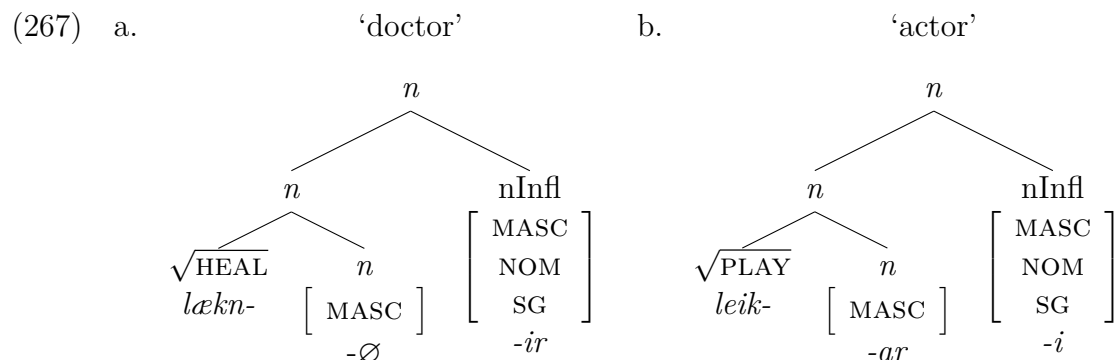
The nouns are both masculine and both are shown in the nominative singular. The only relevant difference between them is that the nominalization morphology is

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<sup>6</sup>There is some variation in the language community in how speakers segment *læknir* ‘doctor’.

I ignore this variation for the present purpose and just present one analysis.

realized as  $-\emptyset$  in *lækn-ir* but it is overt,  $-ar$ , in *leik-ar-i*. Therefore, nInfl is linearly root-adjacent in *lækn-ir*, but not in *leik-ar-i*. Structurally, they are the same.

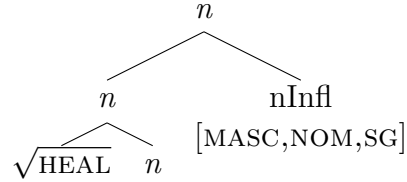


The same nInfl morpheme is realized in two distinct ways in these nouns, a case of contextual allomorphy. If we analyze  $-i$  as the default exponent of this morpheme, we can use the following Vocabulary Items to account for the distribution of exponents. It does not matter for the present purpose which exponent is in fact the default as long as there is a root-conditioned alternation between them. Note as well that the example ignores potential for underspecified Vocabulary Items because we are not focusing on the analysis of syncretism here.

- (268) a. nInfl[MASC,NOM,SG]  $\leftrightarrow$   $-ir / \{\sqrt{\text{HEAL}}, \sqrt{\text{ROUTE}}, \dots\}^{\wedge} \_$   
 b. nInfl[MASC,NOM,SG]  $\leftrightarrow$   $-i$

The syntactic structure and the morphological derivation are as follows when the nominalizer is realized as  $-\emptyset$  as in *lækn-ir*  $\sqrt{\text{HEAL}}-ir$  'doctor':

(269) a.



- b.  $\sqrt{\text{HEAL}} \frown n, n \frown \text{nInfl}$  (Concatenation)
- c.  $\sqrt{\text{HEAL}} \frown [n, -\emptyset], [n, -\emptyset] \frown \text{nInfl}$  (Vocabulary Insertion)
- d.  $\sqrt{\text{HEAL}} \frown \text{nInfl}$  (Pruning)
- e.  $\sqrt{\text{HEAL}} \frown [\text{nInfl}, -\text{ir}]$  (Vocabulary Insertion)
- f.  $\sqrt{\text{HEAL}} - \text{ir}$  (Chaining)

The tree is first translated into concatenation statements;  $\frown$  is the concatenation operator (269b). Vocabulary Insertion starts with the most deeply embedded node (269c) and proceeds outwards. Pruning is an operation which removes  $\emptyset$  elements from the morphology like the non-overt nominalizer above (269d), therefore the root and nInfl can condition the phonological exponent of each other (269e).

Two assumptions about the architecture of the grammar are crucial for deriving the BLAC:

- (270) a. Only morphemes are targets for insertion (Embick In press).
- b. Contextual allomorphy requires concatenation (linear adjacency) (Embick 2010)

Because Vocabulary Insertion always targets individual morphemes, rather than larger structures, phonological exponents of morphemes never extend beyond their fixed slot between the previous and following morpheme, i.e., insertion at non-terminals is disallowed. Conditions on contextual allomorphy are furthermore stated in terms of concatenation. Therefore, they require linear adjacency. The following

derivation demonstrates how an overt nominalizer blocks root-conditioned nInfl allomorphy:

- (271) a.
- 
- b.  $\sqrt{\text{PLAY}} \frown n, n \frown \text{nInfl}$  (Concatenation)
- c.  $\sqrt{\text{PLAY}} \frown [n, -ar], [n, -ar] \frown \text{nInfl}$  (Vocabulary Insertion)
- d.  $\sqrt{\text{PLAY}} \frown [n, -ar], [n, -ar] \frown [\text{nInfl}, -i]$  (Vocabulary Insertion)
- e.  $\sqrt{\text{PLAY}} \text{-ar-i}$  (Chaining)

Here, *-ar* is inserted as an overt exponent of the nominalizer (271c). There is no  $\emptyset$  exponent, so no Pruning takes place. The Vocabulary Item which determines the form of nInfl can only make reference to the nominalizer in (271d), not the root.

In general, the BLAC is a consequence of the Vocabulary Insertion process targeting discrete morphemes sequentially. Although it has been demonstrated here for nominalizers and nominal inflection morphemes, it should in principle apply to any morphemes X and Y in the following linear configurations.

- (272) a.  $\sqrt{\text{ROOT-Y}}$   
 b.  $\sqrt{\text{ROOT-X-Y}}$

In (272a), the root and Y can make reference to each other for the purpose of Vocabulary Insertion. In (272b), the root and X can condition the phonological exponent of each other, and X/Y can also see each other (as long as they are phase local), but here the root and Y do not see each other because the two are not linearly adjacent.

### 5.3.2 Icelandic noun inflection

Root-adjacent nInfl patterns are sometimes organized into tables for language learners according to gender and a distinction between the so-called strong and weak declension. Such tables are shown below.

(273) Strong declension

		‘arm’ MASC	‘needle’ FEM	‘country’ NEUT
SG	NOM	arm- <u>ur</u>	nál- <u>Ø</u>	land- <u>Ø</u>
	ACC	arm- <u>Ø</u>	nál- <u>Ø</u>	land- <u>Ø</u>
	DAT	arm- <u>i</u>	nál- <u>Ø</u>	land- <u>i</u>
	GEN	arm- <u>s</u>	nál- <u>ar</u>	land- <u>s</u>
PL	NOM	arm- <u>ar</u>	nál- <u>ar</u>	lönd- <u>Ø</u>
	ACC	arm- <u>a</u>	nál- <u>ar</u>	lönd- <u>Ø</u>
	DAT	örm- <u>um</u>	nál- <u>um</u>	lönd- <u>um</u>
	GEN	arm- <u>a</u>	nál- <u>a</u>	land- <u>a</u>

(274) Weak declension

		‘telephone’ MASC	‘story’ FEM	‘eye’ NEUT
SG	NOM	sím- <u>ĭ</u>	sag- <u>a</u>	aug- <u>a</u>
	ACC	sím- <u>a</u>	sög- <u>u</u>	aug- <u>a</u>
	DAT	sím- <u>a</u>	sög- <u>u</u>	aug- <u>a</u>
	GEN	sím- <u>a</u>	sög- <u>u</u>	aug- <u>a</u>
PL	NOM	sím- <u>ar</u>	sög- <u>ur</u>	aug- <u>u</u>
	ACC	sím- <u>a</u>	sög- <u>ur</u>	aug- <u>u</u>
	DAT	sím- <u>um</u>	sög- <u>um</u>	aug- <u>um</u>
	GEN	sím- <u>a</u>	sag- <u>na</u>	aug- <u>na</u>

Although the tabulation makes the situation appear somewhat organized, both gender and the distinction between weak and strong declension involve arbitrary memorized class membership. The speaker must know the identity of the root in order to use an appropriate pattern. For example, certain roots are used with masculine, nominative, singular *-ur*, but others with *-i*, *-a* or *-Ø*; see underlined exponents in the tables above. Beyond the main patterns, further variation exist. By one count, there are 96 declension patterns in the language (Kvaran 2005 citing

Jón Friðjónsson’s material for teaching Icelandic as a second language). Of course, there is some matter of debate how such patterns should be counted but there is no doubt that the diversity of root-attached nInfl is considerable. It is beyond the scope of this study to describe all the declension patterns found in the language; such descriptions have been carried out carefully elsewhere (see Rögnvaldsson 1990b; Svavarsdóttir 1994a; Kvaran 2005).

Importantly, it is not enough to identify a noun in the 2x3 grid above in order to know its declension. Due to historical reasons, idiosyncratic sub-patterns exist within a class like the strong masculine nouns. For example, with some roots the genitive singular is *-s*, with others it is *-(j)ar*, and some nouns show intra-speaker variability between two patterns. This is shown for *armur* ‘arm’, *köttur* ‘cat’ and *veggur* ‘wall’ below, all of which are strong and masculine.

(275)	NOM.SG.	GEN.SG.	gloss
	arm-ur	arm-s	‘arm’
	kött-ur	katt-ar	‘cat’
	vegg-ur	vegg-s/vegg-jar	‘wall’

These examples show that we find root-conditioned nInfl alternations when the root and nInfl are linearly adjacent. The root and nInfl are linearly adjacent exactly when the phonological exponent of the nominalizer is  $-\emptyset$ . Contrast this, below, with nInfl with an overt nominalizer, in which root-conditioned nInfl allomorphy is completely absent. All words with the same overt nominalizer have identical declension. To show the effect, I present pairs of words whose nominalizers have the same phonological exponent. The fact to note is that nInfl exponent in the left



column is always identical to the right column. The cases under consideration are the masculine *-ar* nominalizer as well as feminine *-(n)ing*, feminine *-un*, masculine *-and* and masculine *-(n)ing*. It does not matter for the current purpose whether the *-(n)ing* exponents are thought of as one or two distinct objects, they are linear interveners in either case.

Masculine *-ar* nominalizer:

(276)			‘actor’				‘singer’
	SG	NOM	leik-ar- <u>i</u>		SG	NOM	söngv-ar- <u>i</u>
		ACC	leik-ar- <u>a</u>			ACC	söngv-ar- <u>a</u>
		DAT	leik-ar- <u>a</u>			DAT	söngv-ar- <u>a</u>
		GEN	leik-ar- <u>a</u>			GEN	söngv-ar- <u>a</u>
	PL	NOM	leik-ar- <u>ar</u>		PL	NOM	söngv-ar- <u>ar</u>
		ACC	leik-ar- <u>a</u>			ACC	söngv-ar- <u>a</u>
		DAT	leik-ur- <u>um</u>			DAT	söngv-ur- <u>um</u>
		GEN	leik-ar- <u>a</u>			GEN	söngv-ar- <u>a</u>

Feminine *-(n)ing* nominalizer:

(278)			‘rain’				‘increase’
	SG	NOM	rign-ing- <u>Ø</u>		SG	NOM	auk-ning- <u>Ø</u>
		ACC	rign-ing- <u>u</u>			ACC	auk-ning- <u>u</u>
		DAT	rign-ing- <u>u</u>			DAT	auk-ning- <u>u</u>
		GEN	rign-ing- <u>ar</u>			GEN	auk-ning- <u>ar</u>
	PL	NOM	rign-ing- <u>ar</u>		PL	NOM	auk-ning- <u>ar</u>
		ACC	rign-ing- <u>ar</u>			ACC	auk-ning- <u>ar</u>
		DAT	rign-ing- <u>um</u>			DAT	auk-ning- <u>um</u>
		GEN	rign-ing- <u>a</u>			GEN	auk-ning- <u>a</u>

Feminine *-un* nominalizer:

(280)		‘entertainment’		(281)	‘unloading of fish’		
	SG	NOM	skemmt-un- <u>Ø</u>		SG	NOM	lönd-un- <u>Ø</u>
		ACC	skemmt-un- <u>Ø</u>			ACC	lönd-un- <u>Ø</u>
		DAT	skemmt-un- <u>Ø</u>			DAT	lönd-un- <u>Ø</u>
		GEN	skemmt-un- <u>ar</u>			GEN	lönd-un- <u>ar</u>
	PL	NOM	skemmt-an- <u>ir</u>		PL	NOM	land-an- <u>ir</u>
		ACC	skemmt-an- <u>ir</u>			ACC	land-an- <u>ir</u>
		DAT	skemmt-un- <u>um</u>			DAT	lönd-un- <u>um</u>
		GEN	skemmt-an- <u>a</u>			GEN	land-an- <u>a</u>

Masculine *-and* nominalizer:

(282)		‘beginner’		(283)	‘actor’		
	SG	NOM	byrj-and- <u>i</u>		SG	NOM	leik-and- <u>i</u>
		ACC	byrj-and- <u>a</u>			ACC	leik-and- <u>a</u>
		DAT	byrj-and- <u>a</u>			DAT	leik-and- <u>a</u>
		GEN	byrj-and- <u>a</u>			GEN	leik-and- <u>a</u>
	PL	NOM	byrj-end- <u>ur</u>		PL	NOM	leik-end- <u>ur</u>
		ACC	byrj-end- <u>ur</u>			ACC	leik-end- <u>ur</u>
		DAT	byrj-end- <u>um</u>			DAT	leik-end- <u>um</u>
		GEN	byrj-end- <u>a</u>			GEN	leik-end- <u>a</u>

Masculine *-(n)ing* nominalizer:

(284)		‘invoice’		(285)	‘shilling’		
	SG	NOM	reikn-ing- <u>ur</u>		SG	NOM	skild-ing- <u>ur</u>
		ACC	reikn-ing- <u>Ø</u>			ACC	skild-ing- <u>Ø</u>
		DAT	reikn-ing- <u>i</u>			DAT	skild-ing- <u>i</u>
		GEN	reikn-ing- <u>s</u>			GEN	skild-ing- <u>s</u>
	PL	NOM	reikn-ing- <u>ar</u>		PL	NOM	skild-ing- <u>ar</u>
		ACC	reikn-ing- <u>a</u>			ACC	skild-ing- <u>a</u>
		DAT	reikn-ing- <u>um</u>			DAT	skild-ing- <u>um</u>
		GEN	reikn-ing- <u>a</u>			GEN	skild-ing- <u>a</u>

The pairs are all consistent with the BLAC. There is no root-conditioned nInfl allomorphy outside an overt nominalizer. To confirm that this effect is in fact exceptionless, I carried out a database study using the Database of Modern Icelandic Inflection (Bjarnadóttir 2013). Hundreds of words were examined and no cases of

root-specific nInfl were found for any of the nominalizers. The results of the database study are summarized below:

(286) Regularity of nominalizer-attached nInfl

NMLZ	GEND	words	root-specific nInfl	Example (NOM.SG.)
-ar	MASC	557	0	leik-ar-i ‘actor’
-(n)ing	FEM	482	0	auk-ning ‘increase’
-un	FEM	417	0	skemmt-un ‘entertainment’
-and	MASC	228	0	byrj-and-i ‘beginner’
-(n)ing	MASC	80	0	reikn-ing-ur ‘invoice’

The database study confirms that the effects of the BLAC are not just a tendency in these data but rather a categorical constraint from which there are no exceptions.

The Bidirectional Linear Adjacency Constraint (BLAC) also makes predictions about variation and change. If we use the term “analogy” to refer to any change in inflection which cannot be attributed to regular sound change, the BLAC constrains the range of possible analogical changes. We expect any root-conditioning to be possible next to the root and therefore any kind of analogical nInfl change is compatible with the linear configuration  $\sqrt{\text{ROOT-nInfl}}$ . In contrast, root specific nInfl change is ruled out in  $\sqrt{\text{ROOT-n-nInfl}}$ . The table below summarizes predictions about possible and impossible types of nInfl change.

(287)		one word changes	all words of environment change
	$\sqrt{\text{ROOT-nInfl}}$	possible	possible
	$\sqrt{\text{ROOT-n-nInfl}}$	<b>impossible</b>	possible

The most interesting case is the case where nInfl changes outside an overt nominalizer because the BLAC predicts that all words with the same nominalizer exponent must undergo the change at once.

A recent ongoing change in Icelandic, Genitive Variation (GV) affects nouns with feminine *-un* and feminine *-(n)ing*. The change is often discussed in relation with so-called Genitive Avoidance which involves the loss of a genitive environment in the syntax (see Kjartansson 1979, 1999; Svavarsdóttir 1994b; Eggertsdóttir 2009; Þorsteinsdóttir 2009; Rögnvaldsson 2010). However, I will only focus on GV here, which involves a change in the phonological exponent of the genitive singular. The change neutralizes a traditionally *-ar* genitive to the form of the other non-nominative cases.

(288) *-un* FEM suffix declension

		‘entertainment’
SG	NOM	skemmt-un
	ACC	skemmt-un
	DAT	skemmt-un
	GEN	skemmt-un-ar > skemmt-un
SG	NOM	skemmt-an-ir
	ACC	skemmt-an-ir
	DAT	skemmt-un-um
	GEN	skemmt-an-a

(289) *-(n)ing* FEM suffix declension

		‘increase’
SG	NOM	auk-ning
	ACC	auk-ning-u
	DAT	auk-ning-u
	GEN	auk-ning-ar > auk-ning-u
SG	NOM	auk-ning-ar
	ACC	auk-ning-ar
	DAT	auk-ning-um
	GEN	auk-ning-a

The important point to note here is that, as predicted by the BLAC, all words with the respective suffixes are affected by the change. For speakers who have the variation at all, it appears that no *-un* word or *-(n)ing* word shows a lack of such

variation. This provides independent support to the BLAC from change in progress, in addition to the facts from the database study discussed above.

### 5.3.3 The locus of features and the concord mechanism

We will now take a closer look at the ways in which feature values can and cannot spread in the noun phrase. There is one mechanism, i.e., concord, which allows certain feature values to be distributed around the noun phrase in a less local manner than contextual allomorphy. Because we are concerned about locality, I will develop an account of concord which allows certain features which originate close to the root to appear elsewhere, but in restricted ways. In particular I focus on gender features. I crucially assume, following Kramer (2014, 2015), that gender originates on the nominalizer and not the root. Furthermore, following Norris (2012), I assume that a set of unvalued universal features on KP (case phrase) are the locus of the concord mechanism. The noun phrase architecture is as follows.

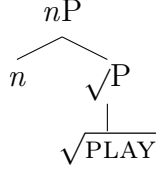
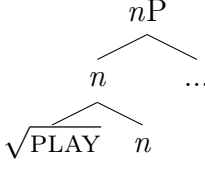
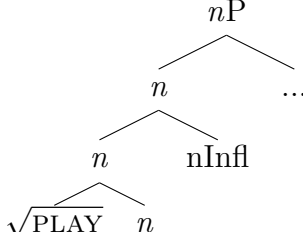


It seems to be a puzzle for a theory based on linear adjacency that the gender features of the noun can in fact appear in multiple locations in the noun phrase. Gender is commonly viewed as an “inherent property of nouns” and it must be associated with a structural position close to the root. Consider the following noun

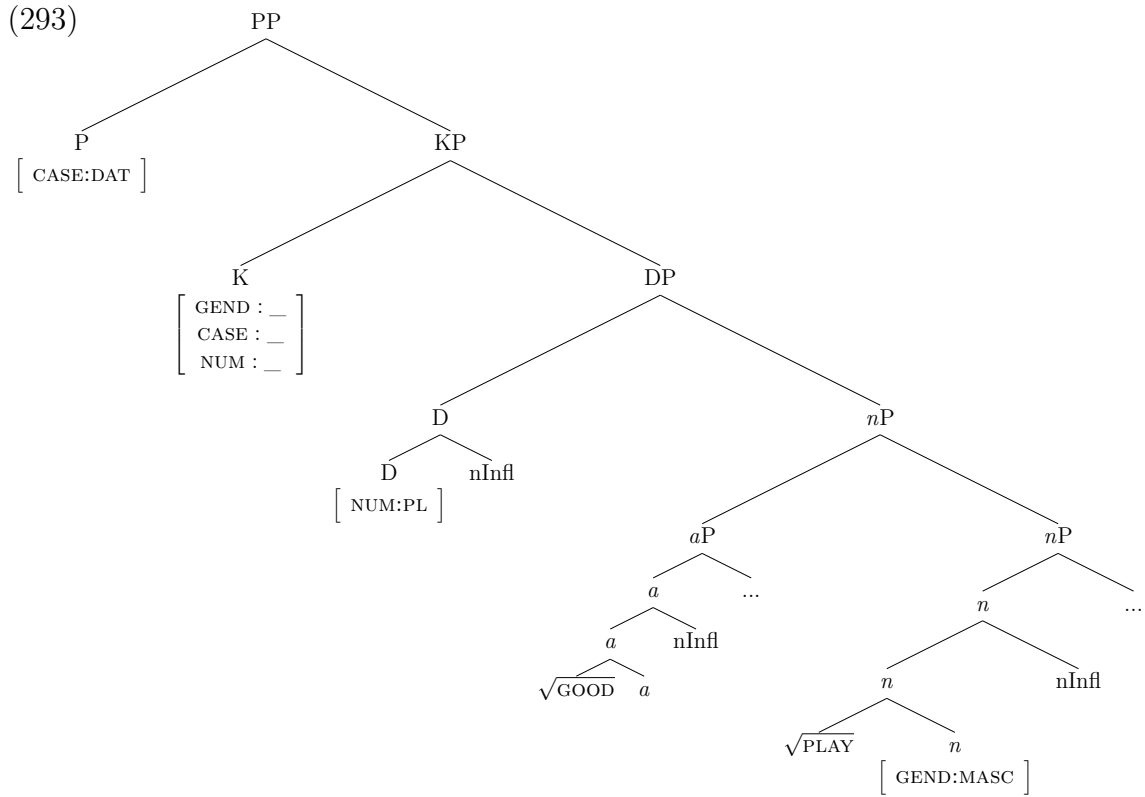
phrase which is masculine, dative, and plural. These three features are all realized in three locations on nInfl elements in the noun phrase.

- (291) *frá góð-u leik-ur-u-n-um*  
 from good-MASC.DAT.PL play-NMLZ-MASC.DAT.PL-DEF-MASC.DAT.PL  
 ‘from the good actors’

In order to understand why gender features can spread away from the noun but not root identity features, let us consider how the derivation of this noun phrase works. The noun *leikurunum* ‘the actors’ starts out as a merger of the nominalizer and the root. The root and the nominalizer form a morphosyntactic word, MWd, by head movement, and the nInfl morpheme is attached as a dissociated morpheme with unvalued gender, case, and number. It should be noted that in the present kind of a theory, unlike some other implementations of minimalist syntax, head movement does not free the relevant head from being deactivated in the sense of phase theory, at least not for the purpose of realization at the interfaces.

- (292) a.  b.  c. 

The adjective *góður* ‘good’ is built in a parallel manner and adjoined to nP which merges with the definite article, and subsequently with K (case) and the preposition *frá* ‘from’. The tree below demonstrates how the values of the concord features originate in different locations although they are collected at K.



The unvalued features on K are valued by Agree.<sup>7</sup> The case value comes from the outside, P in this case, number comes from a functional projection in the noun phrase like D (or Num), and gender comes from the nominalizer. Dissociated nInfl morphemes are attached to (possibly complex) heads which show concord, D, *a* and *n*. The mechanism which inserts nInfl is AGR node insertion in the sense of Norris (2012), cf. Noyer (1997), nInfl being the AGR node in question.

<sup>7</sup>Although standard Agree probes downwards (and values upwards) (Chomsky 2000, 2001), various researchers have pursued approaches in which Agree can be upwards or bidirectional; see, e.g., Neeleman and van de Koot (2002); Adger (2003); Baker (2008); Hicks (2009); Haegeman and Lohndal (2010); Bjorkman (2011); Merchant (2011); Zeijlstra (2012); Wurmbrand (2014); Baier (2015).

(294) **AGR node Insertion**

$$X \rightarrow [X \text{ AGR}]$$

For the mechanism that copies case, number and gender values onto the nInfl nodes, I adopt the implementation of Feature Copying which is stated by Norris (2012); see also Kramer (2009:87).

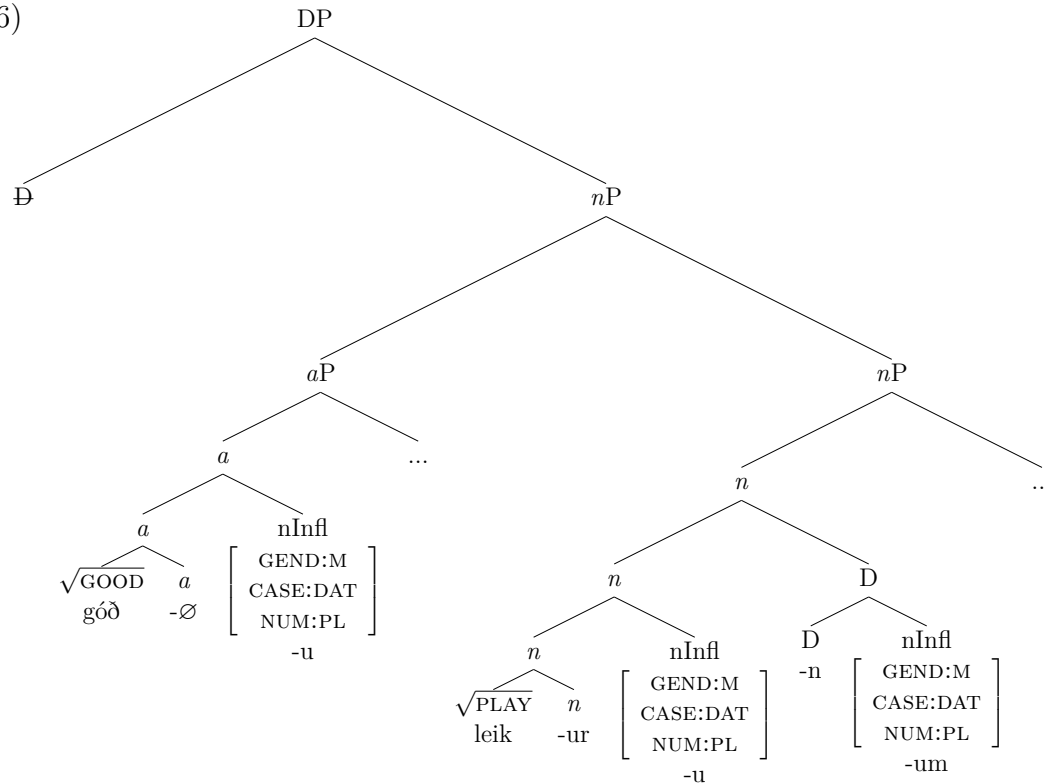
(295) **Feature Copying**

The features on the closest c-commanding K to any particular AGR node are copied onto it.

The noun phrase *góðu leikurunum* ‘the good actors’ from above has the structure in (296) when all the nInfl nodes have been valued (from K) and D has been attached to *n* via a Local Dislocation operation (as discussed in detail in Chapter 4).



(296)



Let us now revisit the question of why root identity features do not spread away from the noun in the same manner as gender does via concord. The first reason is that the locus of concord, the KP, does not collect information about the identity of roots, it is a syntactic functional head with unvalued features for gender, case, and number, which are all presumably members of the set of universal syntacticosemantic features. Second, if KP as the highest functional projection of the nominal spine is a phase head, the root and K are not phase local to each other due to the intervention of the *n* phase. Thus, phase locality would not permit the root and K to Match as they are never phase-theoretically active at the same point in the derivation, at least if class features are not copied onto *n*. Furthermore, even if phase locality were satisfied, concord does not in general target class features em-

pirically (see Kramer 2015:233), plausibly because they are not specified as a part of Universal Grammar; they are just diacritics.

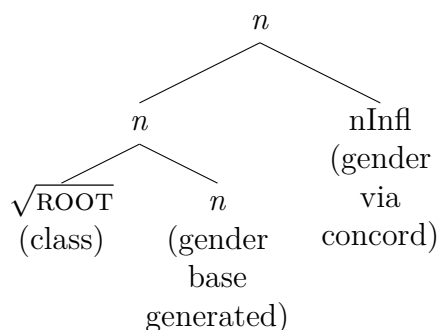
Concord exists and therefore it must be possible to collect and distribute the values of gender, case, and number in the noun phrase. For a theory which focuses on strict locality conditions it is a concern that feature values can be distributed to multiple locations over the kinds of distances that syntactic Agree operates on. However, if the kind of theory which is outlined here is on the right track, the concord mechanism is not unrestricted. It has a specific locus where the feature values are collected and the collection is constrained by phase locality and the types of unvalued features which Universal Grammar makes available. The targets of concord are the edges of complex heads, Morphosyntactic Words (MWds), and it is exactly in such locations that we find nInfl morphemes.

### **5.3.4 The gender/class distinction**

Gender and inflection class seem to be related notions. Both involve arbitrary memorization of some sort and any given Icelandic noun ends up having a weak masculine declension, a strong neuter declension or some other combination. Nevertheless, it is commonly assumed that gender and class membership are distinct types of facts about nouns; see Harris (1991), Alexiadou (2004), and Kramer (2009:120). For example, unlike gender, class does not participate in concord and it is never interpretable. This section investigates the differences between gender and class and

how the two are related to realization of sound and meaning in Icelandic nouns. Following the discussion in the previous section, the model which will be proposed is that facts associated with gender originate at the nominalizer (cf. Kramer 2014) and are copied onto nInfl via concord (Norris 2012). In contrast, there are no proper class features in the system. The notion class is simply a way to refer to a set of roots whose identities are associated with certain realization patterns. Thus, the locus of class facts are at the root, cf. Embick (2000:188) and Embick and Halle (2005), whereas gender facts are distributed between *n* and nInfl.

(297)



Let us consider the consequences of this view. We will focus on nouns where the exponent of the nominalizer is  $\emptyset$  because these are the only cases which allow nInfl and the root to interact. In such a situation, the same nInfl morpheme can have two distinct phonological exponents depending on the identity of the root and this kind of a fact is associated with the notion “declension class”. The following exemplifies a noun in the strong masculine declension, *armur* ‘arm’ and another one in the weak masculine declension *kassi* ‘box’.

(298) a. arm-ur ‘arm’ MASC.NOM.SG

b. kass-i ‘box’ MASC.NOM.SG

In the present system, the Vocabulary Items which realize the strong and the weak declension do so by making reference to the identity of the roots in question. For example, we can state a list of roots which are used with the strong suffix *-ur* and make the weak *-i* the default as follows.

- (299) a.  $\text{nInfl}[\text{MASC},\text{NOM},\text{SG}] \leftrightarrow -ur / \{\sqrt{\text{ARM}}, \sqrt{\text{HORSE}}, \sqrt{\text{PLAY}}, \dots\} \wedge \_$   
 b.  $\text{nInfl}[\text{MASC},\text{NOM},\text{SG}] \leftrightarrow -i$

For the purpose of the derivation, being a strongly inflected noun is in this case a matter of belonging to the set of roots which trigger the strong suffix. We could introduce a notion of, say, CLASS-IV on the root in order to make the set reusable as in (300), but then CLASS-IV is then simply a notation to associate a set of roots with a certain contextual realization of nInfl.

- (300)  $\text{nInfl}[\text{MASC},\text{DAT},\text{SG}] \leftrightarrow -ur / [\text{CLASS-IV}] \wedge \_$

I will not make use of such class features but the notion declension class will be derived by assuming that sets like  $\{\sqrt{\text{ARM}}, \sqrt{\text{HORSE}}, \sqrt{\text{PLAY}}, \dots\}$  are reusable in the grammar. Thus, even if these Vocabulary Items do not make reference to features along the lines CLASS-IV, the system allows for systematic correlations between nouns which take a particular nominative nInfl exponent and a particular accusative exponent.

Roots are assumed to be licensed in terms of the features on the closest category-defining head, including gender (Kramer 2014).<sup>8</sup> The root  $\sqrt{\text{LAND}}$  ‘country, land,

<sup>8</sup>See Harley and Noyer (1999, 2000) on the general idea that roots are licensed by their context.

etc.’ is compatible with neuter, masculine and feminine nominalizers. Importantly, the different genders correlate with different members of the polysemy set of  $\sqrt{\text{LAND}}$ .

- (301) a. land- $\emptyset$  ‘country’ NEUT.NOM.SG (strong neuter declension)  
 b. land-i ‘compatriot’ MASC.NOM.SG (weak masculine declension)  
 c. lönd-un- $\emptyset$  ‘unloading (of fish) onto land’ FEM.NOM.SG (fem. nmlz. *-un*)

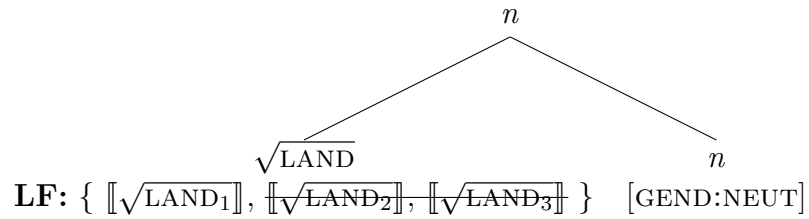
Here, the last interpretation ‘unloading (of fish) onto land’ corresponds to the verb *landa* ‘to unload (fish) onto land’. Nouns whose phonological exponent of *n* is *-un* often correspond to verbs in a parallel manner. I will nevertheless assume for the present purpose that this noun is root-derived and not verb-derived, partly because *un*-nouns do not entail the existence of a corresponding verb. For example, *ogun* is used for ‘conjunction’, from *og* ‘and’, but I do not believe that a verbal form ??*oga* ‘intended: to conjoin’ is generally available in Icelandic. The system is of course compatible with the view that *v* and the feminine nominalizer pick out the same member of the polysemy set.

We can formalize the polysemy set as  $\{\llbracket\sqrt{\text{LAND}}_1\rrbracket, \llbracket\sqrt{\text{LAND}}_2\rrbracket, \llbracket\sqrt{\text{LAND}}_3\rrbracket\}$  where the respective denotations are realized as follows at LF.

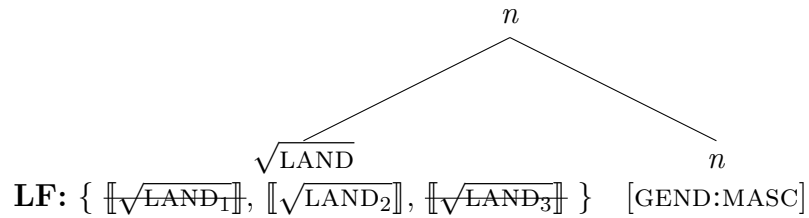
- (302) a.  $\llbracket\sqrt{\text{LAND}}_1\rrbracket = \lambda x . \text{country}(x)$   
 b.  $\llbracket\sqrt{\text{LAND}}_2\rrbracket = \lambda x . \text{compatriot}(x)$   
 c.  $\llbracket\sqrt{\text{LAND}}_3\rrbracket = \lambda e . \text{unloading-of-fish}(e)$

Phase heads are the locus of subset operations over denotations in polysemy resolution and this is demonstrated below for the LF of the words under discussion.

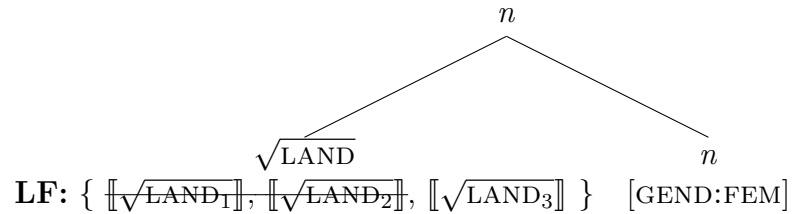
(303) a.



b.



c.



If members of the polysemy set are distinguished by features of the context whereas the notion of declension class is simply associated with the identity of the root, gender features on  $n$  should have a different effect on interpretation than class membership. Empirically, we predict that gender, but not declension class, can distinguish members of polysemy sets. The table in (304) shows cases of polysemy which is resolved by gender features.

## (304) Gender distinguished polysemy sets

át	N.ST. ‘act of eating’	át-a	F.WK ‘krill, food’
bit	N.ST. ‘bite, act of biting’	bit-i	M.WK ‘piece to be eaten’
fat	N.ST. ‘dish, container’	fat-a	F.WK ‘bucket’
flug	N.ST. ‘flight’	flug-a	F.WK ‘fly’
fóstr-i	M.WK ‘foster father’	fóstr-a	F.WK ‘foster mother’
hol	N.ST. ‘cavity’	hol-a	F.WK ‘hole’
hringl	N.ST. ‘jingling, rattling’	hringl-a	F.WK ‘rattle (toy)’
kis-i	M.WK ‘cat (male)’	kis-a	F.WK ‘cat (female)’
kærast-i	M.WK ‘boyfriend’	kærast-a	F.WK ‘girlfriend’
land	N.ST. ‘country’	land-i	M.WK ‘compatriot’
mjón-i	M.WK ‘thin man’	mjón-a	F.WK ‘thin woman’
nafn	N.ST. ‘name’	nafn-i	M.WK ‘namesake (man)’
		nafn-a	F.WK ‘namesake (woman)’
skrið	N.ST. ‘crawl’	skrið-ur	M.ST. ‘forward movement’
		skrið-a	F.ST. ‘landslide’
slag	N.ST. ‘blow, beat’	slag-ur	M.ST. ‘fight’
stað-a	F.WK ‘position, situation’	stað-ur	M.ST. ‘place, location’

The entries in the table, all shown in the nominative singular, indicate whether the gender of the noun is N(euter), M(asculine), or F(eminine) as well as whether the declension follows a weak (WK) or a strong (ST) pattern. In each case, a different member of the polysemy set correlates with a different gender.

For our examples with the root  $\sqrt{\text{LAND}}$ , the different interpretations also correlate with a different realization at PF. A rough sketch of the relevant Vocabulary Items is given below. The nInfl morphemes which have received gender via concord get a gender-specific realization. Their exponents might also in principle be conditioned by adjacent roots although such conditions are not posited here. Furthermore, the feminine nominalizer is realized as *-un* in the context of  $\sqrt{\text{LAND}}$  and some other roots.

- (305) a. nInfl[NEUT,NOM,SG] ↔ -∅  
 b. nInfl[MASC,NOM,SG] ↔ -i  
 c. n[FEM] ↔ -un / {√LAND, ...}^\_

The model also permits that the same root interpretation can be compatible with more than one gender. This results in gender distinguished synonymy pairs of the following type – a form of morphological variation along the gender dimension.

(306) Gender distinguished synonymy pairs

hóst	N.ST ‘cough’	hóst-i	M.WK ‘cough’
krap	N.ST ‘slush’	krap-i	M.WK ‘slush’
starf	N.ST ‘job’	starf-i	M.WK ‘job’
brund	N.ST ‘sperm’	brund-ur	M.ST ‘sperm’
hald	N.ST ‘handle’	hald-a	F.ST ‘handle’
astm-a	N.WK ‘asthma’	astm-i	M.WK ‘ashtma’
vodk-a	N.WK ‘vodka’	vodk-i	M.WK ‘vodka’
gang-a	F.WK ‘walk’	gang-ur	M.ST ‘walk’
fjöld	F.ST ‘crowd’	fjöld-i	M.WK ‘crowd’
slóð	F.ST ‘path’	slóð-i	M.WK ‘path’

In all of the above examples, we have roughly synonymous pairs of forms, at least in a truth conditional sense, and the two nouns of each pair show a different gender.

Thus, the only thing which is being distinguished here from the point of view of the grammar are two morphological variants of the same noun.<sup>9</sup>

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<sup>9</sup>For some of these pairs, there might be cases of polysemy in addition to the synonymy relationship. For example, Eiríkur Rögnvaldsson (p.c.) points out to me that neuter *slóð* ‘path’ can be used in the sense ‘leave a trail’ but the masculine *slóði* ‘path’ is not available for this special meaning. Such facts are compatible with the theory because gender is expected to have the ability to distinguish members of polysemy sets.



Furthermore, roots can show accidental homophony which is distinguished by gender. For example, the strong declension neuter noun *klak* ‘hatching’ has the same root form as weak declension masculine noun *klaki* ‘ice’. A few examples of this type are shown in the table below.

(307) Gender distinguished accidentally homophonous roots

klak	N.ST ‘hatching’	klak-i	M.WK ‘ice’
pakk	N.ST ‘rabble’	pakk-i	M.WK ‘package’
ár	N.ST ‘year’	ár-i	M.WK ‘devil’
grip	N.ST ‘hold’	grip-ur	M.ST ‘object, cattle’
verk	N.ST ‘task’	verk-ur	M.ST ‘pain’
gat	N.ST ‘opening’	gat-a	F.WK ‘street’
sag	N.ST ‘sawdust’	sag-a	F.WK ‘story’
skeið	N.ST ‘period’	skeið	F.ST ‘spoon’
sult-a	F.WK ‘jam’	sult-ur	M.ST ‘hunger’
fán-a	F.WK ‘fauna’	fán-i	M.WK ‘flag’

In cases of accidental homophony between roots, I assume that they are in fact two distinct roots. There is a root  $\sqrt{\text{HATCHING}}$  and another root  $\sqrt{\text{ICE}}$  and they simply happen to be realized with the same phonological material. It is of course not trivial to define accidental homophony in any precise way but I believe that for the time being it is reasonable to attempt to develop theories of polysemy and homophony using our best guesses of which meanings are closely related and which meanings are unrelated. Hopefully, future developments in psycholinguistic and neurolinguistic experiments will provide a more stable ground for research in this area.

The types of gender distinctions which have been presented will now be compared with distinction by declension class in cases where the gender is the same. If access to interpretations of the root is determined by gender features on nominal-

izers, we expect to find synonymy pairs which are distinguished by declension class only. This is indeed the case.

(308) Declension class distinguished synonymy pairs

auðn-a	F.WK ‘wasteland’	auðn	F.ST ‘wasteland’
drang-i	M.WK ‘pillar of rock’	drang-ur	M.ST ‘pillar of rock’
hug-i	M.WK ‘mind’	hug-ur	M.ST ‘mind’
strák-i	M.WK ‘boy’	strák-ur	M.ST ‘boy’
mann-i	M.WK ‘man’	mað-ur	M.ST ‘man’
sál-a	F.WK ‘soul’	sál	F.ST ‘soul’
tékk-i	M.WK ‘check’	tékk-ur	M.ST ‘check’
þúst-a	F.WK ‘hummock’	þúst	F.ST ‘hummock’

These pairs have the same gender each and they are truth conditionally equivalent, differing sometimes in stylistic value which we propose is handled at a different linguistic level. In all cases, the noun on the left is in the so-called weak declension whereas the noun on the right is in the strong declension. As for the synonymy pairs above, the only thing which is being distinguished here from the point of view of the grammar are two morphological variants of the same noun.

For completeness, declension class can also distinguish accidentally homophonous roots just as gender does. A number of examples of this type are shown in the following table.

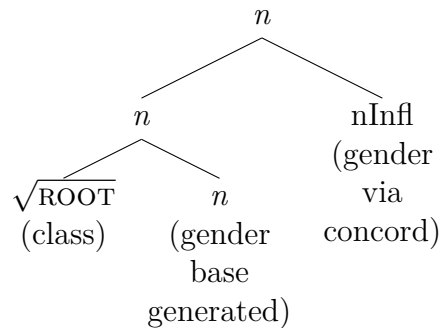
(309) Declension class distinguished accidentally homophonous roots

arf-i	M.WK	‘chickweed’	arf-ur	M.ST	‘inheritance’
bol-i	M.WK	‘bull’	bol-ur	M.ST	‘t-shirt’
hag-i	M.WK	‘pasture’	hag-ur	M.ST	‘finances, advantage’
hjall-i	M.WK	‘ridge’	hjall-ur	M.ST	‘hovel’
kálf-i	M.WK	‘calf (of the leg)’	kálf-ur	M.WK	‘calf (animal)’
lund-i	M.WK	‘puffin’	lund-ur	M.ST	‘grove’
hirð-a	F.WK	‘orderliness’	hirð	F.ST	‘court’
jón-a	F.WK	‘joint’	jón	F.ST	‘ion’
lend-a	F.WK	‘land’	lend	F.ST	‘loin’
mynt-a	F.WK	‘mint’	mynt	F.ST	‘coin’

For example, *arfi* ‘chickweed’ is in the weak masculine declension but *arfur* in the strong masculine declension. As with similar gender distinctions, these are assumed to be manifestations of distinct roots,  $\sqrt{\text{CHICKWEED}}$  and  $\sqrt{\text{INHERITANCE}}$ , respectively.

Recall, now, the hypothesis that the notion of class involves root identity and that gender originates on  $n$  but is copied onto nInfl via concord.

(310)



Furthermore, because the features of  $n$  determine the range of available root interpretations in polysemy resolution, class is not predicted to be involved in polysemy.

If we have a masculine nominalizer which is realized as  $-\emptyset$ , this exponent should be pruned away at PF, and thus class-sensitive vocabulary insertion for nInfl will take

place when the representation has the root and nInfl concatenated. Note that this rendering presupposes that concord precedes the pruning of *n* in the PF derivation.

(311)  $\sqrt{\text{ROOT}} \wedge \text{nInfl}[\text{M}]$

This system makes the interesting prediction that declension class, unlike gender, should not distinguish polysemy sets. Vocabulary Insertion for root-adjacent nInfl simply sees the identity of the root and its own features. Therefore, in order to maintain two declension classes for a homophonous root without a gender distinction, the speaker would have to posit two distinct roots. I would like to argue that positing two roots for what is essentially polysemy is not impossible, but rather rare and often historically unstable.

It is difficult to find good examples of the relevant type but in a large database<sup>10</sup> of nouns, the nouns in (312) were found to be the prime candidates for polysemy sets distinguished by declension class.

(312) Are there any cases of declension class distinguished polysemy sets?

hlut-i	M.WK ‘part’	hlut-ur	M.ST ‘part, object’
munni-i	M.WK ‘orifice, mouth of a cave’	munni-ur	M.ST ‘mouth’
beit-a	F.WK ‘bait’	beit	F.ST ‘pasture, grazing’

These nouns may or may not be actual cases of class distinguished polysemy. For example, it is possible that *hluti* vs. *hlutur* involves two roots,  $\sqrt{\text{PART}}$  and  $\sqrt{\text{OBJECT}}$ , the first of which involves class distinguished synonymy and the latter of which is

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<sup>10</sup>The dataset was derived from the Database of Modern Icelandic Inflection (Bjarnadóttir 2013) and the Tagged Icelandic Corpus (Helgadóttir et al. 2012).

only realized as *hlutur*. The noun *munni* is nearly always used in the sense ‘mouth of a cave’ and often as part of the compound *hellis-munni* ‘lit. cave-mouth’. It is plausible that these are stored as separate roots in the brain. The pair  $\sqrt{\text{BAIT}}$  vs.  $\sqrt{\text{PASTURE}}$  is also in a gray area between polysemy and two distinct roots.

Another revealing example involves the noun *hringur* ‘circle, jewelry’. There is a tendency for the plural of this noun to follow one declension pattern when the meaning is ‘circle’ (313) and another declension pattern when the meaning is ‘jewelry’ (314) and therefore it is a prima facie counterexample against the hypothesis that declension class by itself does not distinguish between members of a polysemy set – the two meanings seem closely related.

(313)			‘circle (shape)’		(314)			‘ring (jewelry)’
	SG	NOM	hring-ur			SG	NOM	hring-ur
		ACC	hring-∅				ACC	hring-∅
		DAT	hring-∅				DAT	hring-∅
		GEN	hring-s				GEN	hring-s
		PL	NOM			PL	NOM	hring- <u>ar</u>
		ACC	hring- <u>i</u>				ACC	hring- <u>a</u>
		DAT	hring- <u>jum</u>				DAT	hring- <u>um</u>
		GEN	hring- <u>ja</u>				GEN	hring- <u>a</u>

However, as predicted by the current theory, this situation is very unstable and there is plenty of variation in whether or not the two pattern as the tendency for usage is sometimes described. Anecdotally, it took the author of this text three attempts to get the two patterns “right”, even when carefully constructing the paradigms as careful written language. This is consistent with the view that when speakers try

to treat the two senses of *hringur* as a case of polysemy, they tend to mix up the declension patterns and variability ensues.

To give some examples from a corpus, I believe the tendency would be for the ‘rings of Saturn’ to follow the non-jewelry pattern but the Tagged Icelandic Corpus (Helgadóttir et al. 2012) has both the ‘jewelry’ interpretation (315) and the ‘rings of Saturn’ interpretation (316) in both plural declension patterns.

- (315) a. *að djúpt í hafi undir íshellu í grænni lautu myndu finnast*  
 that deep in ocean under ice shelf in green hollow would be found  
*hring-ar tveir, hvor um sig með X laga demanti*  
 rings-NOM.PL two, each by itself with X shaped diamond  
 ‘... that deep down in the ocean under a shelf of ice, in a green hollow, two rings would be found, each with an X-shaped diamond ...’
- b. *Út úr böggjunum flóðu skartgripir, hring-ir, armbönd, demantar,*  
 out of packages flowed jewelry, rings-NOM.PL, bracelets, diamonds,  
*hálsmen og gullúr.*  
 necklaces and gold watches  
 ‘Out of the packages, there was a flow of jewelry, rings, bracelets, diamonds, necklaces and gold watches.’
- (316) a. *Ef til vill mundu að lokum myndast hring-ar um jörðina*  
 perhaps would in end form rings-NOM.PL around Earth  
*svipað og á Satúrnusi*  
 similar and on Saturn  
 ‘Perhaps, rings would finally form around Earth similar to Saturn ...’
- b. *Hring-ir Satúrnusar eru vitaskuld helsta einkenni þessarar*  
 rings-NOM.PL of Saturn are naturally prime characteristic of this  
*mikilfenglegu reikistjörnu*  
 great planet  
 ‘The rings of Saturn are of course the prime characteristic feature of this great planet ...’

Further support for the proposal that class distinguished polysemy is unstable comes from the fact that most potential cases in the dictionary involve words which are archaic or associated with old poetry. Some examples are shown in (317) where only

one or neither of the two relevant nouns are part of modern everyday language. Archaic nouns which almost no young and/or living speakers are likely to know without using a dictionary are marked with †.

(317) Archaic/poetic class distinguished polysemy sets

†bamb-i	M.WK	‘large belly’	†bamb-ur	‘large container’
†bark-i	M.WK	‘small boat’	†bark-ur	‘large boat’
†eim-i	M.WK	‘fire’	eim-ur	‘steam, smoke’
†garð-i	M.WK	‘partition (wall)’	garð-ur	‘wall’

Finally, it is worth noting that the strong feminine *sjón* ‘vision, sight’ and weak feminine *sjóna* ‘retina’ is another case where an apparent manifestation of class distinguished polysemy seems to be historically unstable. In the development of this study, the pair was originally listed as a synonymy pair under the ‘vision, sight’ interpretation but Eiríkur Rögnvaldsson (p.c.) made me aware of the fact that according to the Icelandic dictionary, the latter form means ‘retina’, while, crucially, the two meanings tend to be mixed up by speakers (such as myself).

If the analysis in this section is on the right track, we can propose a generalization for disambiguation of contextual polysemy.

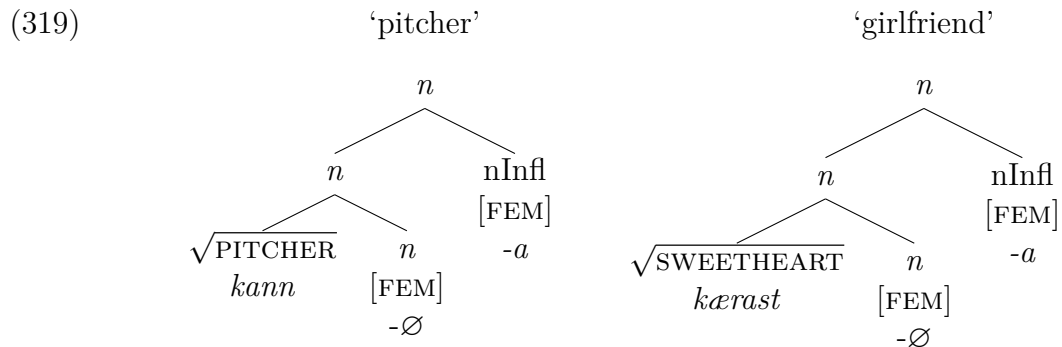
(318) **Contextual Polysemy Generalization**

True polysemy disambiguation requires feature distinctions in the context of the root. Class features and any other aspects of the root itself do not distinguish members of polysemy sets.

According to (318), the only way for a speaker to maintain a distinction between members of a polysemy set strictly for the purpose of declension class is to posit

distinct roots. In such a situation there is a cognitive pressure to either drop one of patterns or unify them. If true, we have pinpointed one way in which the notion of declension class is qualitatively different from grammatical gender because gender seems to easily keep related meanings apart.

The interpretation of the nominalizer itself is also contextually determined. As discussed by Kramer (2009, 2014, 2015), gender is sometimes arbitrary and sometimes interpretable. For example, the Icelandic nouns *kanna* ‘pitcher’ and *kærasta* ‘girlfriend’ are both in the weak feminine declension but it is reasonable to believe that only the latter has interpretable gender. The noun for ‘girlfriend’ contrasts with the masculine noun *kærasti* ‘boyfriend’.<sup>11</sup>



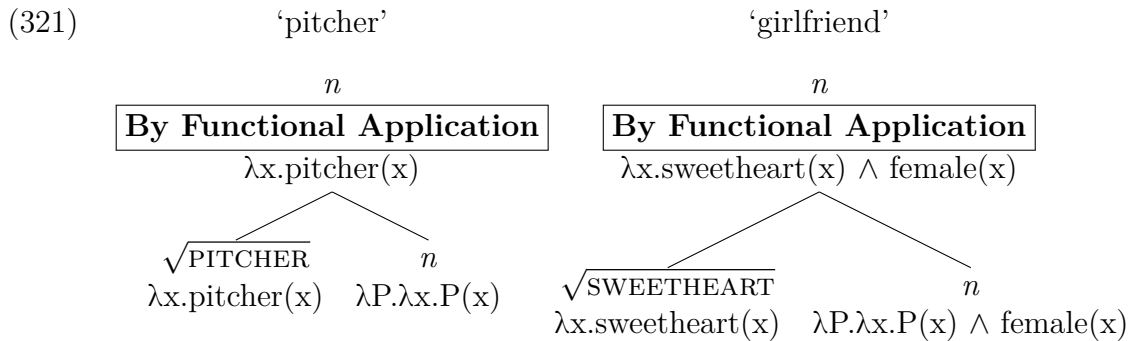
In both cases, the gender feature originates on *n* and is copied onto the nominal inflection nInfl via the concord mechanism at PF. Contextual allosemy realizes the nominalizer at LF such that it contributes natural gender to the truth conditions in the context of certain roots.

<sup>11</sup>I will not treat the root *kærast-* √SWEETHEART as morphologically complex for the purpose of this demonstration even if it derives (at least historically) from the superlative of *kær* ‘dear’ in which *-ast* represents the superlative morphology.



- (320) a.  $\llbracket \mathbf{n} \langle \text{GEND}, \text{FEM} \rangle \rrbracket = \lambda P_{\langle e, t \rangle}. \lambda x. P(x) \wedge \text{female}(x) / \_ \{ \sqrt{\text{SWEETHEART}}, \dots \}$   
 b.  $\llbracket \mathbf{n} \langle \text{GEND}, \text{MASC} \rangle \rrbracket = \lambda P_{\langle e, t \rangle}. \lambda x. P(x) \wedge \text{male}(x) / \_ \{ \sqrt{\text{SWEETHEART}}, \dots \}$   
 c.  $\llbracket \mathbf{n} \rrbracket = \lambda P_{\langle e, t \rangle} . \lambda x . P(x)$

The Meaning Items (MIs) state that a feminine interpretation should be inserted for a feminine gender feature in the context of roots like  $\sqrt{\text{SWEETHEART}}$  but the elsewhere nominalizer is realized at LF as the identity function. The following derivations show how our two example nouns are derived in the semantics.



This approach in terms of contextual allosemy differs from Kramer who makes use of the notions interpretable and uninterpretable features. Here, an interpretable feature simply corresponds to a feature which an MI makes reference to. This idea is obviously closely related to the usual distinction between interpretable and uninterpretable features but it allows us to restrict the formal consequences of the distinction to the LF computation, thus keeping the formal mechanism of syntax simple in the relevant respect. Languages differ greatly in their use of interpretable and arbitrary gender. Icelandic gender is predominantly arbitrary whereas for example Amharic and Spanish make substantial use of interpretable gender (Kramer 2015).

Although English does not have declension classes, it is likely that other root-specific idiosyncracies should follow the Contextual Polysemy Generalization. Consider, for example, the variable pronunciation of the noun *data* which sometimes has the vowel /eɪ/ and sometimes /æ/. While an analysis along the present lines correctly allows for variable use of the two forms, we would not expect them to pick out different members of a polysemy set because the variants presumably do not correlate with any syntacticosemantic feature distinctions in the context of the root. As far as I am aware, this is borne out, although this extension to English is only presented as a preliminary suggestion.

### 5.3.5 Section summary

This section has proposed an analysis of morphological locality in which linear adjacency is important. The Bidirectional Linear Adjacency Constraint (BLAC) was proposed as a generalization which constrains the process of Vocabulary Insertion. I discussed examples from the Icelandic nominal inflection in support of the BLAC, focusing on the lack of VI interactions between the root and some morpheme Y in the linear configuration  $\sqrt{\text{ROOT}}\text{-X-Y}$  in which another morpheme X intervenes. I discussed how the mechanism of concord seemingly allows features to be distributed around the noun phrase at long distances but I argued that this process is in fact quite restricted. Furthermore, I investigated the difference between gender and declension class, suggesting that the former is associated with the nominalizer but

the latter with the root. Finally, I proposed a Contextual Polysemy Generalization stating that there must be some feature distinction in the context of a root to disambiguate polysemy; the features associated with the root itself like “class” do not suffice for this purpose.

## 5.4 Morphophonology

### 5.4.1 Terminology and empirical generalization

The section considers how PF interactions which involve readjustment to a phonological representation are local to the morpheme where the triggering environment is expressed. The generalizations under investigation make use of the terms Morphological reference (M-reference) and Phonological reference (P-reference).

(322) **M-reference:**

Reference to a morpheme as a morpheme, e.g., referring to a feature of a morpheme like [MASC] or the identity of a root like  $\sqrt{\text{SING}}$ .

(323) **P-reference:**

Reference to a phonological environment, e.g., referring to a “phonological pause” or “the vowel of the preceding syllable”.

For reasons that will become clear, I am focusing on the type of reference that is made to the trigger and the target of an alternation instead of the type of an adjustment that is made to the phonological representation. The distinction between

M-reference and P-reference is important because stem-oriented theories without morphemes do not have any natural way of expressing locality in terms of M-reference. In the present theory, surface interactions between morphemes at PF are hypothesized to be constrained by the Morpheme Interaction Conjecture (MIC) (Embick 2013b):

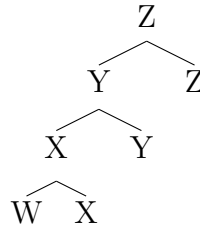
(324) **Morpheme Interaction Conjecture (MIC):** PF Interactions in which two morphemes are referred to by M-reference (as morphemes) occur only under linear adjacency (concatenation).

The MIC can be thought of as a potential refinement of the Bidirectional Linear Adjacency Constraint (BLAC) from above which covers not only Vocabulary Insertion but also phonological readjustments. The MIC requires that any morpheme-specific process has to be able to see the morpheme in question at the level of concatenation.

The cases which are crucially affected involve the situation when both the trigger and the target of an alternation are accessed by M-reference. We refer to such effects as M/M effects. They will be contrasted with effects in which only the trigger is accessed by M-reference but the target by P-reference, i.e., M/P effects.

I follow Shwayder (2015:242) in assuming that the relevant difference between M/M effects and M/P effects is a result of the two applying at distinct stages of the derivation. A structure like the following is first converted into a set of concatenation statements and then chained together. M/M effects apply at the concatenation stage and M/P effects at the chaining stage.

(325)



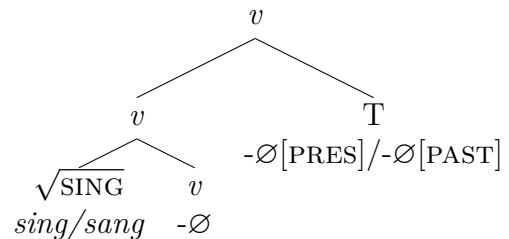
Concatenation stage:  $W \frown X, X \frown Y, Y \frown Z$

Chaining stage: W-X-Y-Z

At the concatenation stage, pairs of morphemes are connected with their adjacent neighbors in the word whereas the chaining stage is a phonological string in which all the morphemes have been connected together. Because M/P effects apply at the level of a phonological representation, they are hypothesized to be subject to phonological rather than morphological locality conditions.

The English alternation between *sing* and *sang* is an example of a morphophonological readjustment in which both trigger and target must be referred to as morphemes, an M/M effect.

- (326) a. *sing* [PRES]  
b. *sang* [PAST]



The trigger does not include any phonologically motivated triggering environment; it involves  $-\emptyset$  exponents of T(ense) which realize the syntacticosemantic features for the present and past tense. Therefore, we have M-reference to the trigger. It is also not the case that all English verb roots with /i/ in the present are realized

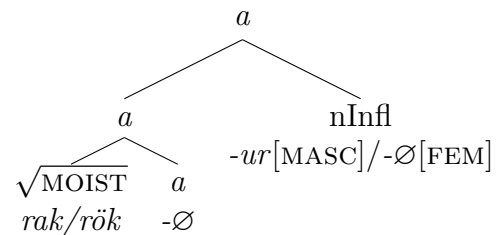
with an /a/ in the past tense. For example, the verb *ping* as in ‘ping the server’ is *ping-ed* in the past tense and not \**ping*. The details of the analysis of this effect are not important here; the point is that the process must make reference to the identity of the root  $\sqrt{\text{SING}}$ , hence the target is also accessed by M-reference. If the MIC is on the right track, such an M/M effect can only take place if the trigger and target, here T[PAST] and  $\sqrt{\text{SING}}$ , are linearly adjacent.

The Icelandic *u*-umlaut is an example of an alternation which is superficially similar to the English alternation *sing/sang*. The phenomenon involves an alternation between an underlying /a/ and /ö/ and in many cases, there is no synchronic motivation for the process in the phonology. For example, the nominal inflection exponent  $-\emptyset$  [FEM,NOM,SG] is a trigger in adjectives as demonstrated by ‘moist’ below. Note that in this adjective, the category-defining head is unpronounced.

(327) ‘moist’

a. rak-ur [MASC,NOM,SG]

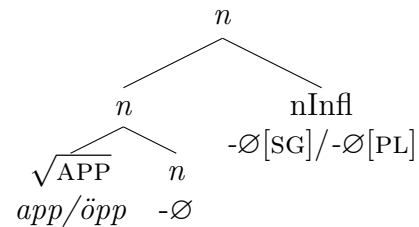
b. rök- $\emptyset$  [FEM,NOM,SG]



As in the case of English *sing/sang*, locality does not tell us whether the umlaut in *rök- $\emptyset$*  ‘moist’ makes morphological reference to the target of the alternation or not. The alternation as attested in this word is in principle analyzable either as suppletive allomorphy or as a phonological readjustment which makes morpheme-specific reference to the trigger. However, the Icelandic umlaut is different from the

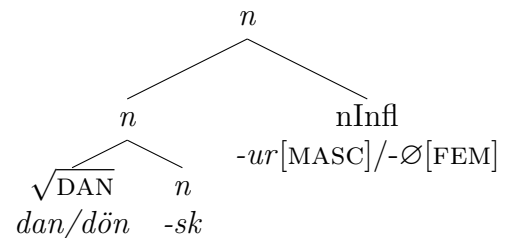
English case in being productive such that it is automatically extended to novel targets, given a productive trigger. For example,  $-\emptyset$  [NEUT,NOM,PL] is a trigger.

- (328) ‘app (as in smartphone app)’  
 a. app- $\emptyset$  [NEUT,NOM,SG]  
 b. öpp- $\emptyset$  [NEUT,NOM,PL]



The productivity of the umlaut strongly suggests that the process does not refer to its target as a morpheme, even if it is allowed to do that when the trigger and target are adjacent. More importantly – and this is the crucial observation – the umlaut is morpheme-skipping if the intervening morpheme is not syllabic. The nationality suffix *-sk* ‘-ish’ is an example of a phonological exponent which the umlaut can apply through.

- (329) ‘Danish’  
 a. dan-sk-ur [MASC,NOM,SG]  
 b. dön-sk- $\emptyset$  [FEM,NOM,SG]



According to the MIC, the fact that the umlaut can apply through another morpheme is a sign that this is an M/P effect rather than an M/M effect. It is an important aspect of this section that sometimes locality can reveal what type of an effect we are looking at.

## 5.4.2 M/M effects – Icelandic verb roots and linear intervention

Wood (2012:127–129) observes a contrast in Icelandic verb inflection. The root allomorphy of a transitive verb may vary according to the features of T (tense, mood and number) when T is linearly adjacent to the root ( $\sqrt{\text{ROOT-T}}$ ). When an anticausative intransivizing morpheme  $-n(a)$  intervenes between the  $\sqrt{\text{ROOT}}$  and T, root allomorphy is unattested ( $\sqrt{\text{ROOT-}n(a)\text{-T}}$ ).

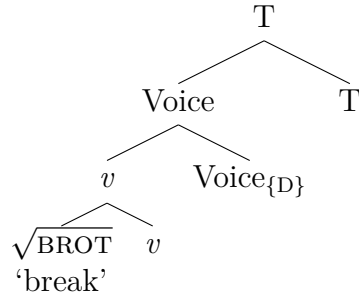
The root  $\sqrt{\text{BROT}}$  ‘break’ is by default realized as *brot*. In the 1st person, present, singular, indicative, the orthographic form is *brýtt*, pronounced [prít]. Wood (2015) gives the  $T_{\text{PRES}}$  Vocabulary Item in (330) and PF derivation in (331) to illustrate how the alternation between /o/ and /i/ is implemented in his system.

(330)  $T_{\text{PRES}} \leftrightarrow /i/_F/ \sqrt{\text{BROT}} \hat{\ } \_$

This  $T_{\text{PRES}}$  exponent includes what Wood considers a “floating vowel”, indicated by /i/\_F. In the present discussion this can be viewed as a morpheme-specific diacritic which triggers a phonological process in certain environments.



(331) a.



- b.  $\sqrt{\text{BROT}} \wedge v, v \wedge \text{Voice}_{\{D\}}, \text{Voice}_{\{D\}} \wedge T_{\text{PRES}}$  (Concatenation)
- c.  $\sqrt{\text{BROT}} \wedge [v, \emptyset], [v, \emptyset] \wedge \text{Voice}_{\{D\}}, \text{Voice}_{\{D\}} \wedge T_{\text{PRES}}$  (Vocab. Insertion)
- d.  $\sqrt{\text{BROT}} \wedge \text{Voice}_{\{D\}}, \text{Voice}_{\{D\}} \wedge T_{\text{PRES}}$  (Pruning)
- e.  $\sqrt{\text{BROT}} \wedge [\text{Voice}_{\{D\}}, \emptyset], [\text{Voice}_{\{D\}}, \emptyset] \wedge T_{\text{PRES}}$  (Vocabulary Insertion)
- f.  $\sqrt{\text{BROT}} \wedge T_{\text{PRES}}$  (Pruning)
- g.  $\sqrt{\text{BROT}} \wedge [T_{\text{PRES}}, /i/F]$  (Vocabulary Insertion)
- h.  $\sqrt{\text{BRÝT}}$  (IPA = [pɹit]) (Chaining)

The effect is an M/M effect because it needs to make M-reference to both trigger and target. Just like English *sing/sang*, it is not a general process which applies across all verbs.

The following tables show how the form of the root varies based on T in the indicative (332) and in the subjunctive (333) when the verb *brjóta* ‘to break’ is used as a transitive. Note that /t/ in *braust* is deleted phonologically.

(332)	PRES		PAST	
	SG	PL	SG	PL
1	brýt-∅	brjót-um	braut	brut-um
2	brýt-ur	brjót-ið	brau(t)-st	brut-uð
3	brýt-ur	brjót-a	braut	brut-u

(333)	PRES		PAST	
	SG	PL	SG	PL
1	brjót-i	brjót-um	bryt-i	bryt-um
2	brjót-ir	brjót-ið	bryt-ir	bryt-uð
3	brjót-i	brjót-i	bryt-i	bryt-u

The T-conditioned root allomorphy we find is diverse. The forms of the root  $\sqrt{\text{BREAK}}$  include *brýt*, *brjót*, *braut*, *brut*, and *bryt*. Contrast this situation with the intransitive where Voice has an overt phonological exponent *-n* and the root is invariably *brot*.

(334)	PRES			PAST	
	SG	PL		SG	PL
	1	brot-na	brot-n-um	brot-n-aði	brot-n-uðum
	2	brot-n-ar	brot-n-ið	brot-n-aðir	brot-n-uðuð
	3	brot-n-ar	brot-n-a	brot-n-aði	brot-n-uðu

(335)	PRES			PAST	
	SG	PL		SG	PL
	1	brot-n-i	brot-n-um	brot-n-aði	brot-n-uðum
	2	brot-n-ir	brot-n-ið	brot-n-aðir	brot-n-uðuð
	3	brot-n-i	brot-n-i	brot-n-aði	brot-n-uðu

The important point here is that the allomorphy contrast between transitive and intransitive  $\sqrt{\text{BREAK}}$  is consistent with the hypothesis that conditions on contextual allomorphy require linear adjacency; *-n(a)* is a linear intervener and blocks M/M effects between T and the root.

Wood (2015:126) notes that there is only one systematic exception to the generalization that stem adjustments cannot be triggered across the *-n(a)* exponent of Voice. This is the *u*-umlaut process which is triggered by certain exponents of T when the underlying root vowel is /a/ as shown for the intransitive indicative paradigm of *batna* ‘improve’ in (336).

(336)	PRES		PAST		
	SG	PL	SG	PL	
	1	bat-n-a	böt-n- <b>um</b>	bat-n-aði	böt-n- <b>uðum</b>
	2	bat-n-ar	bat-n-ið	bat-n-aðir	böt-n- <b>uðuð</b>
3	bat-n-ar	bat-n-a	bat-n-aði	böt-n- <b>uðu</b>	

The inflection pattern of *batna* either means that the MIC should be abandoned or that this is a different type of an effect. The following section investigates the Icelandic *u*-umlaut in more detail and argues that it is an M/P effect which is subject to phonological rather than morphological locality.

### 5.4.3 M/P effects – Icelandic umlaut and morpheme skipping

Modern Icelandic has a process which is referred to as the *u*-umlaut, a modern reflex of a historical sound change. Many cases of this process can be described by a phonological rule like the following.<sup>12</sup>

#### (337) Icelandic umlaut (first version)

Realize underlying /a/ as /ö/ if there is a /u/ in the following syllable.

This description, which is in fact stated as a P/P effect, is largely surface true and it accounts for alternations like the following.

#### (338) ‘bar’

a. bar-Ø [MASC,NOM,SG]

b. bör-um [MASC,DAT,PL]

<sup>12</sup>I use Icelandic orthography here; /a/ and /ö/ are realized as [a] and [œ], respectively.

Here, the /u/ of the dative plural nInfl exponent can be assumed to be the trigger. An analysis of the umlaut process in this spirit is in fact proposed as an active phonological process by some analyses in the literature (e.g., Rögnvaldsson 1981) although details vary between authors depending on framework assumptions.<sup>13</sup> Apparent counterexamples have been explained away by proposing additional analytical tools. For example, underapplication with the masculine, singular, nominative exponent *-ur*, as shown below, has been explained by analyzing this exponent as underlyingly *-r*, the /u/ being derived by *u*-epenthesis at a derivationally later stage than the umlaut.

(339) ‘arm’

a. arm-ur [MASC,NOM,SG]

b. arm-Ø[MASC,ACC,SG]

c. örm-um [MASC,DAT,PL]

One issue with the epenthesis analysis is that it is not straightforward to motivate that *u* is generally used as an epenthesis vowel in Modern Icelandic even if that was the case at the time when the epenthesis process was an ongoing sound change. If we consider the way in which consonant clusters in loanwords are broken up we find

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<sup>13</sup>I will only give a brief overview of some of the crucial issues for the present purpose. There is a vast literature on the Icelandic *u*-umlaut, e.g., Valfells (1967); Anderson (1969); Orešnik (1977); Rögnvaldsson (1981); Kiparsky (1985); Gibson and Ringen (2000); Þráinsson (2011); Jurgec (2011); Lee (2011); Markússon (2012); Þorgeirsson (2012).

various strategies. For example, *Sri Lanka* is sometimes pronounced along the lines of *Siri Lanka* in Icelandic and a name with a word-initial velar nasal like *Ngugi* is likely to be pronounced *Engugi*. I am not aware of pronunciations like ??*Suri Lanka* or ??*Ungugi*.<sup>14</sup>

Another set of apparent counterexamples involve loanwords like *kaktus* ‘cactus’ but these are plausibly monomorphemic and hence not expected to undergo the umlaut if it is restricted to derived environments. The *u*-epenthesis rule and the restriction to derived environments serve to make the generalization in (337) surface true. Even if this is accepted as a valid approach, there are cases where the umlaut overapplies in the absence of a /u/-containing trigger. One such type of an example comes from overt *a* morphemes which yield a ‘covered with  $\sqrt{\text{ROOT}}$ ’ meaning.

(340) ‘grass’

- a. gras-Ø ‘grass’
- b. grös-ug-ur ‘covered with grass’
- c. grös-ótt-ur ‘covered with grass’

The underlying /a/ seen in the noun *gras* ‘grass’ surfaces as /ö/ when *-ug* follows, as expected, but also when this exponent is variably realized as *-ótt*. The overapplication is not memorized for this root as can be seen from the nonce root *nar-* which yields *nöróttur* ‘covered with nar’ but not \**naróttur*. At this point, the reader may be tempted to suggest that the trigger for the umlaut is any rounded back vowel.

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<sup>14</sup>Thanks to Kristján Árnason p.c. for discussing this matter with me.

However, /ó/ is not a trigger in general as shown by the truncating suffix -ó in words like *asn-ó* ‘stupid, silly’ as opposed to \**ösn-ó* derived from *asnalegur* ‘stupid, silly’.<sup>15</sup>

Moreover, certain phonological exponents which are realized as -∅ trigger the umlaut, including plural -∅ in the strong neuter declension.

- (341) a. barn-∅ ‘child’ [NEUT,NOM,SG]  
b. börn-∅ ‘children’ [NEUT,NOM,PL]

Although early analyses like Anderson (1969) analyzed such alternations by deleting an underlying /u/ in the nInfl exponent, loss of motivation for such a deletion rule has led later studies like Rögnvaldsson (1981) to assume that such cases of /u/-less triggers implicate morphology in some manner. Final /u/ does not in general delete in Icelandic. Of course, it is possible to invoke different flavors of /u/ as Anderson does or use floating features, but whatever trick is employed in this case, it serves no other purpose than to encode what is most straightforwardly a morphophonological triggering of the umlaut process. An analysis in terms of morpheme-specific phonology is also the only approach which explains the application of the umlaut with -ótt in (340). We thus introduce a version of the umlaut process which is an M/P effect.

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<sup>15</sup>The lack of an umlaut effect in *asnó* might be analyzed in terms of some special properties of truncation processes. The fact remains that there is no independent evidence that suggests that /ó/ is a phonological trigger for the *u*-umlaut; it only has that effect with -ótt for historical reasons. Thanks to Eiríkur Rögnvaldsson for comments on this issue.

(342) **Umlaut (morphophonology)**

Realize an underlying /a/ as /ö/ in the syllable which precedes the morpheme which triggers the umlaut.

This version covers all the cases. It requires each trigger to be learned on a morpheme-specific basis, but it makes a completely general P-reference to the targets. The analysis that the target is not morpheme-specific is motivated by the fact that the umlaut applies obligatorily to nonce words and loanwords as the following examples show. This obligatoriness holds in most umlaut environments – although see discussion below on exceptional variability.

(343) ‘wug’ (nonce word)

- a. nar-∅ [NEUT,NOM,SG]
- b. nör-um [NEUT,DAT,PL]
- c. \*nar-um [NEUT,DAT,PL]

(344) ‘iPad’ (loanword)

- a. iPad-∅ [MASC,NOM,SG]
- b. iPöd-um [MASC,DAT,PL]
- c. \*iPad-um [MASC,DAT,PL]

The productivity facts extend to cases where there is no /u/ in the trigger. This is shown for a -∅ trigger with a nonce word and a loanword below.

- (345) ‘wug’ (nonce word)
- a. nar-∅ [NEUT,NOM,SG]
  - b. nör-∅ [NEUT,NOM,PL]
  - c. \*nar-∅ [NEUT,NOM,PL]
- (346) ‘clan’ (loanword)
- a. klan-∅ [NEUT,NOM,SG]
  - b. klön-∅ [NEUT,NOM,PL]
  - c. \*klan-∅ [NEUT,NOM,PL]

The examples show that it is obligatory to apply the Umlaut in the plural forms *nör* ‘wugs’ and *klön* ‘clans (e.g., used for a group of players in an online role playing game like World of Warcraft)’. The fact that nonce words and loanwords undergo the Morphological Umlaut obligatorily with -∅ triggers strongly suggests that this is morphophonology of the M/P type rather than the M/M type. There does not appear to be anything morpheme-specific about the target here.

If we really want this to be an M/M effect, perhaps because we want to eliminate all cases of true morphophonology on the basis of theoretical parsimony, we might try to maintain that the Morphological Umlaut with nonce words and loanwords is some form of analogy. Analogy is a type of process which is recognized for language change in historical linguistics for phenomena which cannot be attributed to regular sound change. However, due to the facts which we attributed to the Morpheme



Interaction Conjecture (MIC) above, analogy can also be ruled out on the basis of examples where the Morphological Umlaut is morpheme-skipping. According to our findings regarding the BLAC above, analogy does not appear to skip morphemes.

Consider the nInfl exponent  $-\emptyset$  [FEM,NOM,PL] on adjectives. This is a concord morpheme which agrees with the head noun in the noun phrase and it triggers the Morphological Umlaut on the root of the adjective.

(347) ‘moist’

- a. rak-ur [MASC,NOM,SG]
- b. rök- $\emptyset$  [FEM,NOM,SG]
- c. \*rak- $\emptyset$  [FEM,NOM,SG]

The contrast between the masculine and the feminine above shows that it is clear where the locus of the alternation is even though it is associated with a  $-\emptyset$  exponent. Crucially for our purpose, the same exponent triggers the Morphological Umlaut through the *-sk* ‘-ish’ morpheme in nationality names like ‘Danish’:

(348) ‘Dan-ish’ (nonce word)

- a. dan-sk-ur [MASC,NOM,SG]
- b. dön-sk- $\emptyset$  [FEM,NOM,SG]
- c. \*dan-sk- $\emptyset$  [FEM,NOM,SG]

The alternation in ‘Danish’ shows that the Morphological Umlaut is morphophonology; it is an M/P effect rather than an M/M effect. Because of the BLAC, it is not

possible to analyze this alternation as contextual allomorphy. M-reference to the root is not available when the derivation is working on the nInfl morpheme. If we wanted to maintain this as an M/M effect, like English *sing/sang*, we would need to give up the MIC, and thus the empirical findings from above, where morphemic intervention appears to block the application of a phonological readjustment, would turn into a theoretical coincidence. Note that while some M/M effects may have consequences which look like phonology, for example *sing/sang*, there should be no effects which skip morphemes and look like suppletive allomorphy of the *go/went* type. The Umlaut effect is consistent with this because its effects on the target are most straightforwardly stated in terms of a phonological readjustment. The Morphological Umlaut is a phonological process triggered by a morpheme. The locality conditions which apply to it involve ‘the vowel of the preceding syllable’ and therefore it can skip non-syllabic morphemes like *-sk* ‘-ish’, unlike M/M effects.

Further confirmation comes from the fact that the Morphological Umlaut process is fully productive in morpheme-skipping scenarios in nonce words and loanwords. Let us make up the nationality root  $\sqrt{\text{KLAF}}$  and borrow  $\sqrt{\text{ASSAM}}$  from English.

(349) ‘Klaf-ish’ (nonce nationality word)

- a. klaf-sk-ur [MASC,NOM,SG]
- b. klöf-sk-∅ [FEM,NOM,SG]
- c. \*klaf-sk-∅ [FEM,NOM,SG]

(350) ‘Assamese’ (loan nationality word)

a. *assam-sk-ur* [MASC,NOM,SG]

b. *assöm-sk-Ø* [FEM,NOM,SG]

c. \**assam-sk-Ø* [FEM,NOM,SG]

The examples demonstrate that a  $\emptyset$ -triggered Morphological Umlaut is equally obligatory in cases of morpheme-skipping in nonce nationality words and loan nationality words as it is in the canonical cases which are sometimes described as a P/P effect. The conclusion is, then, that well-defined instances of the Icelandic Umlaut are unambiguous morphophonology, M/P effects, because they cannot be described as M/M effects without giving up the MIC.

By having an effect which makes P-reference to the target, the umlaut escapes morphological locality but this does not mean that the effect is unbounded. The nationality suffix *-sk* ‘-ish, -ese’ is variably pronounced with a vowel *-ísk* and the vowel is a phonological intervener. It is ungrammatical to apply the umlaut if such intervention takes place.

(351) ‘Assamese’

a. *assam-ísk-ur* [MASC,NOM,SG]

b. \**assöm-ísk-Ø* [FEM,NOM,SG]

c. *assam-ísk-Ø* [FEM,NOM,SG]

These examples support the view that the umlaut is an M/P effect in such cases. The question remains whether it is appropriate to analyze some cases of the umlaut as P/P effects and others as M/P effects. Here, theoretical parsimony dictates that the entire phenomenon should be described in terms of a morphophonological umlaut. Since an M/P effect is needed for some cases and the M/P approach is the only analysis which accounts for all the cases, it is the most appropriate analysis in general. It is technically possible to account for many of the umlaut cases as a separate P/P effect which is conditioned by a /u/ in the following syllable, but because such a rule is redundant now that we have the M/P rule, and because the P/P rule faced some empirical challenges as outlined above, I conclude that the P/P process should be abandoned altogether.

Although the *u*-umlaut is generally quite exceptionless, there are some instances of loanwords with  $-\emptyset$ [FEM,NOM,SG] in which its application is optional, notably with the adjective *smart* ‘fashionable’ which is variably realized as *smart* or *smört* in the feminine, nominative, singular, in fact, more frequently in the former manner. This is probably related to the fact that such loan adjectives are borrowed into the uninflected pattern for adjectives in general. Importantly, the masculine form is also just *smart* and does not take the *-ur* nInfl exponent. Borrowing into the uninflected class is only possible when nInfl is root-adjacent. Furthermore, when *smart* is integrated into a native morphological pattern which has an overt trigger,

the *u*-umlaut is again obligatory. This can be observed in the plural superlative *smört-ust-u* ‘the most fashionable’ vs. \**smart-ust-u*.

Other sporadic cases of underapplication are, as far as I know, also restricted to root-adjacent triggers. For example, although the *-ug* form of  $\sqrt{\text{SAND}}$  ‘sand’ is generally *sönd-ug-ur* ‘covered with sand’, with the umlaut applying, the form *sand-ug-ur* ‘covered with sand’ has also been observed in natural data. Importantly, such exceptions are always variably attested and limited to the locality domain of M/M effects, i.e., linear adjacency of trigger and target.

I believe the Icelandic umlaut is best analyzed as an M/P effect with a marginal possibility to specify exceptions on an M/M basis. These exceptions are rare and mostly restricted to the  $-\emptyset[\text{FEM,NOM,SG}]$  exponent in loan adjectives. This approach is more accurate than giving loanwords a special status in general because the umlaut does apply obligatorily to loanwords in most umlaut environments.

The account of morphophonology which has been developed in the chapter makes use of the notions M-reference and P-reference to determine the locality conditions which constrain morphophonological processes. M/M effects obey morphological locality (concatenation) whereas M/P effects obey phonological locality. One reason to develop a theory based on the type of reference rather than the type of adjustment to the representation is that there sometimes appears to be reason to distinguish effects which are superficially of the same nature if we only look at the modification that takes place. Even if the Icelandic *u*-umlaut is an M/P effect and its German

cousin looks like a similar type of a process, it can be argued that the German umlaut is in fact of the M/M type in most cases.

#### 5.4.4 German umlaut and type of reference

If the MIC is on the right track and two morphemes can only interact as morphemes if they are linearly adjacent, we should be able to detect differences between M/M effects and M/P effects based on their productivity and the locality conditions which they obey empirically. The Modern German umlaut, like the Icelandic *u*-umlaut, is the reflex of a historical sound change and it is a similar phenomenon at first sight. Consider the German umlaut correspondences studied by Shwayder (2015:247).

(352) Umlaut vowel correspondences

/u:/	→	/y:/	Huhn ~ Hühn-er ‘hen (SG, PL)’
/ʊ:/	→	/ʏ/	dumm ~ dümm-lich ‘silly’, ‘foolish’
/o:/	→	/ø:/	Vogel ~ Vögel ‘bird (SG, PL)’
/ɔ/	→	/œ/	Holz ~ hölz-ern ‘wood’, ‘wooden’
/a:/	→	/ɛ:/	Europa ~ europä-isch ‘Europe’, ‘European’
/a/	→	/e/	Stand ~ ständig ‘stand’, ‘continuous’
/aʊ/	→	/ɔʏ/	sauf-en ~ Säuf-er ‘drink’, ‘drinker’

The details of the surface manifestation of the process are quite varied but in all cases an underlying back vowel is fronted in the presence of some trigger. The triggering environments are morpheme-specific and the phonological exponent of the

trigger does not have to be a (synchronically) motivated fronting environment. The targets also show morpheme-specific effects. Although all the undergoing segments are back vowels, some back vowels fail to undergo the umlaut in the presence of some triggers. Shwayder (2015:249) uses the 3rd person singular verbal agreement *-t* and the agentive nominalizer *-er* to demonstrate the morpheme-specific properties of the process.

(353) Trigger-Target pair specificity for German Umlaut

Infinitive	3SG pres. indic.	Agent nominal.	Gloss
mal-en	mal-t	Mal-er	‘paint’ ‘paints’ ‘painter’
back-en	back-t	<b>Bäck-er</b>	‘bake’ ‘bakes’ ‘baker’
fahr-en	<b>fährt</b>	Fahr-er	‘drive’ ‘drives’ ‘driver’
trag-en	<b>trägt</b>	<b>Träger</b>	‘carry’ ‘carries’ ‘carrier’

This table shows that for these two umlaut environments in German, the four roots in question show all possible patterns of application and non-application of the umlaut. This idiosyncrasy provides strong evidence for an M/M analysis.

The only target-independent triggers are the diminutive suffixes which are realized as *-chen* and *-lein*. These two morphemes trigger the umlaut process with all potential targets. As a result, Shwayder analyzes the German umlaut as two kinds of processes. It is generally an M/M effect except in the cases of *-chen* and *-lein*

when it is an M/P effect.<sup>16</sup> This does not mean that there are two umlaut processes in German; it means that there are two ways of triggering the umlaut process.

In addition to morpheme-specific reference to both trigger and target, it is important that Shwayder finds that the German umlaut does not skip morphemes the way the Icelandic umlaut does. This means that the present theory which is based on the type of reference made to the trigger and the target is able to capture generalizations which cannot be expressed simply in terms of the type of adjustment that is made to the representation. While all effects of Vocabulary Insertion are M/M effects, morphophonological readjustment is sometimes of the M/P type and sometimes of the M/M type and a good theory of morphophonology should allow us to express this distinction.

#### **5.4.5 Section summary**

This section has presented a theory of morphophonology which is based on the type of reference which is made to the trigger and target of an alternation. I introduced the notions of M-reference and P-reference which are two distinct ways of accessing linguistic material in a morphophonological process. I presented an M/M effect which involved the inflection of Icelandic nouns and demonstrated how linear intervention between trigger and target blocks the application of this effect. I

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<sup>16</sup>This means that the German umlaut might in principle skip morphemes with *-chen* and *-lein* if the relevant phonological locality is satisfied. However, as far as I know, it is difficult to construct appropriate examples to verify whether this is borne out.



contrasted this with the Icelandic *u*-umlaut which is robustly productive and skips intervening morphemes even if its triggering environments are morpheme-specific; the Icelandic *u*-umlaut was analyzed as an M/P effect. Finally, I compared the Icelandic umlaut with a similar phenomenon in German and showed that the present theory gives us the tools to systematically distinguish the properties of M/M effects and M/P effects even if the two sometimes look very similar on the surface.

## **5.5 Remarks on theoretical alternatives**

### **5.5.1 Contrasting families of theories**

This chapter has presented a theory of discrete morphemes in which linear adjacency between morphemes and phase visibility between morphemes constrains the realization of linguistic material. The theory furthermore admits the existence of phonological processes whose triggering environment is tied to specific morphemes. This view of the organization of the grammar allows us to capture attested empirical generalizations in a principled and well motivated manner. However, this is not the only view, of course, of how the grammar is in fact organized, and it is not the only way to express the empirical observations under discussion.

In modern linguistics, most phenomena can be analyzed in most theoretical frameworks as long as the analyst is willing to relax architectural principles as they run into empirical challenges. This is unfortunate, and it makes it, at times, a somewhat unrewarding enterprise to systematically contrast the virtues of different

frameworks. I will nevertheless offer a few words that, in my opinion, raise some reasonable concerns about the design of certain families of alternative theories. I do not doubt that clever analysts can derive themselves around the points which I bring up. However, I wish to suggest to the reader that the relevant workarounds might in some cases miss important generalizations or fail to recognize real explanations.

### 5.5.2 Are morphemes an important ingredient for the theory?

The first comparison to be made is with morphological theories which are morphemeless. Such theories are important to keep in mind because the present theory is essentially a theory of permissible types of interactions between morphemes; the morpheme is absolutely central to my approach. The prime example of a morphemeless theory is the A-Morphous Morphology of Anderson (1992). The theory is stem-oriented in the spirit of the stem and process model of Aronoff (1976, 1994). The objects which are manipulated by such a system are stems and stem-associated feature bundles.

$$(354) \quad \text{STEM} \begin{bmatrix} +A \\ +B \\ +C \end{bmatrix}$$

Such a family of theories derives word forms by process-oriented devices like Aronoff's Word Formation Rules. The rules can make reference to the stem and the set of features associated with it. They produce new phonological objects by manipulating the stem. The fact that the features are associated with the stem rather than with individual morphemes means that there is no natural way to express the way

in which individual morphemes may interact with each other in phenomena like contextual allomorphy.

This dissertation argues that contextual allomorphy requires linear adjacency between the morphemes that are the locus of the features that determine the allomorphy. We referred to this effect as the Bidirectional Linear Adjacency Constraint (BLAC). If the BLAC is true, a morpheme-less theory lacks the theoretical object which is at the core of the relevant empirical generalization, i.e., the morpheme. Therefore, it seems like any way of stating the effects of the BLAC in such a theory becomes an exercise in speaking of morphemes without acknowledging their existence. I will take the position here that it is preferable to simply admit the morpheme and give it the theoretical status which I believe that it deserves.

### **5.5.3 Expanding the role of Vocabulary Insertion**

Another alternative to our approach is a theory which acknowledges the morpheme but not morphophonology. The system of Bye and Svenonius (2012) offers a grammatical architecture in this spirit. In this system, Vocabulary Insertion is powerful but phonological processes do not have access to “lexical, morphological, and syntactic information” (Bye and Svenonius 2012:428). I will refer to this as the VI-only model of morphology because morphology is never in cahoots with a phonology which mixes M-reference and P-reference in the system.

Morphophonology of the M/P type (in our terminology), in which the trigger is morpheme-specific but its target is a phonological representation, relies on morpheme associated floating features in this kind of a system. Conceptually, such floating features are not very different from our M/P effects and the differences are probably not clear enough for the purpose of declaring that one theory is preferable to the other.

However, there are some empirical scenarios which may give us reason to speak of M/P effects rather than floating features. Recall that adjectives formed with *-ug* and *-ótt*, interpreted as ‘covered with’, are both *u*-umlaut triggers even if /ó/ is not an umlaut trigger in general.

- (355) a. *gras* ‘grass’  
 b. *grös-ug-ur* ‘covered with grass’  
 c. *grös-ótt-ur* ‘covered with grass’

It seems more plausible that *-ótt* triggers an M/P effect of the morpheme-specific type which is assumed in our system than that there is a floating /u/ which triggers the umlaut but has no effect on the pronunciation of /ó/. Of course, one might design a derivation that has the intended effect while keeping the terminology of morphosyntax out of it, but it seems likely that any such solution would be, in fact, a disguised way to refer to *-ótt* as a morpheme in the phonology. After all, the *-ótt* is a vowel-initial exponent, so why does this vowel behave as another vowel for the purpose of the phonology? I adopt the position that eliminating M/P effects from

the theory is not feasible, however conceptually attractive it may seem, and even if successful derivations might potentially be designed without mixing M-reference and P-reference. In my opinion, the notion of an M/P effect simply seems to accurately reflect reality in some processes.

The VI-only theory also faces empirical challenges in the case of M/M effects. In such a theory, the irregular past tense is derived by inserting phonological exponents like *sang* at a non-terminal level of structure, e.g.,  $[\sqrt{\text{SING}} \text{ T}_{\text{past}}] \leftrightarrow \textit{sang}$  (see Embick In press). In effect, the theory extends the role of Vocabulary Insertion to make phonological M/M effects redundant. However, this kind of a strongly VI-oriented theory runs into issues in cases of double marking when a morphophonological readjustment of the root coincides with affixal morphology. In order to derive *brok-en* and *tol-d* the VI-oriented theory has to state that these are inserted as a single phonological exponent, e.g.,  $[\sqrt{\text{BREAK}} \text{ Asp}] \leftrightarrow \textit{broken}$  and  $[\sqrt{\text{TELL}} \text{ T}_{\text{past}}] \leftrightarrow \textit{told}$ . Thus, the theory has morphemes, but *-d* and *-en* are counterintuitively not analyzed as morphemes – a seemingly undesirable situation. Note that the *-d* and *-en* morphemes are found elsewhere and with phonologically similar roots. For example, just as we have *tell/told*, we have *spell/spelled*. Furthermore, parallel to *break/broken* we find *beat/beaten*. It seems to be a rather bizarre result if the elements in question are sometimes morphemes and sometimes not, even if everything seems to suggest that they are the same type of an object. Again, my goal here is not to challenge the ability of the VI-only approach to derive all the attested

outputs. It probably has that ability. However, there seem to be clear cases in which the intended conceptual neatness of such a theory does not neatly reflect the attested phenomena.

#### 5.5.4 On phases and levels

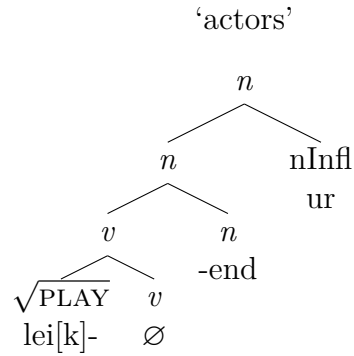
In the discussion above about interactions between the root and elements that are either close to the root or further away from it, we proposed that syntactic phases were important. Some types of such PF phenomena that might be analyzed in terms of phases are potentially also attributable to so-called levels-based analyses (Mohan 1982; Kiparsky 1985, 2000) and a few comments on this analytical option are in order.

We noted that suffixes which are /i/-initial or /e/-initial trigger palatalization, causing an underlying /k/ to surface as [c]. This process applies with all the relevant suffixes except with the plural agentive nominalizer *-end*.

- (356) a. fan[c]-elsi ‘prison’ [NEUT,NOM,SG]  
b. lei[k]-end-ur ‘actors’ [MASC,NOM,PL]

The examples show that palatalization applies in *fang-elsi* ‘prison’ but not in *leik-end-ur* ‘actors’. In our analysis, the underapplication with *-end* was attributed to a *v*-layer inside the nominal.

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According to this analysis, the root and the nominalizer are not phase-theoretically active at the same point in the derivation and it was hypothesized that parts of the phonology, the cyclic phonology in particular, require the target to be phase active.

Let us consider a levels-based alternative. In any system of this general type it could be hypothesized that *-end* is the only potential palatalizer which realizes a Level II suffix and that application of the palatalization process is restricted to Level I. For the core example, this works, and it is a fairly simple analysis. Compared to the phase-theoretic approach, it has the drawback that does not have the same kind of consequences for the analysis of phases in the syntax and semantics, but it might be correct for the basic data.

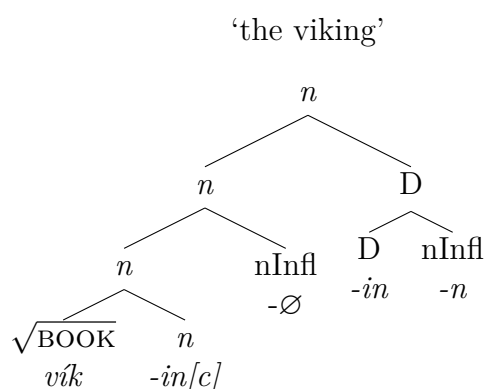
However, the definite article makes it more difficult to maintain the levels-based analysis. The following alternation between [k] and [c] in ‘the viking’ shows that definite article is a palatalization trigger even if it is the outermost morpheme.

(358) a. vík-in[k]-ur-inn ‘the viking’ [MASC,NOM,SG]

b. vík-in[c]- $\emptyset$ -inn ‘the viking’ [MASC,ACC,SG]

For the phase-based account, this fact raises interesting issues about why D might not be a phase head. I proposed above that KP (case phrase) is above DP and determines the phase boundary at the edge of the noun phrase and I also discussed several other analytical options which might be entertained. The only property which my analysis requires in order to account for the palatalization facts is to show that D might not be a phase.<sup>17</sup>

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In contrast, the levels-based analysis has no natural way of turning palatalization on again for an outer morpheme if it has been turned off for some inner morphemes. It is a central appeal of any levels-based approach that inner levels pattern together in showing more phonological activity and once you reach a certain point moving outwards, the activity is turned off.

I conclude that even if a levels-based approach might seem to work well for some of the core cases of palatalization in Icelandic, the phase-theoretic analysis seems to be better motivated and more capable of addressing the issues surrounding the

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<sup>17</sup>Here, I simplify matters by not showing the palatalization which does indeed apply at the first /k/ and by writing the phonological exponents according to Icelandic orthography rather than pronunciation. These issues are unimportant in the present context.



suffixed definite article. There are, without doubt, imaginable ways of making the definite suffix somehow different for the purpose of the levels. However, if it means that outer morphemes can in general reactivate phonology which was turned off at a more deeply embedded level, the initial conceptual appeal of the levels-based approach seems to be inevitably weakened as a result. A discussion of “level ordering paradoxes” and how they compare to a theory in the present spirit is found in Shwayder (2015:39–72) along with pointers to further references on the topic.

### **5.5.5 Section summary**

This section has discussed some alternative theoretical approaches to the types of morphophonological phenomena that are under discussion. The goal of the section is not to prove any particular approach to be wrong. As we discussed above, the current state of affairs in linguistic theory usually makes available some ways to wiggle a linguistic analysis around apparent obstacles. However, I believe it is not without a purpose to draw attention to phenomena which in my opinion look like they point towards the type of a grammatical architecture which I pursue in this dissertation. I believe that considering such cases and highlighting them has some promise to be useful, even for those who will eventually choose to employ morpheme-less derivations, a more prominent role for Vocabulary Insertion, or a system where morphophonological levels play the role which phases do in my analysis of palatalization. At least, these comments should shed some light on the way

of thinking that led me to the theoretical choices that are made in the present work. With luck, they might serve as an inspiration for new and innovative solutions across frameworks.

## 5.6 Chapter summary

This chapter presented case studies which demonstrate the effects of a morpheme-based theory on realization at the interfaces. A study of phase locality in Icelandic agent nominals supported the view that phases restrict interactions between morphemes at PF. I showed that a phase-theoretic generalization about palatalization properly derived a case of an underapplication of the process in an environment where independent arguments could be made for a phase boundary. Any theory which does not consider the role of phases in phonological realization misses the generalization.

I furthermore investigated the locality effects of the process of Vocabulary Insertion, focusing on Icelandic noun declension. The findings supported a Bidirectional Linear Adjacency Constraint (BLAC) which states that conditions on contextual allomorphy require linear adjacency. The main result was that no root-conditioned allomorphy is attested across overt nominalizers despite an apparently chaotic variation in cases where the nominalizer is not pronounced. The findings support the view that the morpheme should be the centerpiece of morphological theory and that individual morphemes are the targets of Vocabulary Insertion.

A theory of morphophonology was presented in terms of the type of reference that is made to the trigger and target of an alternation. I looked at effects in which both trigger and target are accessed as morphemes, so-called M/M effects, and proposed that such effects require linear adjacency between morphemes. In contrast, I proposed that the Icelandic *u*-umlaut is an M/P effect because it does not make morpheme-specific reference to its target. As a consequence, the Icelandic umlaut can skip intervening morphemes as long as phonological locality is satisfied.

I finally contrasted the present approach with three alternative approaches to morphophonology, a morpheme-less theory, a theory which posits an extended role for Vocabulary Insertion and a theory of interactions in terms of morphophonological levels rather than phases. Some empirical cases were discussed which in my opinion suggest that the present approach is on the right track. Whichever conclusions the reader may draw from this discussion about the virtues of different theoretical frameworks, it is my hope that my remarks have made it more clear why I take the theoretical positions that I do – and I hope they will serve as an inspiration for future work which aims to relate the analysis of specific morphophonological phenomena, in Icelandic and beyond, with broad questions about grammatical architecture.

## Chapter 6

### Conclusion

The broad theoretical goal of this dissertation has been to support the view that surface complexity in natural language is a consequence of an interaction between different linguistic systems and that a well-informed analysis needs to take into account how these systems connect with each other. In particular, the theory of realization of morphemes imposes boundaries on syntactic analysis and in order to identify and analyze morphemes, we need to examine their realization in both pronunciation and interpretation.

The centerpiece of my case study on applicatives in the noun phrase in Chapter 3 is the effect of phase locality at the interfaces. The way in which phase structure constrains realization of morphemes at PF and LF reveals properties of the underlying syntactic structure and constrains and informs the analytical options. The main conclusion was that a certain class of nouns in Icelandic can host an applicative structure in a Caused Experience (CEX) construction without being built on top of

a verb. The lack of a derivational dependency between such nouns and verbs was independently supported by other diagnostics in the chapter beyond phase locality. The findings are important because they show that surface observations about the pronunciation and interpretation of morphemes can demand a reconsideration of the theory of syntax. The chapter amended the applicative theory of Pytkänen (2008) by introducing a root-selecting event applicative head which is independent of lexical category.

The second main case study in Chapter 4 focuses on the type of locality which governs suffixation under adjacency. The chapter looks at the distinction between weak and strong articles in the sense of Schwarz (2009) who assumes that a weak article  $D_{\text{weak}}$  expresses uniqueness but a strong article  $D_{\text{strong}}$  expresses anaphoricity. A comparative study of German and Icelandic reveals that the languages manifest the same  $D_{\text{weak}}/D_{\text{strong}}$  distinction in their article systems and that the weak article in Icelandic is realized with a syntax of *the*-support which is structurally similar to English *do*-support. The conditions under which suffixation takes place is strikingly similar in *the*-support and *do*-support and the obvious null hypothesis is that they are structurally of the same nature. This is important because it means that facts about one of the phenomena can potentially inform our analysis of the other. In particular, it is a primary concern to determine what exactly it means for a morpheme to be immediately local to a potential host for the purpose of suffixation. In the chapter, I argue that the data point towards an analysis of support phenomena

in which the support morpheme undergoes local dislocation under linear adjacency in the sense of Embick and Noyer (2001) and that adjuncts do not count as linear interveners, perhaps due to some implementation of late adjunction (Lebeaux 2000; Stepanov 2001).

The third main part of the dissertation in Chapter 5 focuses on the role of the morpheme in morphophonology – in a broad sense. The chapter introduces a case study of phase locality between morphemes in Icelandic agent nominals, arguing that there are crucial differences between root-derived agent nominals and verb-derived agent nominals. It is argued that Icelandic palatalization requires the target of the process to be phase-active and this view has the consequence that any well informed analysis of segmental phonology might need to consider evidence from syntax and semantics for phase structure. The chapter moves on to a study of the locality effects which result from the process of Vocabulary Insertion, focusing on the constraint that conditions on contextual allomorphy require linear adjacency. Subsequently, the chapter discusses phonological processes which are morpheme-specific and presents a view of morphophonology where it is of crucial importance which type of a reference is made to the trigger and target of an alternation. It is proposed that effects in which both the trigger and target are referred to as morphemes are restricted to linearly adjacent morphemes. The final part of Chapter 5 aims to make some connections between the present approach to morphophonology and some theoretical alternatives which are concerned with related phenomena,

drawing attention to some empirical cases that in my opinion suggest that the approach pursued in the dissertation is on the right track.

The dissertation as a whole develops a view of the way in which distinct interacting locality principles constrain human language. The big picture which emerges is that a well informed analysis of one component of language often requires an understanding of other radically different components as well. Deep syntactic locality principles like the cyclic Spell-Out of phases interact with shallow surface-oriented locality principles which make reference to linear adjacency at a derivationally later level of representation. The case studies, which all place a special emphasis on data drawn from the Icelandic noun phrase, could not have been developed in their present form without a coherent theory of syntax, semantics and morphophonology and the way in which these components are related to each other.

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