1 Introduction

1. A number of researchers have argued that the domain of phrasal phonological processes is the spell-out domain (e.g., Chomsky 2001, Adger 2007, Kratzer & Selkirk 2007, Newell 2008, D’Alessandro & Scheer 2015).
   • Does not seem to be sufficient: Spell-out domains can be too small or too large (e.g. Pak 2008, Cheng & Downing 2016).
   • Lack of isomorphism is a traditional argument against direct interface approaches (e.g., Nespor & Vogel 2007, Hayes 1990, Cheng & Downing 2016).
     – Such arguments focus on a particular iteration of a direct interface approach and do not consider additional syntactic factors (see, e.g., discussion in Pak 2008).

   • Contextual allomorphy is limited to the spell-out domain.
   • For morphophonology, the spell-out domain is too large (compounds), or too small (single-stem words).

3. Harðarson (op cit.) proposes a distinction between the domain of application of these processes:
   • The domain of contextual allomorphy is the spell-out domain (with or without additional restrictions).
   • Morphophonology is further conditioned by morphological selection.

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• The goal of this talk:
  – To provide a unified approach to the establishment of lexical and post-lexical phonological domains.
    * Processes apply at the juncture of two elements following concatenation.
    * Make references to selectional properties.
    * Output of spell-out is visible at later cycles.
    * Account for apparent domain/constituent mismatches without referencing intermediate structure.
2 Domains in Compounds

- Harðarson (2018) discusses various asymmetries in terms of application of Contextual Allomorphy CA and morphophonology in compounds.

2.1 Contextual Allomorphy

- The presence of a non-head element can affect the shape of a nominalizer of the head of the compound, exemplified by Bosnian in (2)–(3).
  - Nominalizer is obligatorily overt outside of compounds, (2), and obligatorily ∅ in compounds, (3).
  - Note the absence of linear adjacency.

\[(2)\]
\[\text{a. hod- anje}\\  \text{walk- n}\\  \text{‘walking’}\\  \text{b. *hod- } \emptyset\\  \text{walk- n}\\  \]

\[(3)\]
\[\text{a. mimi- o# hod- } \emptyset\\  \text{by/past- l# walk- n}\\  \text{‘passing by’}\\  \text{b. *mimi- o# hod- anje}\\  \text{by/past- l# walk- n}\\  \]

- The non-head must then be visible to the head of the compound and the two elements must be sufficiently local, i.e. within the same spell-out domain (see, e.g., Bobaljik 2012, Embick 2010, Moskal 2015b, Moskal & Smith 2015, Smith et al. 2018). The structure is provided in (4).

\[(4)\]
\[\text{a.}\\  \text{n}\\  \sqrt{\text{DEVOUR}}\\  \text{žder-}\\  \text{-onja} \star \emptyset\\  \text{b.}\\  \text{n}\\  \sqrt{\text{PERSON}}\\  \text{ljud-}\\  \text{-o}\\  \sqrt{\text{DEVOUR}}\\  \text{žder-}\\  \text{-onja} \star \emptyset\\  \]

- The head of the compound can also influence the form of the non-head element.
  - In Dutch the choice of a linking morpheme is typically dependent on the non-head element although in some cases the head of the compound can influence the choice (see, e.g., Krott et al. 2007)

\[(5)\]
\[\text{a.}\\  \text{schaap-en#tong}\\  \text{sheep-L#tongue}\\  \text{‘sheep’s tongue’}\\  \text{b.}\\  \text{schaap-s#kooi}\\  \text{sheep-L#fold}\\  \text{‘sheep fold’}\\  \text{c.}\\  \text{schaap#herder}\\  \text{sheep#herder}\\  \text{‘shepherd’}\\  \]

- Under the structure argued for in Fenger & Harðarson (2018), this interaction is compatible with a number of proposals for the locality domain of CA.1
  - The process targets the nominalizing suffix at the edge of the non-head element.
  - Sensitivity to the identity of the root of the head of the compound.
  - Implies access to the entire spell-out domain containing the entire structures in (6).

\[(6)\]
\[\text{a.}\\  \text{n}\\  \sqrt{\text{TO TONGUE}}\\  \text{tong}\\  \text{b.}\\  \text{n}\\  \sqrt{\text{S H E E P}}\\  \text{schaap}\\  \text{-en}\\  \]

\[\text{b.}\\  \text{n}\\  \sqrt{\text{F O L D}}\\  \text{kooi}\\  \text{-s}\\  \]

1Note that although Fenger and Harðarson do not analyse alternation such alternations as contextual allomorphy but as manipulation of the features of $n$. The domain in question, as linear order does not seem to play a role, is be compatible with the syntactic locality domains under consideration.
2.2 Morphophonology

• There have been a number of proposals that unify the domain of readjustment/morphophonology and CA (e.g., Embick 2010, Embick & Shwayder 2018, Marantz 2013, Merchant 2015).
  – Proposals unifying the two processes themselves (e.g., Bermúdez-Otero 2013).
• Comparing compounds and single-stem words shows distinct locality conditions.
  – I-umlaut applies in a variety of environments (e.g., Anderson 1969a, 1974, Árnason 2011, Embick & Shwayder 2018).
  * Derivational, (7a), and inflectional, (7b)–(7c).
  * Overt, (7a)–(7b), and covert, (7c).
– Triggered by a particular combination of morphosyntactic features.
– Sensitive to the identity of the potential target.

(7) a. húsi ~ hús- i ~ húsi
  house- n  house- DAT.SG  house- n
b. ern- i
  eagle. GEN.SG  eagle- DAT.SG
c. sip- i ~ sip- i
  sip- PRES- SUBJ  sip- PAST- SUBJ

• In single-stem words, i-umlaut can apply across multiple category nodes as long as no vowel intervenes between the trigger and the target.
  – Predicted to be impossible under all the locality domains under consideration.
  – Appears to apply to the output of previous spell-out domains.

(8) a. gráð- ug-
  ‘greed’
  b. grað- g- i-
  ‘greed’
  c. bokur- um
  ‘banana’

• The u-umlaut in Icelandic, albeit similar to the i-umlaut, has two important differences (e.g. Anderson 1969a,b, 1974, Orešnik 1977, Rögnvaldsson 1981, 2006, Árnason 1985, Kiparsky 1984).
  – Applies regularly in dative plural.
  – Typically applies throughout the stem as long as there is a chain of potential undergoers, /a/, (9)–(10).
  – Never applies across the boundaries between two elements in a compound, (11).

• The umlauts ignore phasal boundaries, but respect the boundaries between two elements in a compound.
  – Morphophonological processes apply at different layers within the complex head yielding smaller domains within the spell-out domain (cf. Pak 2008).
  – There are also instances of processes that are specific to compounds (see discussion in Vogel 2010).
    – In Marathi, stem final stops assimilate with a following stem initial nasal, (12).
    – In Hausa, the final vowel of a class of verbal stems is lengthened when serving as a non-head element in compounds, (13).

(12) Nasal assimilation in Marathi (adapted from Pandharipande 1997:563)
  /bʰaːɡaːwat/ + /nɑːm/ → [bʰaːɡaːwaːmː]  ‘god’  ‘name’  ‘god’s name’
(13) Final vowel lengthening in Hausa (adapted from McIntyre 2006:32)
  /bɪ/ + /bɑːɡo/ → /bɪːbɑːɡo/  ‘follow’  ‘wall’  ‘leakage along the wall’

☛ The output of previous cycles is visible at subsequent cycles.
  – Allows morphophonological domains larger than spell-out domains.

☛ Morphophonology is layered.
  – Can yield a domain smaller than a spell-out domain.
  – Allows different processes to apply at different types of boundaries.
3 Spelling Out the Complex Head

- Ingredients necessary for an account for the patterns in section 2:
  
  I Both head and non-head elements of a compound must be within the same spell-out domain.
  
  II CA must see between two elements in a compound.
  
  III Morphophonology must apply between a base and an affix across spell-out domains but not between two elements in a compound.
  
  IV Morphophonology must be layered: application between a base and an affix followed by application between two compound elements.

3.1 Compound formation (Harðarson 2018)

- Compound elements are formed in separate workspaces (cf. Nunes & Uriagereka 2000, Piggott & Travis 2013).
  
  The non-head element is adjoined directly to the head of the compound in accordance to the Matching Condition, (14).
  
  – Roots must attach to roots, categorized elements at x₀ level, inflected elements at the ϕ₀ level. (see also De Belder 2017, Moskal 2015a for proposals on layered compounding).

(14) The Matching Condition (Harðarson 2017:36)
Compounding merges elements of the same syntactic type.

3.2 Spell-out

- At the point of vocabulary insertion (VI), the entire spell-out domain is accessible.
  
  - Morphophonology applies between elements in a selectional relationship.

(17) Domain for morphophonological interactions

A domain for morphophonology is marked by the highest projection in the extended projection of the root.

i. Morphophonological rules can apply to the exponents of two nodes, X and Y, if X and Y are within the same extended projection.

ii. Morphophonological rules do not apply between two extended projections.

(18) Extended projection within a complex head (modified from Grimshaw 2000)

α is in the extended projection of a root R if:

i. the head of α morphologically selects/subcategorizes R, or

ii. the head of α morphologically selects/subcategorizes β, where β is a head in the extended projection of R.

[Harðarson 2016:23]

Why?

- Timing and nature of the operations affects the accessibility of morphosyntactic information.
  
  – VI has access to the entire spell-out domain.
  
  – Linearization is a part of VI (Noyer 1997).
  
  
  * VI replaces feature bundles—access to morphosyntactic information is limited (Bobaljik 1999).
  
  * Drawing on Pak (2008), timing of concatenation varies.
    
    * Early concatenation: heads within the extended projection.
    
    * Late concatenation: two extended projections.

- To continue the derivation from (16), VI applies simultaneously to the two roots and category nodes, yielding (19).
  
  - The suffix -na is then inserted at ϕ₁ and this element is linearized and concatenated with respect to n₁, (20)
  
  - ϕ₁ morphologically selects n₁ and hence occlusion applies to the string produced by a previous VI operation (/χ/ → [k]).
• Morphosyntactic features of $n_1$ have been replaced by the phonological string.

• Finally the non-head element is concatenated with the head of the compound yielding the string in (21).
  - Fricativization of /k/ is not applicable as the non-head does not select for the head and vice versa.
  - Stress resolution is applied, deleting stress from the head of the compound.

(21) ['paksakna]
  backstory.GEN.PL

• In case of single-stem words containing multiple spell-out domains, consider the derivation of *greðgi* 'greed' from above. The incremental steps are shown in (23)–(26)

(22) The full structure of *greðgi* 'greed'

• Although the output of a previous phase is available, the syntactic structure is not, hence subsequent operations on this output must target its edge, e.g., occlusion above, or apply throughout, e.g., u-umlaut (cf. Kaisse 1985).

• Prediction:
  - A morphophonological domain can be center embedded within a larger one.

• Appears to be borne out.

• Icelandic allows for unstressed prefixes on predicative adjectives, (27a), but not attributive, (27b), (Árnason 1987).

(27) a. Maðurinn er almennt álitið ó-fróður/ó-fróður.
  man.THE is generally considered un-knowledgable
  'The man is generally considered to be unknowledgable.'

b. Ó-fróður/*Ó- fróður maður fékk sér samloku.
  un-knowledgable man got self sandwich
  'An unknowledgable man got himself a sandwich.'

• In case of a compound adjective with a nominal non-head, this asymmetry is lost.

(28) a. Maðurinn er almennt álitið ó-bíl-fróður/? ó-bíl-fróður.
  man.THE is generally considered un-car-knowledgable
  'The man is generally considered to be unknowledgable about cars.'

b. Ó-bíl-fróður/?*Ó-bíl-fróður
  un-car-knowledgable man got self sandwich
  'A man unknowledgable about cars got himself a sandwich.'

• Given the morphosyntactic and semantic considerations, the structure of the compound is as shown in (29).

(29)

• In Icelandic compounds, main stress falls on the extended projection of the leftmost root, $\sqrt{CAR}$ in (29).

• $\acute{O}$- is in the extended projection of $\sqrt{KNOW}$, which does not receive main stress in (29).
VI has access to the entire spell-out domain.
- Includes the entire compound.

Morphophonology applies at concatenation.
- The timing of concatenation is sensitive to selection.
- The phonological output of the previous cycle is visible at later cycles.

4 Beyond the Complex Head

- If morphology is syntax (cf. Halle & Marantz 1993, 1994), we expect parallels between words and phrases.
  - Selection plays a role in syntax and morphology.

  Overview:
  - Concatenation applies first to elements in a selectional relationship.
  - The output of previous Spell-out domains is visible at later stages, the input is not.
  - Processes applying to previously spelled-out material must target either the edge or the entire string.

4.1 Penultimate Vowel Lengthening in Durban Zulu (Cheng & Downing 2007, et seq.)

- The penultimate vowel of a particular domain undergoes lengthening
- The domains do not always appear to fully match syntactic constituency.
- The domain of PVL can span the entire sentence.
  - A simple SVO sentence, (30a)
  - A double object construction, (30b)
  - A topicalized element, (30c)
  - A matrix and a complement clause, (30d)
- The phonological phrasing shown is in accordance with the current proposal.

(30) a. \[ CP ( ìzin-g’áne zi-hlúph’ is-áluə [zi] ) \]
   10-child 10-bother 7-old.woman
   ‘The children are bothering the old woman.’

b. \[ CP ( ūm-fúndísi ü-fúndel-ē’ abá-zal’ in-cw[di] ) \]
   1-teacher 1-read.to-TAM 2-parent 9-letter
   ‘The teacher read to the parents a letter.’

c. \[ CP ( ìzi-vakåshi [ C- ngi-zi-pekèl’ i-nx[ma] ] ) \]
   10-visitor 1-10OBJ-cook.for 9-meat
   ‘The visitors, I am cooking them some meat.’

d. \[ CP ( Si-khólwa [ CP ūkúth’t that ábá-ntwána2-child bá-dlalá ph[ndle ] ] ) \]
   we-believe that 2-child 2-play outside
   ‘We believe that the children are playing outside.’
   [Cheng & Downing 2007:52, ad.]

- The approach from above can be straight-forwardly extended to these examples.
  - Each of these sentences involve a single chain in terms of selection.
  - PVL applies at the first cycle, the resulting string is included in subsequent cycles
  - If the vowel that is targeted at a later cycle has previously undergone PVL, subsequent applications are blocked by phonotactic constraints (no superlong vowels).
  - Moved arguments are included as they are themselves selected and are contained within a structure that maintains a continuous chain of selected material.

(31) \[ vP OBJECT \rightarrow Object target of PVL \]

(32) \[ CP SUBJECT VERB /object/ \rightarrow Object target of PVL \]

  - PVL does not need to refer to a particular head in the structure for its domain.
  - Applies within each spell-out domain.
- The subject sometimes phrases with the rest of the clause, (33a). Sometimes not, (33b).

(33) a. ( ì-síph’ ü-pekèl’ ü-Thánd’ in-kó:khu )
   T-Sipho 18BJ-cook.for 1-Thandi 9-chicken
   ‘Sipho cooked chicken for Thandi.’

b. ( in-kósík[zi] ) ( i-théngel’ ábá-fán ízím-ba:tho )
   9-woman 98BJ-buy.for 2-boy 10-clothes
   ‘The woman is buying clothes for the boys.’
   [Cheng & Downing 2009:209]
• Cheng & Downing (2009, 2012) argue that in (33b) the subject is topicalized and patterns with left-dislocated elements.
  – C&D do not distinguish between left-dislocation (LD) and topicalization—different phrasing of elements on the left periphery unexplained, (30c) vs. (33b).

• Proposal:
  – Dislocated elements are base generated as adjuncts whereas topicalized elements are moved to their position (a.o., Holmberg 1986).
  – Subjects are (typically) in Spec-TP (cf. Cheng & Downing 2009).

• The structures for (33) and (30c) are shown in (34) below.

  (34) a. [CP C [TP (SIPHO COOK.FOR THANDI CHICKEN)]]
  b. [CP (WOMAN) [CP (BUY.FOR CHILDREN CLOTHES)]]
  c. [CP (VISITOR) [CP [TP COOK.FOR M1 MEAT]]]

• Topicalized elements, being selected, will always phrase with the rest of the sentence.
• Dislocated elements, being adjuncts, are not selected and will always phrase separately.

• It follows from the proposal that other non-selected elements will phrase separately.
• Adverbs typically phrase separately from the rest of the sentence and from each other in a neutral context (Cheng & Downing 2014).
  – See Cheng & Downing (2014) and references cited therein on morphosyntactic conditioning of exceptions.

(35) a. (ú-phúze iko:fi) (ngénd[Ì]-shi) (í[ù]-shi)
1SBJ-drink 5-coffee with.bowl again
‘He drank coffee with a bowl again.’

1-Sipho 1SUBJ-cut-APPL-TN 1-Thanidi 5-paper carefully
(íz[Ì]-o) yesterday
‘Sipho cut the paper for Thandi carefully yesterday.’ [Cheng & Downing 2014:47]

4.1.1 Relative Clauses

  – Non-locative restrictive relative clauses: head phrases with RC, (36).
  – Locative restrictive relative clauses: head phrases separately from RC, (37).
  – Non-restrictive relative clauses: head phrases separately from RC, (38).

• In all cases, PVL applies within the relative clause.
• If the edge of the relative clause coincides with the edge of the clause, PVL does not apply in the matrix clause.

(36) Non-locative restrictive relative clauses
a. ([(Ìn-dod’ éqoque ísí-ga[ì]-ko)] í-bon-ê (í-zí-vákâ:shi)
9-man 9REL-wear 7-hat 9SBJ-see-TAM 8-visitor
‘The man who is wearing a hat saw the visitors.’

b. (si-thánd’ [í-sí-gqok’ in-dod’ é-sí-gqok-[í]-yo])
we-like 6-hat 9-man 9REL-6OBJ-wear-TAM-REL
‘We like the hat the man is wearing.’ [Cheng & Downing 2007:53]

(37) Locative restrictive relative clauses
a. (Ngi-thánd’ [(í-lí-hálá kú-y-o)]
I-like 9-house 1-Sipho 1REL-live LOC-9.pronoun
‘I like the house that Sipho is living in.’

b. (Ú-Síphó ú-nungené [(é-n+d[ì]-iní ú-Thémba á-yí-theng[ì]-le)])
1-Sipho 1SBJ-enter LOC-9.house-LOC 1-Themba 1REL-9OBJ-bought
‘Sipho went into the house that Themba bought.’ [Cheng & Downing 2010:40]

(38) Non-restrictive relative clauses
a. [(Ú-nhl[ì]-nhlá) (ó-théng̩ ámá-th[a]-ngá)] ú-wá-thwéle ng’ó-bhasikâ:di)
1-Nhláhla 1REL-buy 6-pumkin 1SBJ-6OBJ-carry with.1-basket
‘Nhlanhla, who bought the pumpkins, is carrying them in a basket.’

b. (si-mem’ [(ú-já bu) (o-m-á[z]-ì]-yo)] é-dií:ni)
we-invite 1-Jabu REL.you-1OBJ-know-REL 9LOC-party-LOC
‘We are inviting Jabu, who you know, to the party.’ [Cheng & Downing 2007:59]

(39) Non-locative restrictive relative clauses (RRC)
\[ \text{DP} \left[ \text{CP HEAD} \left[ \text{RC} \right] \right] \]

(40) Locative restrictive relative clauses (LRC)
\[ \text{DP} \left[ \text{NP HEAD} \left[ \text{CP RC} \right] \right] \]

(41) Non-restrictive relative clauses (NRC)
\[ \text{DP} \left[ \text{HEAD} \right] \left[ \text{CP RC} \right] \]

• Under the current proposal, the structure for RRCs in (39) yields the correct phrasing.
  – The head of the RRC is in Spec-CP and should phrase with the rest of the RRC.
  – The DP selects the RRC and the DP is selected by a head in the clausal structure, and hence the output of the RRC is visible.
  – If the right edges of the RRC and the matrix clause line up, there is only one application of PVL.
  – If the edges do not line up, two PVL applies twice.

• LRCs and NRCs require a degree of reanalysis.

• Proposal:
  – DP is a phase (e.g., Ticio 2003, Matushansky 2005).
  – Drawing on Harizanov & Gribanova (2018), D in Zulu carries the feature [-M].
    * When a head carrying [-M] is merged with an unmodified head, they form a complex head immediately.
    * When a head carrying [-M] is merged with a modified head (a phrase), they form a phrase and head lowers post-syntactically.

• In case of unmodified noun, N and D merge together as a head.
  – N and D are never in a phrasal relationship.
  – D has no phrasal complement, PVL does not apply.

• In case of a modified noun, D merges with an NP.
  – NP is the complement of D, PVL applies.
  – D lowers to N post-syntactically.

• Under these assumptions, the phrasing of LRCs follows according to the structure adopted by Cheng & Downing (2010).
  – NP is a complement of DP and PVL applies.
  – CP is an adjunct and hence phrases separately and PVL applies.

• Problem:
  – Under the structure in (41) the head of NRCs are predicted to phrase with the matrix clause.

• Solution?
  – Drawing on Platzack (2000): The head of a NRC is a DP in the specifier of a null N, taking CP as an adjunct.

(42) \[ \text{DP} \left[ \text{NP HEAD} \left[ \text{NP \left[ \text{DP HEAD} \left[ \text{N^N} \right] \right] \right] \right] \left[ \text{CP RC} \right] \right] \]

• Under the structure in (42), phrasing of NRCs will be identical to LRCs.
  – The head of the RC is contained within the complement of D, PVL applies.
  – RC is an adjunct and phrases separately.

☛ The account developed here allows for a unified way of determining lexical and post-lexical phonological domains.
  – Both are restricted by selection.

☛ Accounts for apparent non-isomorphism without appealing to intermediate structure.
  – Selection can restrict operations to an area smaller than the spell-out domain.
  – The visibility of previously spelled-out items extends the domain beyond the spell-out domain.

☛ Does not require extrinsic constraints to match phonological and syntactic constituency.
5 Conclusions and directions for further study

• Relying solely on spell-out domains is not sufficient to account for the application of phonological processes.
  – Spell-out domains can be either too small or too large for various processes.

• A direct interface approach is still viable as these processes appear to make references to syntactic properties.
  – Can reference selectional properties.
  – Include the output of previous spell-out domains.

• Additional benefits:
  – Does not require reference to an intermediate structure.
  – Does not require extrinsic constraints to limit apparent mismatches.

• Next steps:
  – Further exploration of the predictions made by the proposal.
    * Relative clause structure and consequences for extraposition and extraction.
    * A deeper investigation into the phrasing of adverbs and its morphosyntactic conditioning.
  – Extending the empirical domain.
    * Further exploration of PVL in other Bantu languages.
    * Branchingness.
    * Tone processes in various Bantu languages.

List of references and appendices can be found in the online version of this handout.
https://gislihardarson.wordpress.com/papers-handouts/
References


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### A Fully spelled-out Spell-out

- **Ingredients necessary for an account for the patterns in section 2:**
  - Both head and non-head elements of a compound must be syntactically active and accessible to each other within a spell-out domain.
  - Pre-VI processes as well as VI must see between the non-head element and the head of the compound but respect spell-out domains.
  - Post-VI processes must be able to apply between a base and an affix across spell-out domains but respect the boundary between two elements in a compound.
  - Post-VI processes that apply within the complex head must be layered: application between a base and an affix followed by application between two compound elements.

- **Compound formation (Harðarson 2018)**
  - Compound elements are formed in separate workspaces.
  - The non-head element is adjoined directly to the head of the compound in accordance to the Matching Condition, (43).
    - Roots must attach to roots, categorized elements must attach at $x^5$ level, inflected elements must attach at the $\varphi^0$ level. (see also De Belder 2017, Moskal 2015a for proposals on layered compounding).

(43) *The Matching Condition* (Harðarson 2017:36)

- Compound merges elements of the same syntactic type.

(44) `/pak/-∅/say/-∅/-na/ → [paksakna]`  
  back- n- story- n- GEN.PL  
  ‘backstories’

- The two elements are formed in separate workspaces (cf. Nunes & Uriagereka 2000, Piggott & Travis 2013).

(45) *Workspace 1*  
```
/\   \  /\  /\  
BACK \  n \  n  
```

(46) *Workspace 2*  
```
/\   \  /\  /\  
STORY \  n \  n  
```


- A head $\varphi$ is merged with the resulting structure (Harðarson 2016, 2017).

![Diagram]

- The non-head element is still syntactically active, i.e., it has not undergone spell-out (transfer, VI, and linearization).

- Transfer is induced by the merger of a phase head (cf. Chomsky 2001) and VI of its complement is induced by a merger of a second phase (cf. Embick 2010).
  - The initial phase head and all heads in the complement of the higher phase are accessible to the root (Embick 2010)
  - The spell-out domain hence includes the entire structure in (46).

- At PF a number of ordered operations apply (e.g., Halle & Marantz 1993, 1994, Embick & Noyer 2001, Harley & Noyer 2003, Embick 2010).
  - At the point of VI, the entire spell-out domain is accessible for VI (with or without additional restrictions) (cf. Moskal & Smith 2015, Smith et al. 2018).

(47) *Domain for morphophonological interactions*

- A domain for morphophonology is marked by the highest projection in the extended projection of the root.
  i. Morphophonological rules can apply to the exponents of two nodes, X and Y, if X and Y are within the same extended projection.
  ii. Morphophonological rules do not apply between two extended projections.

(48) *Extended projection within a complex head (modified from Grimshaw 2000)*

- $\alpha$ is in the extended projection of a root R if:
  i. the head of $\alpha$ morphologically selects/subcategorizes R, or
  ii. the head of $\alpha$ morphologically selects/subcategorizes $\beta$, where $\beta$ is a head in the extended projection of R.
Why?

• Timing and nature of the operations affects the accessibility of morphosyntactic information.
  – VI has access to the entire spell-out domain.
    * As elements have already undergone VI, the access to morphosyntactic information is limited (Bobaljik 1999).

• Following Bobaljik (2000), I assume that VI occurs cyclically from the root outwards and that VI rewrites the output of syntax.
  – Outward sensitivity to morphosyntactic features.
  – Inward sensitivity to phonological form.

• Following Noyer (1997), I assume that linearization and concatenation immediately follow VI cyclically.
  – Otherwise the operations are run along the lines of Embick (2010).

• Drawing on, e.g., Monahan (1982), Kiparsky (1982), Pak (2008), morphophonology applies cyclically immediately following concatenation.
  – Limited access to morphosyntactic information, following VI (cf. Bobaljik 1999), allows for reference to selection and morphosyntactic feature content.

• Drawing on Pak (2008), processes are specified for the timing of concatenation.
  – Early concatenation concatenates morphemes within the extended projections.
  – Late concatenation concatenates two extended projections

• To continue the derivation from (46), VI applies simultaneously to the two roots and category nodes, yielding (49).

The suffix -na is then inserted at $\varphi_1$ and this element is linearized and concatenated with respect to $n_1$, (50)

- Null morphemes are only visible to the extent that the morphosyntactic features are visible.
- $\varphi_1$ morphologically selects $n_1$ and hence occlusion applies to the string produced by a previous VI operation (/\gamma/ → [k]).

• Morphosyntactic information with respect to $n_1$ has been erased leaving only the phonological string
  – Under the approach taken here, only morphosyntactic information pertaining to the highest projection of the spelled out structure is available post-VI.

• Finally the non-head element is concatenated with the head of the compound yielding the string in (51).
  – Fricativization of /k/ is not applicable as the non-head does not select for the head and vice versa.
  – Stress resolution is applied, deleting stress from the head of the compound.

\begin{align*}
(51) & ['paksakna] \\
  & \text{backstory.GEN.PL}
\end{align*}

• In case of single-stem words containing multiple spell-out domains, consider the derivation of græðgi ‘greed’ from above.
  – The initial spell-out domains contains only the root and the nominalizer, (52).
  – The second domain contains the output of the previous domain and the adjectivizer, (53).
    * The morphosyntactic features of $n$ are still visible, conditioning the insertion of /\gamma/.
  – The final spell-out domain contains the second nominlizer, (54).
    * Triggers vowel deletion on /\gamma/, feeding occlusion.
    * Triggers i-umlaut on the diphthong /au/.
    * Morphosyntactic information pertaining to $a$ is available.
    * For elements below $a$, only the phonological string remains.
  – The output of this third domain is shown in (55).
Although the output of a previous phase is available, the syntactic structure is not, hence subsequent operations on this output must target its edge, e.g., occlusion above, or apply throughout, e.g., u-umlaut (cf. Kaisse 1985).

• Prediction:
  – A morphophonological domain can be center embedded within a larger one.

• Appears to be borne out.

• Icelandic allows for unstressed prefixes on predicative adjectives, (56), but not attributive, (57), (Árnason 1987).

  (56) a. Maðurinn er almennt ófróður.
  ‘The man is generally considered unknowledgable.’

  b. Maðurinn er almennt ó-fróður.
  ‘The man is generally considered unknowledgable.’

  (57) a. *Ófróður maður fékk sér samloku.
  ‘An unknowledgable man got himself a sandwich.’

  b. Ó-fróður maður fékk sér samloku.
  ‘An unknowledgable man got himself a sandwich.’

• In case of a compound adjective with a nominal non-head, this asymmetry is lost.

  (58) a. Maðurinn er almennt óbíl-fróður.
  ‘The man is generally considered unknowledgable about cars.’

  b. ??Ó-bíl-fróður maður fékk sér samloku.
  ‘A man unknowledgable about cars got himself a sandwich.’

  (59) a. Ó-bíl-fróður maður fékk sér samloku.
  ‘A man unknowledgable about cars got himself a sandwich.’

Given the morphosyntactic and semantic considerations, the structure of the compound is as shown in (60).

  a. Ó-fróður maður fékk sér samloku.

  ‘A man unknowledgable about cars got himself a sandwich.’

  b. ??Ó-bíl-fróður maður fékk sér samloku.

  ‘A man unknowledgable about cars got himself a sandwich.’

• In Icelandic compounds, main stress falls on the extended projection of the leftmost root, \( \sqrt{\text{CAR}} \) in (60).

• \( \sqrt{-} \) is in the extended projection of \( \sqrt{\text{KNOW}} \), which does not receive main stress in (60).

• Summary:
  – At the point of VI, any part of the compound is accessible in accordance to syntactically determined locality constraints.
  – Morphophonology applies at the point of concatenation and has access to both morphosyntactic information and phonological.
    * Only the features associated with the highest constituent are visible post-VI.
    * The phonological output of the previous cycle or spell-out domain is visible.
  – Concatenation applies first to morphemes in a selectional relationship before concatenating adjoined material.

B Dislocated elements in Zulu

• Following Cheng & Downing (2009), right dislocated elements are adjoined to vP, (61) corresponding to (35b).
Dynamic Domains

Oblatorily precede other adjuncts.

• The verb moves to a position above vP but below T (following Cheng & Downing 2009).

\[
\text{[CP C [\text{TP} \text{SUBJECT} [\text{T} [\text{XP} [\text{XP} \text{VERB} [\text{vP [\text{vP} \text{IO} \text{RD-DO]} \text{ADJUNCT}] \text{ADJUNCT}]]]]]
\]

Non-contrastive topics vary in terms of their position with respect to the subject as well as their phonological phrasing (Cheng & Downing 2009).

– Precede the subject and phrase separately, (62).
– Follow the subject and phrase separately, (63).
– Follow the subject and phrase with the clause and subject phrases separately, (64).

(62) Context: What did the lawyer do with the papers?
(áma-ph[ë:ph’) (úm-mél’ ú-wá-sayín-fë:le)
6-paper 1-lawyer 1SBJ-6OBJ-sign-TAM
‘The lawyer signed the papers.’

[Cheng & Downing 2009:228]

(63) a. Context: What did the visitors buy for their families?
(Ízí-vakásh’ (fími-ndenî y’á: zo) zì-fì-thengél: ízín-gu:bo.)
8-visitor 4-family 4.their 8SBJ-4OB1-buy.for 10-clothes
‘The visitors bought clothes for their families.’

[Cheng & Downing 2009:227]

(64) a. Who did the woman buy the greens from?
(In-kósí[kái:si] (imí-fín’ í-fì-thengé: kú-m-li:mi.)
9-woman 4-vegetable 9SBJ-4OBJ-buy LOC-1-farmer
‘the woman bought the greens from a farmer.’

[Cheng & Downing 2009:227]

Contrastive topics always precede the subject and phrase separately, (65).

(65) Context: Did the chief build houses inside our village or outside our village?
[é-sí-godi-ni s[ë:] thu] ín-duna y-akhé: ízì:n-dlu, háhyí
LOC-7-village-LOC 7,our 9-chief 9SBJ-build 10-house not
nga-phá:ndle.
LOC-outside
‘The chief built houses inside our village, not outside our village.’

[Cheng & Downing 2009:227–228]

Cheng & Downing (2009), following, e.g., Belletti (2004), argue that the post-subject position involves movement to a lower topic position between IP and vP (TP and vP under the current approach).

Pre-subject topics are argued to occupy a position in the CP domain.

– Does not explain the difference between (63) and (64).

Proposal:

– The elements phrasing separately are LD elements.
– Low LD topics (non-contrastive) are adjoined to TP, (62) and (63).
– In (63), the subject has moved to Spec-CP.
– High LD topics (optionally contrastive) adjoin to CP, (65).
– In (64), the indirect object has been topicalized and the subject is LD.

The structures for pre-subject topics are given in (66), compare to (62), and (67), compare to (65).

(66) [CP [TP (NC-TOPI) [TP (SUBJECT VERB)]]]

(67) [CP (TOPI) [CP [TP (SUBJECT VERB)]]]

When the subject phrases separately and the topic phrases with the rest of the clause, (64), the subject is LD and the object has undergone movement to Spec-CP.

– Subject not selected, hence forms a domain to itself.
– Object is selected and contained within the CP, hence phrases with the rest of the clause.

Structure is shown in (68), compare to (64).

(68) [CP (SUBJECT) [CP (OBJECT [TP VERB])]]

In cases such as (63), the subject has undergone movement to Spec-CP.

– Subject is a selected element and still contained within the CP.
– The low topic, an adjunct, is not selected and embedded within the domain marked by the CP.

The structure is shown in (69), compare to (63).

(69) [CP (SUBJECT [TP (TOPI) [TP VERB]])]