On Morphological Locality, Linear Adjacency, and the Nature of Vocabulary Insertion

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No matter what theory or subtheory of linguistics one works in, questions of locality are of the utmost importance\(^1\). These questions normally take forms like ‘What is the domain for the particular phenomenon I am examining?’ or ‘What type of configurations between two linguistic elements provide a local enough environment for a process to occur?’

Here we will focus on morphological locality, using the general framework of Distributed Morphology (Halle and Marantz, 1993, 1994; Harley and Noyer, 1999). Empirically, we will examine the Irish verbal complex. Specifically, we will concern ourselves with the dependent/independent alternation and the synthetic endings brought to the attention of the literature by McCloskey and Hale (1984). The dependent/independent alternation, as we shall see in much more detail throughout the paper, is a form of verbal allomorphy which is triggered by adjacent complementizers. It is shown briefly in (1).

(1) The Dependent/Independent Alternation

a. Gheobhaidh tú carr nua.
   get.FUT you car new
   ‘You’ll get a new car.’

b. ... go bhfaighidh tú carr nua.
   c get.FUT.DEP you car new
   ‘...that you will get a new car.’

In (1a), we see that the future form of the verb meaning ‘get’ is gheobhaidh [jo.i]. But when it follows the embedded declarative complementizer go, it must change to bhfaighidh [wāi.i]. These alternations cannot be accounted for through the regular phonology of Irish, and are thus suppletive. Below, I argue that these forms are best thought of as portmanteaux.

Furthermore, I argue that portmanteaux phenomenon result from the nature of Vocabulary Insertion (VI), which I will argue is best thought of as operating over Spans (Svenonius, 2012; Merchant, 2015). Importantly, I differ from these authors and argue that the relevant notion of a Span is not a contiguous part of an Extended Projection (Grimshaw, 2000), but rather linearly adjacent members of an Extended Projection.

Now, readers familiar with the literature on these concerns may be troubled. Vocabulary Insertion has been standardly thought of as operating on hierarchical structures, not linearized ones. Vocabulary Insertion begins

\(^1\)Thanks are due, first and foremost, to the Irish speakers who helped me along the way. Particularly, Ailbhe Nic Giolla Chomhaill, Lee Vahey, and Conal McShane. Additionally, thanks are due to Jim McCloskey, Sandy Chung, Armin Mester, Jason Merchant, Ryan Bennett, and the audiences at the ICCS XV, AlMM3.
with the most deeply embedded node and then works its way up the tree Bobaljik (2000). Additionally, it has been argued that contextual suppletion may only occur between *linearly adjacent* nodes, not hierarchically adjacent ones Embick (2010). The claims made here are not to be interpreted as contradicting these findings. Instead, I propose that linearization happens before Vocabulary Insertion, as discussed in Arregi and Nevins (2012). Therefore, this information is available to Vocabulary Insertion, and I only propose that Vocabulary Insertion can use it. If the arguments below prove convincing, we end up in a very interesting place theoretically: Vocabulary Insertion operates over linearized hierarchical structures, and can use this linear information, as well as hierarchal information.

The paper is organized as follows. In §1, I will present the current theoretical landscape within Distributed Morphology, focusing on how the morphology is conceived of in relation to the syntax, and previous proposals on the nature of Vocabulary Insertion. In §2, we will examine the Irish verbal complex. Particularly, we will focus on comparing ‘regular’ verbs\(^2\) with verbs which undergo the dependent/independent alternation. This section is broken up into several parts. First, the morphology of the actual verbal element is examined. Then, complementizers are examined, as they are undoubtably part of the verbal complex and have interesting and important morphological interactions. Then I discuss formal approaches to constructing the verbal complex in Irish, appealing to the notion of C-Lowering, as proposed by McCloskey (1996), formalized using the system of morphological Lowering in DM (Harley and Noyer, 1999; Embick and Noyer, 2001; Oda, 2012). Once we have an understanding of the empirical and syntactic background, I move on to discuss the actual morphology. §3 presents an analysis of the Irish verbal complex using Spanning (Svenonius, 2012; Merchant, 2015). This account draws heavily on work in Oda (2012), and can be seen as a rephrasing of his core insight. Importantly though, this Spanning account makes certain predictions about the synthetic endings present in the language. It will be these data which will require us to think of Vocabulary Insertion fundamentally operating over hierarchical structures, but with access to linear information in §4. Furthermore, these Irish data make an interesting case that Vocabulary Insertion, and the morphology more broadly, has access to entire Extended Projections, not just certain portions of Extended Projections determined through syntactic phases (Chomsky, 2001, 2008) or morphological cycles (Embick, 2010). This will require us to reconsider the nature of the syntax-morphology interface. §5 concludes.

1 Theoretical Background

As stated above, the analysis provided here is within the general framework of Distributed Morphology (Halle and Marantz 1993, 1994; Harley and Noyer 1999, among many others). Within Distributed Morphology (henceforth DM), there is no ‘distinct’ morphological component of the grammar. Rather, the empirical terrain traditionally relegated to morphology emerges through interactions between the syntactic component of the grammar and the ‘PF’ branch (Embick and Noyer, 2001). Here, we will not focus too closely on what is meant by ‘PF’ in DM, but rather focus on one distinct aspect of this theory: Late Insertion, and the necessary corollary, Vocabulary Insertion\(^3\). The definition of Late Insertion is given in (2), taken from Halle and Marantz (1994).

\[\text{Late Insertion: The terminal nodes that are organized into the familiar hierarchical structures by principles and operations of the syntax proper are complexes of semantic and syntactic features}\]

\(^2\)In other words, verbs which do not undergo the dependent/independent alternation.

\(^3\)See the works cited above for a more lengthy discussion of these two ideas, as well as Bobaljik (2000) and Embick (2010).
but systematically lack all phonological features. The phonological features are supplied - after the syntax - by the insertion of Vocabulary Items into the terminal nodes Vocabulary Insertion (VI) adds phonological features to the terminal nodes, but it does not add to the semantic/syntactic features making up the terminal nodes” (Halle & Marantz 1994, 275-276).

To paraphrase this, DM posits that the syntax has no primitive notion of ‘word.’ Even further, there is posited to be no phonological information at all in the syntax. Rather, what the syntax sees and manipulates are ‘feature bundles.’ These feature bundles for functional morphemes can be thought of as purely the formal syntactico-semantic features so common in formal syntactic theory, as as [+Q], [+WH], [+FINITE], and so on. Within DM, these feature bundles are what correspond to morphemes in other theories. Throughout, I will use the terms ‘feature bundle’ and ‘morpheme’ interchangeably.

Additionally, DM makes a sharp divide between functional morphemes (f-morphemes) and lexical morphemes (l-morphemes). How this has been interpreted in the literature is by the notion of a Root. Roots are open-class items which act as the anchor upon which morphological structure is built. Following Arad (2003), Roots are crucially distinct from full words. One way in which they are distinct is that Roots contain no category information. Rather, category itself is an emergent phenomenon resulting from syntactic structure at the level of the word. This can be seen concretely in (3) and (4), which shows how this notion of morphological structure can be used fruitfully to account for cases of morphological ambiguity by illustrating sample derivations of the famous English ‘unlockable.’

(3) ‘able to be unlocked’

(4) ‘not able to be locked’

Thus, morphological ambiguity is reduced to structural ambiguity relating to the attachment site of a linguistic element, just like in the classic example ‘Sally saw a man with a telescope.’ Just as this ambiguity is formally analyzed as resulting from differing syntactic attachment sites of the PP ‘with a telescope,’ the ambiguity in ‘unlockable’ results from the optionality of attachment site. While in ‘Sally saw a man with a telescope,’ the linguistic element leading to the ambiguity is a phrase, in ‘unlockable’ it is a functional polarity head which can be attached in different positions to yield different interpretations.

This is all well and good, and certainly, in my mind, represents the theoretical optimum available in the literature right now. This is because it greatly reduces the size of the grammar by doing away with a separate generative module, the generative lexicon, and places an emphasis on the importance of hierarchical structure, which has been shown time and time again, in every major subfield of generative linguistics, to be of the utmost importance.

\[4\] Note that in (4) I attach Pol to v, not directly to the root. I do not have any arguments for this choice, and it is immaterial to the discussion here. Whether Pol attaches to v or lower, perhaps directly to the Root itself, is not important. What does matter is that the difference in meaning is correlated with a difference in structural attachment site.
But we still have not answered the question of how words are built, which, presumably, is the job of any theory of morphology. Classical DM provides the expected answer given the general architecture of the theory: word-building is not a modular concept, but rather the emergent result of syntactic operations such as classical head-movement (Baker, 1998; Pollock, 1989), as well as operations unique to the morphology, such as Lowering and Local Dislocation (Embick and Noyer, 2001). Either way, a ‘word’ is not a syntactic primitive, but rather a side effect of independent operations.

This brings us back to the concept of Vocabulary Insertion, mentioned above in (3). Vocabulary Insertion is, perhaps, the only truly unique operation in the morphology within DM\(^5\). How VI works, under any theory of it, is by matching syntactico-semantic features with the actual, observed pieces of languages. A sample of this is given in (5) for the English plural suffix.

\[(5) \quad [+PL] \iff /s/\]

This pairing between syntactico-semantic features and material interpretable by the phonology is called a Vocabulary Item. Let us take a second to examine the form of (5). On the left is a syntactico-semantic feature, provided from the syntax. On the right is the actual phonological material, which is then manipulated by the phonology. Additionally, the bidirectionally of the arrow between the two is important. It signifies that neither the feature bundle on the left, nor the overt form on the right, holds any more theoretical significance than the other. In other words, within DM it is not the case the /s/ ‘comes from’ [+PL] or vice-versa. Instead, /s/ is said to expone, or spell-out, [+PL], meaning that they are formally equivalent.

But, as we know, the plural suffix in English has more forms than /s/. Take, for example, /on/ found at the end of ‘oxen.’ As any speaker of English knows knows, formally and semantically speaking, /on/ and /s/ are fundamentally the same thing. We can interpret this formally by claiming that both /on/ and /s/ are exponents of [+PL]. How, then, do we account for a pattern such as (6)?

\[(6) \quad \begin{array}{ll}
  a. & \text{fox -es} \\
  b. & \text{*fox -en} \\
  c. & \text{ox -en} \\
  d. & \text{*ox -es}
\end{array}\]

This phenomenon is what is called ‘suppletion’ in the literature. Here we will use the definition of suppletion in (7).

\[(7) \quad \textbf{Suppletion:} \quad \text{The phenomenon by which the exponent of a feature bundle varies in such a way that cannot be accounted for through the regular phonology of the language.}\]

Thus, the alternation between /s/ and /on/ is suppletion, as /s/ and /on/ do not vary outside of this paradigm in the phonology of English. By contrast, the forms of /s/, namely [s], [z], and [əz], can be accounted for by the regular phonology of English, namely voicing assimilation.

Now, how do we capture suppletive paradigms, such as those in (6), with the technology of Vocabulary Items from (5)? The solution DM provides is simple: provide multiple Vocabulary Items for the same feature bundles, and then provide contextual information which limits the Insertion of that Vocabulary Item. These are shown in (8).

\(\text{\textsuperscript{5}Setting aside operations such as Lowering and Local Dislocation discussed in Embick and Noyer (2001). Interestingly though, these operations look exactly like other operations attested independently in the grammar, namely syntactic head-movement via adjunction for Lowering and phonological metathesis for Local Dislocation. Going further to uncover deeper similarities between these operations, in the spirit of Arregi and Nevins (2012), is beyond the scope of this paper, but is, nonetheless, a necessary qualification to make.}\)
Now, all we need is a general principle which guides and operates over VI about the use of Elsewhere forms, such as /s/ above, to prevent (6d), "oxes." This can be found in the work of Hankamer and Mikkelsen (2005), which builds on earlier work in Halle (1997). They provide such a principle in the form of the Extended Subset Principle. I provide the slight reformulation of their definition below.

**Extended Subset Principle**: When a feature bundle has two possible exponents but differ in contextual specification so that the contextual specification of one item is a subset of the contextual specification of another, the item with the more restricted contextual specification must be chosen.

In other words, Insert the most specific exponent you can.

Thus, questions of locality in DM are built into what environments, or contextual specifications, are possible in Vocabulary Items, and what those possible Vocabulary Items are. The literature has answered these questions in a few ways. Most recently, a few ideas have emerged from the literature which, when viewed as a whole, provide a testable theory. For ease of reference, I will call this theory the Standard Theory of Vocabulary Insertion (SToVI). As I said, SToVI emerges from several sources, particularly, in chronological order, Bobaljik (2000); Embick (2010); Bobaljik (2012); Svenonius (2012), and Merchant (2015). Which pieces of SToVI come from which authors will be demarcated below.

First is the contribution of Bobaljik (2000), which is arguably the most important proposal of the bunch, as it has constrained the ways subsequent works have thought about Vocabulary Insertion. Bobaljik argues on the basis of elaborate verbal morphology in Itelmen that Vocabulary Insertion has the following two properties:


- a. Vocabulary Insertion inserts Vocabulary Items into terminal nodes.
- b. The first node to be subject to Vocabulary Insertion is the most deeply embedded node.
- c. Vocabulary Insertion trades morphosyntactic features for phonological features; once a node has undergone Vocabulary Insertion, it contains only phonological features.

In other words, Insert from the bottom up.

As Bobaljik discusses at length, this formulation of Vocabulary Insertion has important consequences for the kinds of allomorphy that are possible. Importantly, there is no single answer: both phonologically conditioned and morphosyntactically conditioned allomorphy are possible, but it depends on which nodes have already been Inserted and which nodes have not at a particular point in the derivation. Consider a structure such as (11).

```
X
 Y  X[MORPHO]
 Z[MORPHO]  Y[MORPHO]
```

Per the standard assumptions in DM, the syntax only manipulates abstract features. Thus, none of these nodes have any phonological features, only morphosyntactic features. Now, VI will operate on Z first, as it is the most deeply embedded node in this structure. This will produce the following structure in (12).
In (12), Vocabulary Insertion has inserted a Vocabulary Item into Z. In Bobaljik's system, this is an overwrite operation, meaning that the phonological features overwrite the morphosyntactic ones. This has important implications for what allomorphic contexts a particular node can have. For instance, when Y is undergoing Vocabulary Insertion, it can be sensitive to only the morphosyntactic features of X, and to only the phonological features of Z. Likewise, when VI was operating on Z, Z could show allomorphic variation due to morphosyntactic features of Y and Z, but not to their phonological features, as they have not undergone VI and thus do not have any phonological features.

This introduces the notions of inward and outward sensitive allomorphy in addition to phonologically conditioned and morphosyntactically conditioned. The interactions between these four kinds of allomorphy lead to the following proposed typology of allomorphy.

(13) **Typology of Allomorphy**

<table>
<thead>
<tr>
<th></th>
<th>Inward Sensitive</th>
<th>Outward Sensitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonologically Cond.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Morphosyntactically Cond.</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

Thus, if an allomorphic pattern on a node α is *phonologically* conditioned, it may only reference the phonological features of nodes more deeply embedded than it. This is because these are the only phonological features that exist at a given point in the derivation. Likewise, if another allomorphic pattern on a node β is *morphosyntactically* conditioned, then it must be outward sensitive, not inward.

One of these predictions is obviously wrong, and has thus not been adopted by the literature: the lack of existence of inward sensitive morphosyntactically conditioned allomorphy. Take, for example, our example of the English plural suffix from above in (6), reproduced below in (14).

(14) a. fox -**es**
    b. *fox -**en**
    c. ox -**en**
    d. *ox -**es**

Here it is clear that the allomorphy demonstrated by the plural suffix is not phonologically conditioned, but still inward sensitive. Thus, it cannot be the case the Vocabulary Insertion overwrites morphosyntactic features. Instead, it must simply add phonological features to the node's morphosyntactic features.

Thus, we amend our understanding of Vocabulary Insertion.

(15) **SToVI, 2nd Pass**

a. Vocabulary Insertion inserts Vocabulary Items into terminal nodes.

b. The first node to be subject to Vocabulary Insertion is the most deeply embedded node.

c. Vocabulary Insertion adds phonological features to a node; once a node has undergone Vocabulary Insertion, it contains both phonological and morphosyntactic features.
But still, Vocabulary Insertion is conceived of as operating on hierarchical structures containing no phonological features until after a node has undergone Vocabulary Insertion. Additionally, Vocabulary Insertion operates on one terminal node at a time in a piecemeal fashion, starting from the most deeply embedded node and working its way up. Thus, our predictions about what types of allomorphy are possible is amended as well.

(16) Amended Typology of Allomorphy

<table>
<thead>
<tr>
<th></th>
<th>Inward Sensitive</th>
<th>Outward Sensitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phonologically Conditioned</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>Morphosyntactically Conditioned</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Both inward and outward sensitive morphosyntactically conditioned allomorphy are predicted to be possible, but still not outward sensitive phonological allomorphy. Largely, this prediction has been maintained in the literature, and the few possible cases of outward-sensitive phonologically conditioned allomorphy are preciously few.

Now, after Bobaljik (2000), the next major contribution to the theory of Vocabulary Insertion is Embick (2010). Embick builds on Bobaljik’s basis proposal, that Vocabulary Insertion operates on hierarchical structures and starts at the most deeply embedded node. But he adds important conditions on it, demonstrated below. The italicized lines represent Embick’s contributions.

(17) SToVI, 3rd Pass

a. Vocabulary Insertion inserts Vocabulary Items into terminal nodes.

b. The first node to be subject to VI is the most deeply embedded node in a cycle.

c. Vocabulary Insertion adds phonological features to a node; once a node has undergone Vocabulary Insertion, it contains both phonological and morphosyntactic features.

d. A node $\alpha$ may only trigger allomorphy on a node $\beta$ iff:
   1. $\alpha$ and $\beta$ are in the same cycle.
   2. $\alpha$ and $\beta$ are linearly adjacent.

Here, the notion of linear adjacency is strongly codified. But a few points need to be clarified. First, is Embick’s notion of a cycle. While inspired by Phase theory from syntactic thought (Chomsky, 2001), it differs from it in important ways.

First, consider a structure such as (18). Following Embick’s notation, lower case nodes are cyclic heads.

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6See ? for a possible case though.

7Embick (2010) also argues that phonologically conditioned allomorphy is not possible within his system. I will not address this proposal here.

8Furthermore, it is unclear exactly what the relationship between syntactic phase heads and morphological cyclic heads is. The only heads which Embick explicitly identifies as morphological cyclic heads are the ‘categorizing little heads’ of Arad (2003). Whether or not syntactic phase heads, such as C, are morphological cyclic heads as well is an unresolved issue. All Embick says on the issue is: “These [category defining heads] are not necessarily the only phases in the theory; phases implicated in the work of Chomsky (2000, 2001) and others - for instance, C and D - could be part of this type of theory as well. There is a question as to whether category-defining heads and heads like C and D have the same status, however.” (Embick 2010, pg. 194, fn. 10)
Now let us discuss how this structure will undergo Vocabulary Insertion. First, a morphological cyclic head in Embick’s system is slightly different from a phase head in the system developed in Chomsky (2001). In Chomsky’s work, when a phase head enters the derivation, it sends it’s complement to Spell Out. In Embick’s system, when a cyclic head enters the derivation, it does not send its complement to Spell Out. But rather, it activates any cyclic heads in its complement. For example, in (18) when \( x \) Merges, it activates any cyclic domains in its complement. This is not relevant for us in this sample derivation, but it would be if the Root took a complement, for example.

When \( y \) enters the derivation, it activates \( x \). This sends \( x \), the Root (\( x \)’s complement), \( W \), and \( Z \) are sent to Spell-Out\(^9\). The status of \( W \) and \( Z \) seems to be peripheral, but the important prediction of Embick’s system is that two cyclic heads will never be in the same morphological cycle.

This notion of a cycle is developed and slightly modified in the next major contribution to SToVI: Bobaljik (2012). While following the system developed in Embick (2010), Bobaljik differs in a few important ways. In this work, Bobaljik uses an impressively broad typological survey of comparative and superlative morphology to make the following theoretical claims.

\[
\text{(19) } \quad \text{A node } \alpha \text{ may trigger suppletion on a node } \beta \text{ iff:}
\]

\[
\begin{align*}
\text{a. } & \alpha \ldots [X^* \ldots Z] \\
\text{b. } & [\chi] \ldots [X^* \ldots \beta]
\end{align*}
\]

What the locality conditions in (19) mean is that two nodes are only local enough for suppletion to be triggered if no maximal projection boundaries separate them\(^{10}\). This can be seen as a strengthening of Embick’s locality conditions, which merely required that the two nodes be in the cycle. For Bobaljik, they must be within the same cycle and not be separated by any maximal projection boundaries. Importantly though, the possible contextual environments for suppletion are still defined hierarchically.

Now, Bobaljik himself draws a crucial distinction between suppletion phenomenon and portmanteaux. Bobaljik builds on work in Radkevich (2010) in analyzing portmanteaux as involving insertion at a non-terminal node. Specifically, he analyzes suppletive superlative forms as portmanteaux of all of the nodes in the complex head. Such superlative suppletion patterns can be seen in (20).

\[
\text{(20) }
\]

\(^9\) Merge of cyclic \( y \) triggers Spell-Out of cyclic domains in the complement of \( y \)…For a cyclic domain headed by cyclic \( x \) in the complement of \( y \), this means that the complement of \( x \), the head \( x \) itself, and any edge\(^*\) material attached to \( x \)’s domain undergoes Vocabulary Insertion.’ Embick (2010), pg. 53

\(^{10}\) For our purposes it is enough to think of the locality conditions as restricting possible environments for contextual suppletion to morphological words. See Bobaljik and Harley (to appear) for a discussion on this important distinction though.
He analyzes this formally by allowing VI to Insert at non-terminal nodes. To see this, consider a structure such as (21).

(21)  
\[
\begin{array}{c}
\text{SPRL} \\
\text{CMPR} & \text{SPRL} \\
\text{ROOT} & \text{CMPR}
\end{array}
\]

As can be seen in (21), Bobaljik analyzes these superlative suppletive cases as involving VI Inserting at a non-terminal node, specifically the highest SPRL.

Now, Bobaljik makes the following claim about locality in portmanteau constructions.

(22)  
\[\text{Bobaljik 2012, pg. 149}\]
If an exponent \(X\) expresses \(\sqrt{\text{ROOT}}+F_1\ldots F_n\), for some features \(F_1\ldots F_n\) then \(F_1\ldots F_n\) must be adjacent to (or contiguous) with the root.

In other words, all of the nodes which are realized by a single portmanteau must be linearly adjacent/contiguous. Interestingly, this definition of portmanteaux is built on linear relations, not hierarchical ones, which contrasts with the hierarchically based environments for suppletion. This is very similar to the proposal made here.

The next major contribution for us is provided by Svenonius (2012) and Merchant (2015) in the form of the theory of Spanning. Spanning is similar to the theory of portmanteaux developed in Radkevich (2010) and Bobaljik (2012) in that Spanning allows VI to Insert not just piecemeal one terminal node at a time. Spanning contends that the locus for VI is not the terminal node, or even non-terminal nodes, but spans of terminal nodes. In this theory, a Span is defined as in (23).

(23)  
\[\text{“Let } T \text{ be an ordered } n\text{-tuple of terminal nodes } < t_1, \ldots, t_n > \text{ such that for all } t \in T, t=t_1 \text{ or } t \text{ is an element of the extended projection of } t_1.\]
\[\text{a. For all } k = 1\ldots n, t_k \text{ is a span. (Every node is a trivial span.)}\]
\[\text{b. For any } n>0, \text{ if } t_k \text{ is a span, then } < t_k, \ldots, t_{k+n} > \text{ is a span.”} \quad \text{Svenonius (2012)}\]

In other words, a Span is similar to a contiguous subset of the heads in an Extended Projection. They differ crucially in that Grimshaw’s original formulation of an Extended Projection crucially made reference to category features, while no such notion seems to be present in the Spanning literature. Rather, Svenonius (2012) emphasizes that the critical notion is selection.

To see this, imagine a syntactic structure such as (24).
(24) N5
   N4    N5
   N3    N4
   N2    N3
   N1    N2
   ...  N1

(24) can represent either a complex head resulting from head-movement, or a contiguous section of the clausal spine determined through successive complement relations. Thus, Spanning does not make a sharp distinction between within a complex morphological word and outside one, as in Bobaljik (2012). This is in fact necessary for his analysis of portmanteaux in French, which will be presented below in (29-30). Merchant (2015) presents the possible Spans from (24), using the definition in (23). This is shown below in (25).

(25)

A. N1
B. N2
C. N3
D. N4
E. N1 N2
F. N2 N3
G. N3 N4
H. N1 N2 N3
I. N2 N3 N4
J. N1 N2 N3 N4

(25) visually demonstrates the formal definition in (23). As stated in (23), each terminal node is a Span, albeit a trivial one. Additionally, any contiguous sequence of heads along a chain of complementation is a possible Span. Impossible Spans are sequences such as N1 and N3, without including N2. This is not a possible Span because it is formed by a noncontiguous set of heads.\(^{11}\)

\(^{11}\) Although there is, perhaps, a pathological prediction here when it comes to languages with mixed headedness. Consider a structure such as (i).

(i) N3
   N2    N3
   N2    N1

As far as I can tell, the definition of a Span above predicts that we should be able to find portmanteaux between N3 and N2, as, even though they are not adjacent, they form a contiguous portion of the Extended Projection with contiguity defined selectionally. I know of no data which support this prediction.
As stated above, Spanning is primarily a theory of Vocabulary Insertion whose core tenet is that the Span, and not just the terminal node, is the target of Vocabulary Insertion. In order to see how this works, let us run through a toy derivation. Let us return to our tree in (26), reproduced below with each node assigned some features, abbreviated as ‘f’.

(26)

```
                N5
               /   \    
              N4     N5[f1]
             / \   /  \  
            N3 N4[f2] N5[f1]
           / \   /  \   
          N2 N3[f3] N4[f2]
         / \   /   \   
        N1 N2[f4] N3[f3]
       / \   /     \   
      ... N1[f5]     ...
```

Now, imagine that all of these heads are visible to Vocabulary Insertion at the same time, i.e., that they occur in the same Spell-Out domain. Imagine that our toy language contains the following lexical entries, specified for our sample features.

(27) a. `<[f1, f2, f3]⇒ blurg>`
b. `<[f4, f5]⇒ blarfs>`

Now, assuming that these lexical entries in (27) are the only lexical entries in our language, Vocabulary Insertion will insert `blurg` into the Span consisting of N5, N4, and N3, and `blarfs` for the Span consisting of N2 and N1.

For our purposes here, Merchant (2015) uses Spanning to define the locality domains for allomorphy selection. Merchant proposes the following hypothesis, which he calls the Span Adjacency Hypothesis.

(28) **Span Adjacency Hypothesis**: Allomorphy is conditioned only by an adjacent span.

As Merchant states, (28) “permits nonadjacent heads and their features to participate in the conditioning of an allomorph, but requires that such nonadjacent heads (or their features) for a span with heads . . . , up to an including the head that is adjacent to the head that is adjacent to the conditioned form” (Merchant, *ibid*, pg. 27). In other words, a node may exhibit allomorphy triggered by a nonadjacent head if and only if any and all heads intervening between the triggering head and the head exhibiting allomorphy also participate in the allomorphy selection. To see this, consider our tree in (26). The Span Adjacency Hypothesis says that N5 may trigger allomorphy on N1 if and only if N4, N3, and N2 are also involved.

Furthermore, Merchant argues that Spanning is superior to the theory of non-terminal node Insertion found in Radkevich (2010) and Bobaljik (2012). This has to do with cases of portmanteaux in an Extended Projection that does not involve the Root node. Merchant’s examples involve complex patterns in Greek verbal morphology which I will not reproduce here for reasons of space, but it is worth noting that the same point is made in the French cases examined in Svenonius (2012).

In French, the masculine article *le* fuses with prepositions if it occurs before a consonant initial nouns. (29) demonstrates this with the prepositions à ‘to’ and de ‘from/of’.

```
(29) ...
```
Setting aside the difference between V-initial and C-initial nouns, the syntactic structure of these phrases is taken to be something like (30).

(30) \[
\begin{array}{c}
\text{PP} \\
\text{P} \quad \text{DP} \\
\text{à} \text{/de} \quad \text{D} \quad \text{NP} \\
\text{le/la} \quad \text{N}
\end{array}
\]

Now, how do we handle the portmanteaux forms *au* for *à le* ‘to the’ and *du* for *de le* ‘of the’? Svenonius proposes that these forms Spell-Out the Span P and D.

(31) a. \[ [+\text{DEF, MASC}] \leftrightarrow /\text{l}o/ /\ldots/\text{C} \]
  b. \[ [+\text{P, ‘to’}] \leftrightarrow /\text{a}/ \]
  c. \[ < [+\text{DEF, MASC}], [+\text{P, ‘to’}] > \leftrightarrow /o/ /\ldots/\text{C} \]

The important thing about the Vocabulary Items in (31) is that the Span which Spells Out *au /o/ ‘to the’* realizes a contiguous part of the extended projection of N which does not include the nominal Root. This is impossible in the system of Radkevich (2010) and Bobaljik (2012), as their only way of Spelling Out these two heads is to Insert high, perhaps at PP\(^{12}\). But this would obligatorily require the nominal Root to be included in the portmanteau, as it is contained within the PP which is undergoing Insertion.

(32) \[
\begin{array}{c}
\text{PP} \leftarrow \\
\text{P} \quad \text{DP} \\
\text{à} \text{/de} \quad \text{D} \quad \text{NP} \\
\text{le/la} \quad \text{N}
\end{array}
\]

This is obviously the wrong prediction, as can be seen in (29); the nominal Root occurs alongside the portmanteau forms *au* ‘to the’ and *du* ‘of the.’ Thus, Spanning, which allows these nodes to be included in a single

\(^{12}\)While Bobaljik does not explicitly say that VI can insert at phrasal categories, not just heads, it is not obviously ruled out in his system.
Vocabulary Item to the exclusion of the Root, represents an improvement in the theory.

Where does this discussion leave us? If we understand all of these proposals as a whole, we piece together the following understanding of the process of Vocabulary Insertion. Note that the theory of suppletion is built into the theory of Vocabulary Insertion.

(33) **Complete Theory of Vocabulary Insertion: SToVI Final**
   a. Vocabulary Insertion operates on hierarchical structures, beginning with the most deeply embedded node and working its way up (Bobaljik, 2000).
   b. Vocabulary Insertion operates within cycles, determined by categorizing heads (Embick, 2010).
   c. Vocabulary Insertion may operate over Spans of an Extended Projection (Svenonius, 2012; Merchant, 2015).
   d. Suppletion may only be triggered within a morphological word and within a morphological cycle (Bobaljik, 2012).
   e. Suppletion may only be triggered by adjacent Spans (Merchant, 2015).

Now that we understand how Vocabulary Insertion has been thought about previously in the literature, let us move on to the empirical portion of this paper.

## 2 The Irish Verbal Complex

The Irish finite verb is fairly standard from an Indo-European perspective. Verbs consist of a root and tense/mood morphology\(^{13}\), which is suffixal on the verbal root. (34) shows a few sample sentences with the verb highlighted and morphologically parsed.

(34) a. Éir-óidh sí as an bpost.
   rise-FUT she from the job
   ‘She will retire from the job.’
   b. Thabhar-fadh sé rabhadh dom.
   give-COND he warning to.me
   ‘He would warn me.’
   c. Ith-eann an fear sin cáca gach lá.
   eat-PRES the man that cake every day
   ‘That man eats cake every day.’

Additionally, many southern (Munster) dialects allow so-called ‘synthetic endings,’ which encode tense/mood information as well as the $\phi$-features of the subject. Consider the following forms, adapted from McCloskey and Hale (1984), the seminal work these synthetic endings.

(35) a. Chuir -eadar isteach ar an phost.
   put.PAST -PAST.3PL in on the job
   ‘They applied for the job.’

---

\(^{13}\)Note that in this paper I will not discuss non-finite forms of Irish verbs, the so called ‘verbal nouns.’ I will also collapse the difference between tense and mood for the sake of exposition. Furthermore, from an Irish viewpoint, both tense and mood marking are both suffixes on the verbal root and are mutually exclusive, giving the impression that they are in complementary distribution. This makes this move not totally unreasonable, as it seems like the difference between tense and mood is not relevant in Irish, morphologically speaking.
b. Mhol -amar è.
   propose.PAST -PAST.1PL
   ‘We proposed it.’

The range of possible tense/mood suffixes varies across dialects, as pointed out by McCloskey and Hale. Legate (1999) discusses the two most extreme patterns. One, common in northern (Ulster) dialects radically reduces the number of possible suffixes, instead opting for a default suffix and overt pronouns. The second, found in traditional southern (Munster) varieties, has numerous portmanteaux suffixes which combine tense/mood and the φ-features of the subject. (37) shows the full Munster Irish conjugation for the verb *cuír* 'put,' while (36) shows the Ulster conjugation for the same verb. Both (36) and (37) are adapted from Legate (1999)\(^{14}\).

(36) \[ \text{Ulster conjugation} \]

<table>
<thead>
<tr>
<th></th>
<th>Pres</th>
<th>Fut</th>
<th>Past</th>
<th>Imperf</th>
<th>Cond</th>
</tr>
</thead>
<tbody>
<tr>
<td>1s</td>
<td><em>cúir-im</em></td>
<td><em>cúir-fidh mé</em></td>
<td><em>chuir-∅ mé</em></td>
<td><em>chuir-inn</em></td>
<td><em>chuir-finn</em></td>
</tr>
<tr>
<td>2s</td>
<td><em>cúir-eann tú</em></td>
<td><em>cúir-fidh tú</em></td>
<td><em>chuir-∅ tú</em></td>
<td><em>chuir-teá</em></td>
<td><em>chuir-feá</em></td>
</tr>
<tr>
<td>3s</td>
<td><em>cúir-eann sé/sí</em></td>
<td><em>cúir-fidh sé/sí</em></td>
<td><em>chuir-∅ sé/sí</em></td>
<td><em>chuir-eadh sé/sí</em></td>
<td><em>chuir-feadh sé/sí</em></td>
</tr>
<tr>
<td>1pl</td>
<td><em>cúir-eann muid</em></td>
<td><em>cúir-fidh muid</em></td>
<td><em>chuir-∅ muid</em></td>
<td><em>chuir-imíd</em></td>
<td><em>chuir-fimid</em></td>
</tr>
<tr>
<td>2pl</td>
<td><em>cúir-eann sibh</em></td>
<td><em>cúir-fidh sibh</em></td>
<td><em>chuir-∅ sibh</em></td>
<td><em>chuir-eabhair</em></td>
<td><em>chuir-feadh sibh</em></td>
</tr>
<tr>
<td>3pl</td>
<td><em>cúir-eann siad</em></td>
<td><em>cúir-eann siad</em></td>
<td><em>chuir-∅ siad</em></td>
<td><em>chuir-eadar</em></td>
<td><em>chuir-feadh siad</em></td>
</tr>
</tbody>
</table>

(37) \[ \text{Munster conjugation} \]

<table>
<thead>
<tr>
<th></th>
<th>Pres</th>
<th>Fut</th>
<th>Past</th>
<th>Imperf</th>
<th>Cond</th>
</tr>
</thead>
<tbody>
<tr>
<td>1s</td>
<td><em>cúir-im</em></td>
<td><em>cúir-feadh</em></td>
<td><em>chuir-eas</em></td>
<td><em>chuir-inn</em></td>
<td><em>chuir-finn</em></td>
</tr>
<tr>
<td>2s</td>
<td><em>cúir-ir</em></td>
<td><em>cúir-fir</em></td>
<td><em>chuir-∅</em></td>
<td><em>chuir-teá</em></td>
<td><em>chuir-feá</em></td>
</tr>
<tr>
<td>3s</td>
<td><em>cúir-eann sé/sí</em></td>
<td><em>cúir-fidh sé/sí</em></td>
<td><em>chuir-∅ sé/sí</em></td>
<td><em>chuir-eadh sé/sí</em></td>
<td><em>chuir-feadh sé/sí</em></td>
</tr>
<tr>
<td>1pl</td>
<td><em>cúir-imíd</em></td>
<td><em>cúir-fimid</em></td>
<td><em>chuir-eamar</em></td>
<td><em>chuir-imid</em></td>
<td><em>chuir-fimid</em></td>
</tr>
<tr>
<td>2pl</td>
<td><em>cúir-eann sibh</em></td>
<td><em>cúir-fidh sibh</em></td>
<td><em>chuir-eabhair</em></td>
<td><em>chuir-eadh sibh</em></td>
<td><em>chuir-feadh sibh</em></td>
</tr>
<tr>
<td>3pl</td>
<td><em>cúir-id</em></td>
<td><em>cúir-id</em></td>
<td><em>chuir-eadar</em></td>
<td><em>chuir-idís</em></td>
<td><em>chuir-fidís</em></td>
</tr>
</tbody>
</table>

From this we can see that the morphemes which go into composing the verbal complex should minimally be V and T.

Additionally, there is further evidence that Irish has a morphological realization of v with some verbs, namely what is traditionally called ‘the second conjugation’ (Acquaviva, 2014). These verbs have the stable suffix -igh [iː] which shows sensitivity to the following tense/mood suffix. This is demonstrated in (38) with some sentences involving the second conjugation verb *imigh* 'leave'\(^{15}\).

(38) a. Im -í -onn siad gach lá.
    leave -v -PRES they every day
    ‘They leave every day.’

\(^{14}\)Notably, I did not include the so-called ‘autonomous’ forms. I will not discuss them here at all, as everything that ends up being said by the end of the paper will account for these forms as well. See McCloskey (2007) and the citations there in for more information on this construction.

\(^{15}\)A discussion of the morpheme glossed as d below is provided shortly.
b. D’-im -igh ∅ siad.
   D -leave -v -PAST they
   ‘They left.’

c. D’-im -í -odh sé ag 8 uair a chlog.
   D -leave -v -PAST.HAB he at 8 o’clock
   ‘He used to leave at 8 o’clock.’

From this we can conclude that the Irish verb minimally incorporates three morphemes: V v T, in this order.

Note that if the verb undergoes head movement to T in the syntax, as proposed by Chung and McCloskey (1987) and McCloskey (1996), this morpheme order is the predicted order from the Mirror Principle (Baker, 1985, 1998), assuming head movement in this case is leftward adjunction. This is shown in (39), which parses the verb in (38a) imi-ónn ‘leaves.’

\[
(39) \quad T \\
\quad \quad v \quad T \\
\quad \quad \quad \sqrt{\text{ROOT}} \quad v \quad \text{onn} \\
\quad \quad \quad \quad \quad \quad \quad \text{PRES} \\
\quad \quad \quad \quad \quad \quad \quad \quad \quad \text{im} \quad \text{í} \\
\quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \text{leave} \quad v
\]

With these basics in mind, let us now incorporate complementizers.

### 2.1 Complementizers in the Verbal Complex

It has long been noted that complementizers in Irish are notably ‘close’ to their following verbs. This closeness is observed by a few features. First, complementizers and the finite verb form a single prosodic word (Bennett et al., 2013). Second, syntactically nothing may intervene between the complementizer and the verb. Based on this, McCloskey (1996), in my view rightly, puts complementizers into the verbal complex. (40) provides some examples.

\[
(40) \quad a. \quad \text{Ni-or mhíll} \quad \text{se an fhíanaise.} \\
\quad \text{NEG-R destroy.PAST he the evidence} \\
\quad \text{‘He did not destroy the evidence.’}
\]

\[
(40) \quad b. \quad \ldots \text{go n-éir-óidh} \quad \text{si as an bpost.} \\
\quad \text{c rise-FUT she from the job} \\
\quad \text{‘...that she will retire from the job’}
\]

\[
(40) \quad c. \quad \text{An dtabhar-fadh} \quad \text{se rabhadh dom?} \\
\quad \text{Q give-COND he warning to.me} \\
\quad \text{‘Would he warn me?’}
\]

It is worth noting that the elements which comprise the set known as ‘complementizers’ is much larger in Irish than in many other languages. This goes back as long as there has been generative work on Irish, dating back at least to McCloskey (1978), and argued for specifically most recently in McCloskey (2002). I will not challenge this conclusion here. (41) provides the full table of these elements.
In (41) we see that Irish complementizers cover a wide range of semantic functions, ranging from negation (41a, 41d) to relative markers (41e, 41f) and conditional markers (41g,h). Also of note is that (41) indicates whether a given complementizer occurs with -r, in a way to be discussed shortly. Observe that the set of complementizers which do or do not take -r is seemingly random; there are no semantic or phonological generalizations to be made. The phonological point is particularly worth making. In (41e) and (41f), we see the two famous relativizers (McCloskey, 2002). Both are pronounced [ɔ], but one occurs with -r and the other does not. Therefore, membership in the subset of complementizers which occurs with -r does not seem to be phonologically motivated.

Now, what is this -r? -r and the related morpheme d-, are pieces of verbal morphology which doubly mark certain tense/mood features on the verb. Their distributions are practically identical, although not totally overlapping. See Oda (2012) for a discussion.

What are widely considered to be core cases of -r and d- are found in the common simple past forms. Here, d- appears before verbal roots that begin either with a vowel or /f/.

When one of the designated complementizers from the table in (41) occurs before a verb in the past tense though, d- may not surface. Instead, the complementizer is suffixed with -r.

---

16 It is tempting to make an analysis out of the fact that the two non-triggering complementizers cause lention while most of the triggering complementizers trigger nasalization. The high frequency negation marker in (41a) tells against this potential analysis though because it causes lention but does take the dependent form.

17 An account of this distribution may be within reach for DM with impoverishment. The exact analysis of this is beyond the scope of this paper, and for now I will gloss over the subtle and interesting differences between -r and d-.

18 This behavior is not uniform across dialects. All Munster simply past forms may famously occur with d-, realized as an orthographically independent word do [do]. This cross-dialect behavior is not of particular interest to us here.

19 The Munster facts work the same here.
‘You drank water.’

b. … gu-r fhoghlaímh-∅ tú Gaeilge.
   c-r learn-PAST you Irish
   ‘…that you learned Irish.’

Adapted from Oda (2012)

Now, occurrence of -r²⁰ is sensitive to the identity of the root. This is cached out in the dependent/independent alternation.

As mentioned above, the dependent/independent alternation is verbal allomorphy triggered by complementizers. Importantly, the set of complementizers which triggers the dependent form is identical to the set of complementizers which take -r. Therefore, I will refer to these complementizer as “triggering complementizers.” A complete list of triggering and non-triggering complementizers is given in (44) for future reference, and in all following examples triggering complementizers will occur with a superscript t.

(44)

<table>
<thead>
<tr>
<th>Triggering Complementizers</th>
<th>Non-triggering Complementizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>ní</td>
<td>d'</td>
</tr>
<tr>
<td>Negation</td>
<td>Direct relative</td>
</tr>
<tr>
<td>an</td>
<td>má</td>
</tr>
<tr>
<td>Interrogative</td>
<td>Realis conditional</td>
</tr>
<tr>
<td>go</td>
<td>Embedded declarative</td>
</tr>
<tr>
<td>nach</td>
<td>Embedded negation</td>
</tr>
<tr>
<td>aN</td>
<td>Indirect relative</td>
</tr>
<tr>
<td>dā</td>
<td>Irrealis conditional</td>
</tr>
</tbody>
</table>

As stated above, the triggering complementizers take -r and trigger the dependent form, and the non-triggering complementizers take d- and do not trigger the dependent form. A minimal pair is given below in (45) and (46). In (45), verbal complexes with the triggering complementizer ní are given, and in (46) with the non-triggering complementizer mà.

(45) a. nír raibh . .
   NEG be.PAST.DEP
   ‘...was not...’

b. mà bhí . .
   REAL be.PAST.INDEP
   ‘...if...was...’

(46) a. nír-or ól . .
   NEG-r drink.PAST
   ‘...didn’t drink...’

²⁰But not Munster dialectal do. But even in Munster Irish do and -r never cooccur.
Comparing the two sentences in (45) and (46) shows the main differences between triggering and non-triggering complementizers. Triggering complementizers take the dependent form of the verb (45a), but non-triggering complementizers do not (45b). Additionally, triggering complementizers occur with -r (46a), while non-triggering complementizers take d- (45b).

Now, without further ado, let us take a closer look at the dependent/independent alternation. The full list of verbs which undergo it is given below in (47).

(47) The Independent/Dependant Alternation

<table>
<thead>
<tr>
<th>Citation Form</th>
<th>Past Tense Alternations</th>
<th>Future &amp; Conditional Alternations</th>
<th>Present Tense Alternations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Independent Form</td>
<td>Dependent Form</td>
<td>Dependent Form</td>
</tr>
<tr>
<td>bi ‘be’</td>
<td>bhí</td>
<td>raibh</td>
<td></td>
</tr>
<tr>
<td>[biː]</td>
<td>[viː]</td>
<td>[rεv] or [ro]</td>
<td></td>
</tr>
<tr>
<td>déan ‘do’</td>
<td>rinne</td>
<td>dearna</td>
<td></td>
</tr>
<tr>
<td>[dʒen]</td>
<td>[rINi]</td>
<td>[dʒar.na]</td>
<td></td>
</tr>
<tr>
<td>feic ‘see’</td>
<td>chonaic</td>
<td>faca</td>
<td></td>
</tr>
<tr>
<td>[frkɔ]</td>
<td>['xo.niːk]</td>
<td>['fa.kɔ]</td>
<td></td>
</tr>
<tr>
<td>téigh ‘go’</td>
<td>chuaigh</td>
<td>deachaigh</td>
<td></td>
</tr>
<tr>
<td>[tʃeː]</td>
<td>['xu.ɪ]</td>
<td>[dʒa.xiː]</td>
<td></td>
</tr>
<tr>
<td>faigh ‘get’</td>
<td>gheobhaidh</td>
<td>bhfaighidh</td>
<td></td>
</tr>
<tr>
<td>[fai]</td>
<td>[jο.i]</td>
<td>[wai.i]</td>
<td></td>
</tr>
</tbody>
</table>

In (47), we see that there is no plausible way to get from the independent form to the dependent form, or vice versa, in the synchronic phonology of Irish. Therefore, I take the dependent/independent alternation to be a case of true suppletion.

Now, as shown briefly above, the dependent form is triggered when and only when one of the triggering complementizers (the complementizers which occur with -r) precedes one of the verbs in (47). Importantly for us, -r never cooccurs with the dependent form.

(48) a. An raibh tú tinn?
    Q was.DEP you sick
    ‘Were you sick?’

Note that dialects differ in which verbs undergo the dependent/independent alternation and which do not. These forms are consistent with most Connemara dialects, and are also the forms used in the standard language.
b. *Án bhí tú tinn?
Q was.Indep you sick
Intended: ‘Were you sick?’
Adapted from Oda (2012)

c. *Á-r raibh tú tinn?
Q-r be.Past.Indep you sick
Intended: ‘Were you sick?’

d. *Á-r bhí tú tinn?
Q-r be.Past.Indep you sick
Intended: ‘Were you sick?’

In (48a) we see the only possible choice. The complementizer an, which is a triggering complementizer, must take the dependent form of the following verb. (48b) shows that the dependent form is indeed required here, because it occurs after a triggering complementizer. (48c) and (48d) show that in the context of the dependent form of a verb, -r may not occur, nor can -r and the independent form be used in its place. This contrasts with verbs that do not undergo the DPA, such as cuir ‘put,’ shown in (49).

(49) a. Á-r chuir tú an t-uisce-beatha ’sa chuisneoir?
Q-r put.Past you the whiskey in.the refrigerator
‘Did you put the whiskey in the refrigerator?’
b. *Án chuir tú an t-uisce-beatha ’sa chuisneoir?
Q put.Past you the whiskey in.the refrigerator
Intended: ‘Did you put the whiskey in the refrigerator?’

Comparing (49a) with (49b) shows that -r is indeed required when it can occur. This is in contrast with the dependent forms in (48), which categorically cannot occur with -r. These results are summarized in (50).

(50)

<table>
<thead>
<tr>
<th>Dependent or Independent?</th>
<th>Triggering Complementizers (C⁺)</th>
<th>Non-Triggering Complementizers (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-r?</td>
<td>✓</td>
<td>×</td>
</tr>
</tbody>
</table>

This distribution is firmly entrenched in the language. Patterns like (48) and (49) are incredibly robust, and these judgments are categorical and firm.

Let us now step back and ask which allomorph, -r or d- on the one hand, and either the dependent or independent form on the other, should be considered the ‘default,’ or Elsewhere, allomorph, and which is the contextual allomorph.

Based on examples like (42-46) I conclude that d- is the default allomorph, because it occurs when nothing precedes it, or one of the non-triggering complementizers. -r only occurs when in the context of a triggering complementizer. Therefore, it seems clear that d- is the default allomorph. Likewise, the dependent form occurs only when a triggering complementizer precedes it. Therefore, by the same logic, the dependent form should be considered the contextual allomorph and the independent form the Elsewhere form.

Now, let us turn our attention to how the verbal complex is constructed. This is done with a combination of syntactic head-movement, as well as the post-syntactic operation of Lowering (Embick and Noyer, 2001). I claim that complementizers undergo Lowering into the verbal complex, and term this operation C-lowering. C-
lowering will be important to us because it will create the right environment for the locality conditions discussed in the introduction to apply.

2.2 C-lowering

Now I will present the motivation for complementizer lowering, or C-lowering. This idea dates back to McCloskey (1996), who proposed it in order to account for certain differences between the semantics of certain sentences of Irish and their linear forms. §2.2.1 presents the original NPI facts from McCloskey, and §2.2.2 shows the sentential adverb facts, also from McCloskey. §2.2.3 introduces new data not discussed by McCloskey relating to the relative scope of negation and disjunction.

2.2.1 Fronted NPIs

McCloskey (1996) observes that NPIs may be fronted to the left of their licensors, specifically the negative complementizers. The NPIs in (51) are bolded.

(51) a. Greim ar bith ní fhuil sé a ithe.  
   bite any NEG is he eat.PROG  
   ‘Not a bite is he eating.’

b. Pingin rua cha-r chaith mé ar an bháid.  
   penny red NEG-r spend.PAST I on the boat  
   ‘Not a red cent did I spend on the boat.’

McCloskey (1996) proposes on distributional grounds that NPIs must be c-commanded by their licensors at S-Structure. Therefore, the examples in (51) must be derived from S-Structures such as those in (52). Bear in mind that these are extremely ungrammatical, even unparseable, as actual sentences of Irish.

(52) a. *Ní greim ar bith fhuil sé a ithe.

22This point is contentious. See, for example, Hoeksema (2000), among others. A full investigation of this is beyond the scope of this paper, but I do have a few thoughts.

The languages that Hoeksema looks at, primarily English and Dutch, have very different negation than Irish. In these languages, negation is more like an ‘adverbial,’ to use Hoeksema’s term, which occurs under T. In the Irish case, negation is extremely high, and contrasts with English and Dutch in terms of allowing topicalized NPIs in the first place, as these examples show.

(i) a. *Any bite is he not eating.
   b. *Ook maar iets wil ik niet.
      anything want I not  
      Intended: ‘Not a thing do I want.’

Furthermore, abandoning the c-command restriction on NPI licensing requires us to abandon another interesting cross-linguistic difference between Irish and English which McCloskey (1996), following Chung and McCloskey (1987), discusses. As McCloskey points out, Irish allows subject NPIs while English does not.

(ii) Adapted from McCloskey (1996)

   a. *Anyone didn’t speak with me.
   b. Char labhair duine ar bith liom.  
      NEG-R speak.PAST person any with.me  
      ‘Nobody spoke to me,’ literally ‘Anyone didn’t speak to me.’

   It is not clear to me how to account for this difference without the c-command condition.
b. *Cha*-r _pingin rua_ chaith mé ar an bhád.

The question is therefore how to get from (52) to (51). Raising the NPI to Spec,CP in the syntax would violate the c-command condition on NPI licensing. Additionally, raising the verb to C would create profoundly ungrammatical sentences, as demonstrated in (53).

(53) a. *Ní* fhuil greim ar bith sé a ithe.
   b. *Cha*-r chaith pingin rua mé ar a bhád.

This leaves one option: lower C to the verb, which is exactly what McCloskey proposes. Therefore, we derive (51) from at as follows in (54).

(54) \[Ní \text{ greim ar bith} \quad \rightarrow \quad Ní \text{ greim ar bith} \quad \text{ní fhuil sé a ithe.}\]

The exact details of this lowering operation will be discussed below in §3, but for now the fact that lowering seems to occur at all is what is important.

### 2.2.2 Leftward Adjuncts

In addition to the NPI facts, McCloskey discusses cases of leftward adjuncts in Irish. Adjuncts which, on interpretive and typological grounds, modify embedded TPs, appear to the left of the complementizer in embedded clauses. Some of these cases are shown in (55). Remember that the important aspect of these data is that the bolded adjuncts are interpreted in the embedded clause, not in the matrix clause.

(55) a. Deiridís _an chéad Nollaig eile_ go dtiocfadh sé an tSaoirse.
   say.3PL.PAST.HAB the first Christmas other c come.COND he up
   ‘They used to say that next Christmas he would come up.’
   
   b. Tá eaglais _leath an ama_ nach féachann mé an tSaoirse. 
   is fear on.me half the time c.NEG knowing I a. alive or dead you
   ‘I'm afraid that half the time I don’t know whether you’re alive or dead.’
   
   c. Tá a fhios agam _[i lár an gheimhrídh] [ón ngrinneal an tSaoirse]_ go gcaitheará
   knowledge at.me in middle winter.gen from-the sea.bed up c throw.AUTO
   ballaigh ar an dtráigh.
   ‘I know that in the middle of winter wrasse are thrown up onto the beach from the seabed.’

In (55), we see that either a single adjunct (55a, 55b), or two adjuncts (55c) may appear to the left of the complementizer, _go_ in (55a) and (55c), and _nach_ in (55b). There is a particularly strong case in (55a) that the adverb is being interpreted in the lower clause and not the higher clause. This is because of the adverb itself, _an chéad Nollaig eile_ ‘next Christmas.’ If it were interpreted in the higher clause, this would lead to a tense clash, causing ungrammaticality, because the meaning of ‘next Christmas’ does not compose with the tense of the verb, namely the past habitual. But it can compose with the tense/mood of the lower clause, namely the conditional.

---

[23]Note that the future discussion of pronoun incorporation has no bearing here. These results are identical either with full DP subjects or these pronouns.
Therefore, the leftward adjunct must be interpreted in the lower clause and not the higher. The question then is how is the adverb interpreted to the right of the complementizer, in the lower clause, but surfaces to its left.

Considering these interpretive effect, McCloskey proposes that the linear order seen in (55) is derived from S-Structures such as those in (56), identically to our discussion of fronted NPIs above. Just as with our discussion of fronted NPIs, these proposed S-Structures are severely ungrammatical as actual sentences of Irish.

(56)  
   a. *Deirid go an chéad Nollaig eile dtiocfadh sé aníos .
   b. *Tá eagla orm nach leath an ama feasach mé aníos beo nó marbh thú.
   c. *Tá a fhios agam go [i lár an gheimhrídh] [ón ngrinneal aníos] gcaitear ballaigh ar an dtráigh.

McCloskey proposes that we get from the S-Structures in (56) to the surface forms in (55) via the same process of complementizer lowering discussed above. This is demonstrated below for the derivation of (56a) to (55a).

(57)  
Deirid go an chéad Nollaig eile dtiocfadh sé aníos → Deirid an chéad Nollaig eile go dtiocfadh sé aníos.

2.2.3 Negation and Disjunction

Irish shows a surprising and interesting pattern when two negated sentences are conjoined via disjunction. The important thing about this construction is what it means, as indicated by the English gloss for (58).

(58)  
[Ní-or ith mé prátaí] nó [ní-or ól mé deoch.]
   neg-r eat.past I potatoes or neg-r drink.past I drink
   'I didn’t eat potatoes or I didn’t drink a drink.’

What is important about these constructions is that the coordinator nó ‘or’ is not interpreted as ‘or,’ but rather as ‘and.’

The argumentation that this is evidence for C-lowering goes as follows. This sentence looks like it ought to mean (¬p ∨ ¬q), but it actually means (¬p ∧ ¬q). But, considering that it actually uses the Irish equivalent of disjunction, nó, we want to incorporate this into the representation of the meaning somehow. Crucially, we can get from the actual meaning, (¬p ∧ ¬q), to one involving disjunction via DeMorgan’s Law. This gives us ¬(p ∨ q).

So, the question is how we get from the proposed semantics, ¬(p ∨ q), where negation scopes over the conjunction, to (58), which has the morphological marker of negation in each conjunct.

I propose that we think of these cases as involving the negative complementizer, níor, lowering into each of the disjuncts. Thus, a single instance of semantic negation can appear in two places. The proposed analysis is demonstrated below in (59).

(59)  

The proposed account in (59) accounts for the actual form of the utterance, as well as its semantics. Therefore, I take this to be evidence for C-lowering.
Furthermore, there is an interesting connection between these cases and cases from a more famous instance of lowering: English T-lowering.

English T-lowering demonstrates these ‘ATB Lowering effects’ as well. When VPs are conjoined, T must lower in each of the conjuncts.

To see this, first consider (60), adapted from Embick and Noyer (2001).

(60)  
  a. John has completely destroyed the opposition.
  b. *John completely has destroyed the opposition.

In (60a) we see that the adverb ‘completely’ can occupy a position between T, as indicated by the auxiliary ‘has,’ and the VP. (60b) shows, furthermore, ‘completely’ must occur in this position and cannot modify TP. Therefore, I will take the position of ‘completely’ to occupy some position below T and above VP. The exact identity of this position is not important for our discussion here; the argumentation only requires that its position be below T.

Now, consider what happens when VPs are coordinated. We can be sure that the phrase being coordinated cannot be TP or T’, because of the position of the adverb ‘completely.’

(61)  
  a. Mathilda t, completely V_P[ destroy-ed, the opposition ] and V_P[ crush-ed, their dreams ].
  b. *Mathilda t, completely V_P[ destroy-∅ the opposition ] and V_P[ crush-ed, their dreams ].
  c. *Mathilda t, completely V_P[ destroy-ed, the opposition ] and V_P[ crush-∅ their dreams ].

(61a) shows that when VPs are coordinated, T, here marked by the past tense suffix ‘-ed,’ must lower into each conjunct. Severe ungrammaticality results if lowering occurs into only the rightmost (61b) or the leftmost (61c) conjunct.

There is a strong parallel between these English cases and the Irish cases in (58). Furthermore, I propose that these ‘ATB effects,’ to name them informally, are a trademark of morphological Lowering, and furthermore could be used as a diagnostic for Lowering crosslinguistically.

In this subsection we have seen that there is considerable evidence for an operation of C-lowering in Irish, and that such the evidence which suggests its existence is entirely independent of the concerns about allomorphy with which we began. I adopt the idea here, and in the following section I will formalize it within the framework of Distributed Morphology. But for now, the morphological structure of the verbal complex must be something like (29).

(62)  
  go^T n -im -i -onn
  c leave -v -T.pres
  ‘...that leaves...’

Now that we have established C-lowering is part of the grammar of Irish, let us formalize it.

---

24I follow Embick and Noyer (2001) in using ‘t’ to mark the origin site of a lowered node. I do not assume that lowering eaves a trace. Furthermore I have no idea how one would demonstrate this. I use this notation purely for expository purposes.

25Note also that Harley and Noyer (1999) and Oda (2012) also discuss a C-lowering account for Irish, but neither develops it in detail. The former simply identifies that the cases discussed in McCloskey (1996) may be accounted for via morphological Lowering, while the later simply takes it as a given. My account differs from these previous accounts in that it more fully develops the formalism and ties the C-lowering directly to allomorphy.
2.3 A Formalization of Lowering

C-lowering can be naturally understood within the framework of Distributed Morphology (Halle and Marantz, 1993, 1994). But before I present the formalism I will be using, it is worth taking some space to talk about why I am pursuing a morphological account and not another account. By hypothesis, the only ban on lowering in a derivation exists in the narrow syntax. This means that any step in the PF branch of the standard Y-model after the narrow syntax could be where the lowering occurs. Particularly, there exists the possibility of phonological or prosodic displacement. This possibility is worth taking seriously, as it was what was originally proposed by McCloskey to account for C-lowering (McCloskey, 1996). Specifically, McCloskey proposed that C-lowering is motivated by the ‘prosodic weakness’ of complementizers in this language.

While this type of prosodic movement is attractive, I suggest that it is not the best way to think about C-lowering. This suggestion comes from three observations. First, let us consider the prosodic form of the complementizers, given in (63).

(63) Prosodic Shape of Irish Complementizers

<table>
<thead>
<tr>
<th>Orthography</th>
<th>Meaning</th>
<th>Phonological shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ní\textsuperscript{t}</td>
<td>Negation</td>
<td>[n\textipa{[i]}]</td>
</tr>
<tr>
<td>b. an\textsuperscript{t}</td>
<td>Interrogative Marker</td>
<td>[\textipa{[ə]}]</td>
</tr>
<tr>
<td>c. go\textsuperscript{t}</td>
<td>Embedded Declarative Complementizer</td>
<td>[\textipa{[go]}]</td>
</tr>
<tr>
<td>d. nach\textsuperscript{t}</td>
<td>Embedded Negative Complementizer</td>
<td>[n\textipa{[ax]}]</td>
</tr>
<tr>
<td>e. a\textsuperscript{t}</td>
<td>Indirect Relative Marker</td>
<td>[\textipa{[ə]}]</td>
</tr>
<tr>
<td>f. a</td>
<td>Direct Relative Marker</td>
<td>[\textipa{[ə]}]</td>
</tr>
<tr>
<td>g. d\textsuperscript{a}</td>
<td>Irrealis Conditional Marker</td>
<td>[d\textipa{[ə]:}]</td>
</tr>
<tr>
<td>h. m\textsuperscript{a}</td>
<td>Realis Conditional Marker</td>
<td>[m\textipa{[ə]:}]</td>
</tr>
</tbody>
</table>

In (63), we see that some complementizers should be considered weak by any definition of prosodic weakness. These include (63b, c, e, f). But importantly, not all complementizers in Irish have the same prosodic shape. Some have long vowels (63a, g, h), and one has the bimoraic sequence [ax] (see Bennett Submitted for the argument for the bimoraic status of these sequence in Irish). From this examination, we see that not all complementizers in Irish have the same prosodic shape. Therefore, I suggest that it is not the right move to pin their uniform behavior with respect to lowering on their non-uniform prosodic characteristics.

Second, the argument from prosodic weakness seems to make the wrong predictions with the original data used to propose C-lowering, namely fronted NPIs and TP-joined adjuncts. Let us return to a case of leftward adjunction, repeated below in (64). The proposed lowering analysis of these data is reproduced in (65).

(64) Deiridí as an chéad Nollaig eile go\textsuperscript{t} dtiocfadh sé aníos. say.3PL.PAST.HAB the first Christmas other c come.COND he up ‘They used to say that next Christmas he would come up.’

(65)

a. Deiridí an chéad Nollaig eile go\textsuperscript{t} dtiocfadh sé aníos →

b. Deiridí an chéad Nollaig eile go\textsuperscript{t} dtiocfadh sé aníos.
If Irish complementizers were simple phonological dependents, we do not necessarily expect them to impose a category restriction on their prosodic host. Furthermore, assuming a strict indirect-reference view of the syntax-prosody interface (see Selkirk 2009, 2011 and Bennett et al. 2013 for recent discussions, but this idea dates back to the founding of prosodic phonology with Nespor and Vogel 1986), there should not be any information about morphosyntactic category available to the phonology proper. Therefore, we expect the end of the narrow syntax, namely (65a), to lead to a perfectly licit prosodic parse as in (66) where the brackets indicate a prosodic constituent.

(66) *Deirid [go an chéad Nollaig eile] dtiocfadh sé aníos.

In (66), the complementizer go is a simple phonological dependent. Therefore, we might expect it to be dependent on whatever occurs to its right, which in this case is the adjunct an chéad Nollaig eile ‘next Christmas.’ But this leads to severe ungrammaticality. Therefore an analysis which seeks to explain C-Lowering effects through the prosodic weakness of these elements, perhaps like standard treatments of the English genitive ‘s, would make the wrong predictions.

The final point which suggests that C-lowering is not prosodically motivated comes from the fact that C-lowering triggers allomorphy. Further, the allomorphy it triggers is suppletive. While there are theories which account for allomorphy in the phonology (Mascaró, 2007), these theories are best equipped to handle cases of allomorphy where the choice between the two allomorphs is phonologically conditioned, particularly when selection of a certain allomorph reflects an Emergence of the Unmarked. While these theories could possibly be used in the Irish cases, doing so seems to me to miss the elegance of these theories and the cases they are designed to handle. The point of these theories is to incorporate the observation that allomorphy selection is often phonologically optimizing. In the cases we care about here, the allomorphy is not phonologically optimizing. Therefore, using these theories does not seem like the right move. Rather, I suggest that its non-optimizing nature means that it is better to account for this particular case of allomorphy in the morphology, using the tools which Distributed Morphology makes available, such as Competition and Vocabulary Insertion (see Harley and Noyer 1999 for an overview of the operations made available within DM).

Based on the discussion here, I suggest that a prosodic account is not obviously within reach and turn to developing a morphological account of C-lowering within the framework of Distributed Morphology (Halle and Marantz, 1993, 1994).

Within the DM literature there is a formalization of lowering which fits the bill. This is the operation called Lowering, proposed by Embick and Noyer (2001). Embick and Noyer’s formalism is provided below in (67), and is presented in tree format in (68).

(67) \[
\[ X_P X^o \ldots [Y_P \ldots Y^o \ldots ] \] \rightarrow [X_P \ldots [Y_P \ldots [Y^o + X^o] \ldots ]] \]

26The only prosodic constraint that I can think of which would be violated by (66) is MATCH-PHRASE, as formulated by Bennett et al. (2013). But of course, this is an OT constraint and is therefore violable. Indeed, it is a crucial aspect of their analysis that MATCH-PHRASE be violable.
In this formalism, Lowering takes the head of a phrase and adjoins it to the head of its complement. This creates a complex head very similar to the complex head created by head-to-head adjunction. More importantly for our purposes here, this Lowering operation creates the right environment for the locality conditions provided by Bobaljik (2012), discussed above in §1; no maximal projection boundaries will separate the heads in the complex head after Lowering has applied. This is a welcome result.

Therefore, I will adopt Embick & Noyer’s Lowering operation.

Now that we have identified the operation we want to use, we need to identify the syntactic structure that it will apply to. This will be the focus of the next subsection.

### 2.4 A Syntax for Irish

In this paper I will be using what is, to my knowledge, the most recent proposals about the syntax of clause structure in Irish. This syntax was proposed by McCloskey et al. (2014) primarily to account for observations about Responsive Ellipsis in the language. I will not review the Responsive Ellipsis motivations here, but instead focus on the interesting morphological ramifications that this syntax has. The syntax is presented in (69).

The key features of this syntax are the split tense system and the Pol(arity) head. First, let us start with Pol. Pol has been posited by McCloskey (2009, 2011); Elfner (2011, 2012); Bennett et al. (2013) to be the position which
the verb in Irish raises to. I will adopt this, although the polarity head will not play a large role in our discussion, as Pol is always morphologically silent in Irish.

The more interesting projection for our purposes is the high T projection. This split T system is meant to integrate the split T system of Stowell (2007), and more interestingly for us, McCloskey et al. (2014) argues that this split T projection has morphological consequences in Irish. Specifically, McCloskey proposes that -r (and d’-) is the morphological realization of \( T_{\text{HIGH}} \). First, let us recall the basic facts behind -r.

-\( r \) appears in the simple past as a mandatory suffix on a subset of complementizers, specifically the complementizers which also trigger the dependent form. Importantly, -\( r \) and a dependent form never cooccur. These core data are reproduced below in (70) and (71) respectively.

(70) a. \( A^r-r \) chuir tú an t-uisce-beatha ’sa chuisneoir?
   q-r put.PAST you the whiskey in.the refrigerator
   ‘Did you put the whiskey in the refrigerator?’


(71) a. An\( ^r \) raibh tú tinn?
   Q was.DEP you sick
   ‘Were you sick?’


Thus, in terms of the morphology, the pattern to be accounted for here is one in which there is a choice between an overt exponent and a lack of exponence. Stated differently, we need to account for the fact that dependent forms and -\( r \) are in complementary distribution. Below we will devote a substantial amount of time to how to think about this pattern, but for now let us follow McCloskey et al. (2014) and take -\( r \) to be an exponent of \( T_{\text{HIGH}} \).

The final piece of the puzzle is how we can be sure that the elements which we have been analyzing as occupying C do in fact do so. The strongest argument in my mind comes from McCloskey (2002), where these elements (particularly the two relativizers, commonly know as ‘\( a^{\text{i}} \)’ and ‘\( a^{\text{II}} \)’, as well as go) interact with extraction in a way which strongly suggests that these elements are phase heads (Chomsky, 2001, 2008). We can make sense of this by subsuming these elements under C.

\( ^{27} \)This account differs substantially from the other recent account of -\( r \), namely that in Oda (2012). I do not pursue Oda’s account for two reasons. First, Oda’s account relies on an unmotivated Agree system in which C agrees in T in tense features. This agreement is unmotivated because it gets the standard relation between C and T in which C passes tense features to T, not the other way around (Chomsky, 2008). Additionally, the Agree account also relies on Fission, a second morphological process. That means Oda’s account relies on four moving pieces: Agreement, Lowering, Fission, and then Vocabulary Insertion/Competition. The account proposed here will involve only two processes: Lowering and Vocabulary Insertion/Competition. Therefore, by parsimony, the proposed account here is worth pursuing.
The second important piece is how we know that negation occupies C and not Pol, for example. McCloskey (2011) argues that Pol is in fact the original host of negation features, but these are copies onto C via Agree. This proposal is made to account for sentences like (72).

(72) Mur\textsuperscript{r} dtéighinn agus iad cailleadh, mhuirbhfeadh siad mé.
\quad if.\textsc{neg} go.\textsc{cond.1sg} and \quad them lose.-\textsc{fin} kill.\textsc{cond} \quad they me
'If I were not to go and they were to lose, they would kill me.'

The crucial part of this example is that, morphologically, negation occurs on C (\textit{mur}\textsuperscript{r}, the negative conditional marker), but is only interpreted in the left conjunct; negation does not scope over both conjuncts. McCloskey analyzes these examples as cases of left-conjunct agreement between two conjoined PolPs, demonstrated below\textsuperscript{28}.

(73)

\begin{center}
\begin{tikzpicture}
  \node (CP) {CP};
  \node (C) [below = 1cm of CP, anchor=west] {C\lbrack \textsc{cond, \textsc{ineg}} \rbrack};
  \node (TP\textsubscript{high}) [right = 1cm of C, anchor=west] {PolP};
  \node (TP\textsubscript{low}) [below = 1cm of TP\textsubscript{high}, anchor=west] {TP};
  \node (Pol\textsubscript{high}) [below = 1cm of TP\textsubscript{high}, anchor=west] {TP};
  \node (Pol\textsubscript{low}) [below = 1cm of TP\textsubscript{low}, anchor=west] {TP};
  \node (Pol) [below = 1cm of Pol\textsubscript{low}, anchor=west] {TP};
  \node (vP) [below = 1cm of Pol, anchor=west] {TP\textsubscript{low}};
  \node (RootP) [below = 1cm of vP, anchor=west] {TP\textsubscript{low}};
  \node (Root) [below = 1cm of RootP, anchor=west] {TP\textsubscript{low}};
  \node (Verbal Root) [below = 1cm of Root, anchor=west] {TP\textsubscript{low}};

  \draw (C) -- (TP\textsubscript{high}) node [midway, above] {\&};
  \draw (TP\textsubscript{high}) -- (Pol\textsubscript{high}) node [midway, above] {};
  \draw (Pol\textsubscript{high}) -- (Pol\textsubscript{low}) node [midway, above] {};
  \draw (Pol\textsubscript{low}) -- (vP) node [midway, above] {};
  \draw (vP) -- (RootP) node [midway, above] {};
  \draw (RootP) -- (Root) node [midway, above] {};
  \draw (Root) -- (Verbal Root) node [midway, above] {};

  \node (Complementizers) [above = 1cm of TP\textsubscript{high}, anchor=west] {Complementizers};
  \node (The Finite Verb) [above = 1cm of Pol, anchor=west] {The Finite Verb};
  \node (Verbal Tense Morphology) [above = 1cm of vP, anchor=west] {Verbal Tense Morphology};
  \node (Root) [above = 1cm of vP, anchor=west] {Root};
  \node (Verbal Root) [above = 1cm of Root, anchor=west] {Verbal Root};
\end{tikzpicture}
\end{center}

This structure allows us to understand why morphological negation occurs on C, but is only interpreted in the left-most conjunct.

Thus, the tree with all of the nodes with their morphological exponents is given below in (74).

(74)

\begin{center}
\begin{tikzpicture}
  \node (CP) {CP};
  \node (C) [below = 1cm of CP, anchor=west] {C\lbrack \textsc{cond, \textsc{ineg}} \rbrack};
  \node (TP\textsubscript{high}) [right = 1cm of C, anchor=west] {PolP};
  \node (TP\textsubscript{low}) [below = 1cm of TP\textsubscript{high}, anchor=west] {TP};
  \node (Pol\textsubscript{high}) [below = 1cm of TP\textsubscript{high}, anchor=west] {TP};
  \node (Pol\textsubscript{low}) [below = 1cm of TP\textsubscript{low}, anchor=west] {TP};
  \node (Pol) [below = 1cm of Pol\textsubscript{low}, anchor=west] {TP};
  \node (vP) [below = 1cm of Pol, anchor=west] {TP\textsubscript{low}};
  \node (RootP) [below = 1cm of vP, anchor=west] {TP\textsubscript{low}};
  \node (Root) [below = 1cm of RootP, anchor=west] {TP\textsubscript{low}};
  \node (Verbal Root) [below = 1cm of Root, anchor=west] {TP\textsubscript{low}};

  \draw (C) -- (TP\textsubscript{high}) node [midway, above] {\&};
  \draw (TP\textsubscript{high}) -- (Pol\textsubscript{high}) node [midway, above] {};
  \draw (Pol\textsubscript{high}) -- (Pol\textsubscript{low}) node [midway, above] {};
  \draw (Pol\textsubscript{low}) -- (vP) node [midway, above] {};
  \draw (vP) -- (RootP) node [midway, above] {};
  \draw (RootP) -- (Root) node [midway, above] {};
  \draw (Root) -- (Verbal Root) node [midway, above] {};

  \node (Complementizers) [above = 1cm of TP\textsubscript{high}, anchor=west] {Complementizers};
  \node (The Finite Verb) [above = 1cm of Pol, anchor=west] {The Finite Verb};
  \node (Verbal Tense Morphology) [above = 1cm of vP, anchor=west] {Verbal Tense Morphology};
  \node (Root) [above = 1cm of vP, anchor=west] {Root};
  \node (Verbal Root) [above = 1cm of Root, anchor=west] {Verbal Root};
\end{tikzpicture}
\end{center}

\textsuperscript{28}The presence or absence of T\textsubscript{high} does not affect this argumentation.
Now, assuming this syntax, we can begin to ask how the complex head necessary for the morphology to operate is formed.

There are in principle two possibilities. First, we could depart from McCloskey and claim that the verb actually raises to $T_{\text{HIGH}}$ and then $C$ undergoes Lowering to $T_{\text{HIGH}}$. Assuming head-to-head adjunction, this would produce the structure in (75). The second possibility is that McCloskey is right and the verb does not raise to $T_{\text{HIGH}}$. Instead, it could be that Irish presents what is, to my knowledge, the first documented case of successive lowering. This analysis would work as follows. First, $C$ lowers to $T_{\text{HIGH}}$. Then, $T_{\text{HIGH}}$, along with $C$, lowers to Pol, where it forms a complex head with the verb which underwent head movement to Pol in the syntax. This analysis is demonstrated in (76).

(75) \[ \text{CP} \rightarrow \text{TP} \rightarrow T \rightarrow C \rightarrow \text{Pol} \rightarrow \sqrt{\text{ROOT}} \rightarrow v \]

(76) \[ \text{CP} \rightarrow \text{TP} \rightarrow \text{PolP} \rightarrow \text{Pol} \rightarrow T \rightarrow C \rightarrow \text{Pol} \rightarrow \sqrt{\text{ROOT}} \rightarrow v \]

Differentiating between these two structures is difficult, but I propose that (76) is the right structure for Irish. This has to do with the order of morphemes involved. If we assume that adjunction is always leftward, and furthermore if we assume that the order of morphemes in the verbal complex obeys the Mirror Principle, then (76) must be the right structure because it produces the right order of morphemes. But this choice does not have any substantive effects for the analysis pursued here; the important thing is that all of these nodes end up in a single complex morphological head.

Furthermore it is reasonable to claim that the Irish verbal complex does obey the Mirror Principle. Recall from our discussion in §2, particularly example (39), reproduced below in (77).

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29Bennett, p.c., observed a second possibility. Namely, raise $T_{\text{HIGH}}$ to $C$ at some point before $C$-lowering. This would make the projecting category adjoining to Pol C, not $T_{\text{HIGH}}$. But besides this, this account would be virtually identical to the account presented here.
In this subtree of the verbal complex, we see that Irish does obey the Mirror Principle. Therefore, by hypothesis, it is reasonable to operate under the assumption that Irish always obeys the Mirror Principle. If we grant this assumption, then (76) is the correct structure. The proposed analysis, with the complete morphological parse for (78), is given below in (79).

2.5 Interim Summary

So far, we have seen that C-lowering is crucial to our understanding of locality in the Irish verbal complex. To see this, let us recall the proposed locality conditions from §1, reproduced below.

(80) **The Licensing Condition for Contextual Allomorphy:** For a node $\alpha$ to trigger allomorphy on a node $\beta$:

a. $\alpha$ and $\beta$ must not be separated by any XP boundaries

b. $\alpha \sim \beta$. 
As discussed above, these locality conditions have two distinct parts. First, the two nodes must not be separated by any XP boundaries. Second, they must be linearly adjacent.

C-lowering as presented above satisfies the first of these conditions. It creates such an environment that C and the verbal root are within the same complex head, and therefore not separated by any XP boundaries. Therefore, if we allow C-lowering as a part of the grammar of Irish, then we can maintain the first clause of these conditions.

In the coming sections, we will turn our attention to the second clause: adjacency. Particularly, we will see which notion of adjacency, structural or linear, is important for these Irish data. We will conclude that Irish provides interesting evidence for linear adjacency.

3 Spanning in the Irish Verbal Complex

First, let us recall the basic pattern that any theory must account for. Recall that -r, which we have analyzed as exponing $T_{\text{minor}}$, must occur between a verb and one of the triggering complementizers given the right tense specifications, namely the past tense$^{30}$.

(81) a. $A^*\text{-}r$ chuir tú an t-uisce-beatha 'sa chuisneoir?
    q-r put.PAST you the whiskey in.the refrigerator
    ‘Did you put the whiskey in the refrigerator?’

b. *An$^*$ chuir tú an t-uisce-beatha 'sa chuisneoir?
    q put.PAST you the whiskey in.the refrigerator
    Intended: ‘Did you put the whiskey in the refrigerator?’

But importantly, dependent forms and -r are in complementary distribution.

(82) a. An$^*$ bhfaca tú an t-uisce-beatha 'sa chuisneoir?
    q see.PAST.DEP you the whiskey in.the refrigerator
    ‘Did you see the whiskey in the refrigerator?’

b. *$A^*\text{-}r$ bhfaca tú an t-uisce-beatha 'sa chuisneoir?
    q-r you the whiskey in.the refrigerator
    Intended: ‘Did you see the whiskey in the refrigerator?’

I contend that Spanning can account for this pattern quite easily$^{31}$. But first, let us refresh our memories about what Spanning is.

Spanning is fundamentally a theory of Vocabulary Insertion. The proposal is that not just terminal nodes may be the site Vocabulary Insertion, but rather the Span. A Span is defined in Svenonius (2012) as follows.

(83) “Let $T$ be an ordered n-tuple of terminal nodes $<t_1, \ldots, t_n>$ such that for all $t \in T$, $t=t_1$ or $t$ is an element of the extended projection of $t_1$.

    a. For all $k = 1 \ldots n$, $t_k$ is a span. (Every node is a trivial span.)
    b. For any $n>0$, if $t_k$ is a span, then $<t_k, \ldots, t_{k+n}>$ is a span.” Svenonius (2012); Merchant (2015)

$^{30}$Here I focus solely on the morphology. I take it for granted that the syntactico-semantic conditions which license -r are present in the input to the morphology. As stated above, I will set aside the subtle intricacies of the distribution of -r discussed in Oda (2012).

$^{31}$Note that this account is essentially that found in Oda (2012), restated in the framework of Spanning. But the core insight is his.
Essentially, a Span is a contiguous portion of an Extended Projection, with contiguity defined in terms of selection. The analysis presented here will emphasize the notion of selection as being the crucial factor, as proposed in Svenonius (2012), rather than the linear order the nodes end up in, but this will be changed in §4. To start, let us give formal Vocabulary Items for all of the nodes in (79), reproduced below in (84)\textsuperscript{32}.

\begin{align*}
\text{(84)} & \quad \text{N} \text{í}^\text{-or im-i-adar} \\
& \quad \text{NEG}-r \text{ leave-}v\text{-3PL.PAST} \\
& \quad \text{'}They didn’t leave.’
\end{align*}

\begin{align*}
\text{(85)} & \quad \text{a. } [\text{C:+NEG}] \leftrightarrow \text{ní} \\
& \quad \text{b. } [\text{T}_{\text{HIGH}}\text{:+PAST}] \leftrightarrow \text{r} \\
& \quad \text{c. } [\sqrt{\text{LEAVE}}] \leftrightarrow \text{im} \\
& \quad \text{d. } [v] \leftrightarrow \text{i} \\
& \quad \text{e. } [\text{T}_{\text{LOW}}\text{:3.PL}] \leftrightarrow \text{adar}
\end{align*}

Note that each of these Vocabulary Items only targets a single node. This is fine, as each terminal node is a trivial Span in the definition given in (83). Now let us think about a verb without an over exponent of $v$, such as cuir ‘put’ shown above in (83). Spanning allows us an elegant analysis of these, demonstrated in (86).

\begin{align*}
\text{(86)} & \quad [\sqrt{\text{PUT}}, v] \leftrightarrow \text{cuir}
\end{align*}

In Spanning, we do not need to employ silent allomorphs of $v$ in the environment of certain roots, such as that found in much traditional DM literature (see Embick 2010, for one particularly well-fleshed out theory of this sort). Instead, this information is simply provided in the Vocabulary Item itself. Presumably, an analysis of this form is more appealing, as we know that we need the VI anyways, and we know that we need to allow Vocabulary Items to range over multiple nodes to account for portmanteaux. This allows us to use independently required technology without resorting to massive contextual lists.

\subsection{A Necessary Excursus into Irish Synthetic Endings}

Now, let us return to the VI in (85d), which demonstrates the synthetic ending -adar, which encodes past tense and a 3rd plural subject. Dialects differ greatly in terms of which synthetic forms are available, but all allow some. The two extremes are shown in (87) and (88). (87) shows the most impoverished dialect, that of Ulster, which (88) shows the richest, Munster.

\footnote{Note that I am making a few assumptions in the Vocabulary Items for -adar. These will be examined in detail shortly. But crucially for the argument here, no matter what theory one adopts for these forms they will be identified with $T_{\text{low}}$ in the split-T system presented here.}
Now, these synthetic endings have received quite a bit of attention in the literature. Broadly speaking, there are two main camps.

The first is the ‘agreement’ based approach, advocated for in McCloskey and Hale (1984); Legate (1999), among others. These accounts analyze the synthetic endings as agreement between a functional projection (identified as T\textsubscript{low} in our current framework) and a silent pronominal. Importantly, this pronominal must be silent, as these forms may not cooccur with an overt pronoun.

Furthermore, there is good evidence that there is in fact a pronominal in constructions like (89a), as presented in McCloskey and Hale (1984). This data is not repeated here for purposes of space, but they have been accepted in the literature and I have no reason to challenge them here.

The second is the ‘incorporation’ analysis, put forward by Brennan (2009); Diertani (2011). In this analysis, the inflection endings are the pronouns, which have incorporated into the verb. This straightforwardly accounts for the distribution in (89), and also for the fact that overt agreement never cooccurs with a full DP subject.
My goal in this paper is not to wade into this debate. Rather, I will follow the agreement based approach here. I do so for three reasons. First, the cliticization accounts seem to be unable to account for the fact that the silent pronouns in these constructions can be coordinated.

To capture these effects, Brennan (2009) must stipulate that this cliticization process does not obey the Co-ordinate Structure Constraint. It seems to me, rather, that these cases are better understood as instances of left-conjunct agreement, as proposed in McCloskey and Hale (1984).

My second reason for using the agreement analysis and not the incorporation analysis is that the incorporation analyses I am familiar with explicitly claim that these synthetic suffixes are clitics, particularly Brennan (2009). But to use the term ‘clitic’ as such is to render it meaningless, particularly considering that there are classic tests for clitichood versus affixhood provided in Zwicky and Pullum (1983). While only three of their six tests are possible to run in Irish33, all three of these tests point to these endings being inflectional affixes, not clitics.

The first is that clitics exhibit a low degree of selection with respect to their hosts. These synthetic suffixes are only possible on finite verbs, indicated a high degree of selection. This patterns with affixes, not with clitics. Second, arbitrary paradigm gaps are more characteristic of affixes than of clitics. A glance back at the tables in (85) and (86) shows that there are, in fact, arbitrary gaps, such as the lack of synthetic forms for the third singular. This again points back to affixhood. Third, morphophonological ‘idiosyncrasies’ are more characteristic of affixes than of clitics. In modern terminology, this can be restated as ‘affixes show contextual suppletion, while clitics do not34.’ Reviewing the tables above again, it is clear that these endings are suppletive for tense/mood. Again, they pattern with affixes, not clitics. Of course, these tests are not conclusive. But they do mean that the burden of proof that these endings are morphological clitics is on proponents of incorporation accounts. These effects, in contrast, fall out naturally from an agreement based account.

My third and final reason for pursuing the agreement based approach is one ultimately of parsimony in the morphology. To see this, consider the Vocabulary Items put forward by Diertani (2011) for a subset of the Munster synthetic endings. (92d) is provided by me, but would clearly be what Diertani would have proposed if she had discussed this specific form.

33Zwicky & Pullum’s test of ‘idiosyncratic meanings’ seems never to be active in agreement morphology. I know of no cases where, say, the very shows third plural agreement but is interpreted as first singular, for example. I set the reason for this divide aside for the purposes of the present task.

34Note that the modern DM literature has recreated this finding, namely in Bobaljik (2012)’s examination of comparative morphology cross-linguistically. What Bobaljik found was that suppletion is only possible within a word, not across XP boundaries (i.e., outside of a morphosyntactic word). This clearly is a novel, and important, restatement of Pullum and Zwicky’s observation discussed here.
b. \([1SG] ⇔ \text{-inn} / [\text{IMPF, COND}]\)

c. \([1SG] ⇔ \text{-eas} / [\text{PAST}]\)

d. \([1SG] ⇔ \text{-ir} / [\text{FUT}]\)

The important thing that these Vocabulary Items miss is that these synthetic forms are fundamentally port-manteaux between tense/mood and a set of \(\phi\)-features. That is to say that they require complementary Vocabulary Items limiting the expression of tense/mood only in these forms, and furthermore, that they must be null. Consider, for example, what the necessary Vocabulary Items for present, future, and the conditional must look like.

\begin{align*}
(93) & \quad \text{a. } [\text{FUT}] ⇔ \text{-fidh} \\
& \quad \text{b. } [\text{FUT}] ⇔ \emptyset / [1SG] \\
& \quad \text{c. } [\text{PRES}] ⇔ \text{-eann} \\
& \quad \text{d. } [\text{PRES}] ⇔ \emptyset / [1SG] \\
& \quad \text{e. } [\text{COND}] ⇔ \text{-feadh} \\
& \quad \text{f. } [\text{COND}] ⇔ \emptyset / [1SG]
\end{align*}

This clearly misses the generalization. This missed generalization becomes particularly profound if Vocabulary Items for all the synthetic forms are considered, but this subset serves to make the point.

So, once we accept that these forms are portmanteaux, then it ultimately doesn’t matter whether we adopt an agreement analysis or an incorporation analysis, as the Vocabulary Items will look identical\(^{35}\).

\begin{align*}
(94) & \quad \text{a. } [T_{\text{LOW}}:+\text{PRES}, 1SG] ⇔ \text{-im} \\
& \quad \text{b. } [T_{\text{LOW}}:+\text{COND}, 1SG] ⇔ \text{-inn} \\
& \quad \text{c. } [T_{\text{LOW}}:+\text{PAST}, 1SG] ⇔ \text{-eas} \\
& \quad \text{d. } [T_{\text{LOW}}:+\text{FUT}, 1SG] ⇔ \text{-ir}
\end{align*}

Thus, for us, it does not matter where these features come from. They can come from either agreement or from an incorporated pronoun/incorporated \(\phi\)-features, as in Brennan (2009); the important thing for the argumentation here is that these form expone \(T_{\text{LOW}}\).

### 3.2 Returning to Spanning: The Dependent Forms

Now, how can Spanning help us with dependent forms? The solution is incredibly simple. All we have to say here is that the Vocabulary Items for dependent forms include more nodes than verbs which do not undergo

\(^{35}\)Note that, as mentioned above, I collapse the difference between tense and mood. This is done for ease of exposition, as the verbal complex as conceived of here already contains quite a few nodes. Furthermore, there is no morphological evidence, as far as I know, for posing two distinct nodes in the morphology for tense and mood. But ultimately this choice is purely aesthetic.
the dependent/independent alternation, namely the nodes in the verbal Extended Projection from the Root up to T\_\textsc{high}. To see this, consider the Vocabulary Items in (95), which show the dependent alternation \textit{conaic}~\textit{faca}, setting aside initial consonant mutations\textsuperscript{36}. Recall that \textit{conaic} ‘saw’ is the independent form, while \textit{faca} ‘saw’ is the dependent form\textsuperscript{37}.

(95)  a. \[[\text{T}\textsc{high}:+\text{PAST}, \text{Pol}, \text{T}\textsc{low}, v, \sqrt{\text{SEE}}] ⇔ \text{conaic}\]

b. \[[\text{T}\textsc{high}:+\text{PAST}, \text{Pol}, \text{T}\textsc{low}, v, \sqrt{\text{SEE}}] ⇔ \text{faca}/\text{C}\]

Furthermore, Vocabulary Items of this shape are perfectly licit in the Spanning literature, as the contextual allomorphy, the dependent form, is triggered by an adjacent Span, specifically the complementizer (see Merchant 2015). In other words, dependent forms Spell Out the bolded nodes in the tree in (96).

(96)

```
CP
  C
    TP\textsc{high}
      T\textsc{high}
        PolP
          Pol
            TP\textsc{low}
              T\textsc{low}
                vP
                  v
                    RootP
                      Root
```

Now, this makes the strong prediction that dependent forms will never occur with synthetic endings. This prediction comes from two claims. The first is that the synthetic endings, no matter how they’re conceived, expone a tense node. For us, this tense node is T\textsc{low}. The second source of this prediction is stated most clearly in Merchant (2015)’s Span Adjacency Hypothesis, shown below in (97).

(97) **Span Adjacency Hypothesis:** Allomorphy is conditioned only by an adjacent span.

Merchant goes on further to say:

“This hypothesis permits nonadjacent heads and their features to participate in the conditioning of an allomorph, but requires that such nonadjacent heads (or their features) for a span with heads...up to and including the head that is adjacent to the conditioned form” (Merchant 2015).

As dependent forms are fundamentally root allomorphy, this means that in order for C to be able to trigger allomorphy on the root, the span containing the root must also contain all the heads up to T\textsc{high}, the node adjacent to C.

\textsuperscript{36}Furthermore, see McCloskey (2004) for interesting evidence that these forms are active in the minds of speakers, despite the fact that they are never directly observed, as they always occur in environments for initial consonant mutations.

\textsuperscript{37}Note that the morphological status of Pol is difficult to ascertain because it is always phonologically null. It will not feature prominently in any of our morphological analyses, and is included here solely for the sake of the definition of a Span in (83).
Unfortunately, this prediction does not pan out. Dependent forms do show the exact same synthetic endings as verbs which do not undergo the alternation. This can be seen most clearly in the Irish of the Dingle Peninsula in West Munster, as reported in Ó Sé (2000). Consider the forms in (98).

(98)

<table>
<thead>
<tr>
<th>Independent Form</th>
<th>Dependent Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1SG chonac</td>
<td>feaca</td>
</tr>
<tr>
<td>2SG chonaic-is</td>
<td>feaca-is</td>
</tr>
<tr>
<td>3SG chonaic sé/sí</td>
<td>feacaigh sé/sí</td>
</tr>
<tr>
<td>1PL chonaic-eamar</td>
<td>feac-eamair</td>
</tr>
<tr>
<td>2PL chonaic-eabhair</td>
<td>feac-abhair</td>
</tr>
<tr>
<td>3PL chonaic-eadar</td>
<td>feac-adar</td>
</tr>
</tbody>
</table>

In fact, such forms are quite common in dialects which maintain these synthetic endings, such as the Irish of Ring, as reported by Breatnach (1947)\(^{38}\).

(99) \(\ldots\) ná rabh -ais choidhche gan casachtach\(\ldots\)
\(\text{NEG.EMBED be.PAST.DEP -PAST.2SG ever without cough}\)
\(\ldots\) that you were never without a cough\(\ldots\)

\(\text{Breatnach 1947, pg. 93}\)

In fact, even the morphologically impoverished dialects such as Ulster still maintain at least one synthetic form, namely -inn, which marks the 1sg conditional. There is only one verb which undergoes the dependent/independent alternation in the conditional, faigh ‘get,’ but synthetic endings with this dependent form abound.

(100) Dá bhfaigh -inn carr nua, bheinn sásta.
\(\text{if.IRREAL get.COND.DEP -COND.1SG car new be.COND.1SG happy}\)
\('If I were to get a new car, I would be happy.'\)

As can be seen in comparing these forms in (98-100) to the paradigms in (87-88), the dependent forms show the same synthetic endings as verbs which do not undergo this alternation\(^{39}\).

This is a serious problem for the Spanning account presented here, or more specifically for Spanning as conceived of in Svenonius (2012). In the following section I will show the proposal for how to account for these patterns: Vocabulary Insertion operating over linearized strings, not on hierarchical structures.

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\(^{38}\)Note that ná is this dialect’s version of the embedded negative complementizer nach. Thanks also to Lee Vahey and Ailbhe Nic Giolla Chomhaill for their judgments on translating this into English.

\(^{39}\)Note that the first singular forms are not chonaiceas and feacas respectively. This is typical for Munster dialects, where the first singular for this verb, and for this verb only, is marked by depalatalization of the final segment. Note also that the plural forms of the independent form may end in a depalatalized consonant as well, such as chonacamair. Ó Sé indicates that these two forms are in free variation, with certain speakers showing a slight preference for one or the other. None of these subirregularities will be of particular interest to us here.
4 Vocabulary Insertion and Linearized Strings

In the previous section we uncovered a tension. The first is that Spanning gives us a simple and elegant account of the dependent/independent alternation, particularly the complementary distribution between dependent forms and -r, the morphological realization of Ti. But on the other hand, the synthetic endings present in the language, if they do expone Ti, as I have argued they do, suggest that dependent forms do not expone all the nodes from Ti to the Root, as is required for Spanning accounts (Merchant, 2015). Essentially, what we want is VIIs such as those in (102) for a verbal complex such as that in (101).

(101) Ní feac -aíš
    neg see.past.dep -past.2sg
    ‘You didn’t see.’

(102) a. [C:+NEG]⇒nì

b. [Ti:+PAST, √SEE, v]⇒feac /CTRIGGER---

c. [Tl:+PAST, +2sg]⇒aíš

Essentially, we want is for dependent forms to expone all and only the bolded heads in the tree below.

(103)

Importantly, these nodes do not form a contiguous span of the Extended verbal Projection to the exclusion of Tl. So it seems as though we’re stuck.

But I propose that an interesting option remains: linear order. While these heads do not form a contiguous span of the Extended verbal Projection in the sense of selection (Svenonius, 2012), they do form a linearly contiguous portion of an extended projection40. Therefore, we can make sense of these data if we allow Vocabulary Insertion to be sensitive to linear information.

Such a theory is not totally radical. Recent work argues that linearization may not be an inherent side effect of Vocabulary Insertion, as was proposed in Embick and Noyer (2001). For example, Arregi and Nevins

40This conclusion is another reason to be wary of a clitic incorporation analysis of synthetic endings, as they would require us analyze the synthetic endings as portmanteaux composed of two nodes which are not members of the same extended projection, namely the incorporated pronoun and the tense node. While this is obviously not an argument against an incorporation analysis.
 Specifically analyze linearization as a process during Spell Out before Vocabulary Insertion. Furthermore, Bobaljik (2012), building off work in Radkevich (2010), argues that portmanteaux will only be possible between linearly adjacent nodes. It is also worth noting that, if Arregi and Nevins (2012) are right and linearization is a process which precedes Vocabulary Insertion, then there is no a priori reason as to why Vocabulary Insertion should not be sensitive to this information. Furthermore, it has been shown extensively in the existing DM literature that Vocabulary Insertion is sensitive to the results of other morphological processes, such as Lowering, particularly in English tense morphology. So, why should linearization be special? The proposal here is that it isn’t, and Vocabulary Insertion can be sensitive to the results of linearization, just as it can be sensitive to the results of Lowering operations.

This proposal is not inherently incompatible with DM either, as it was outlined in §1. The core insight of DM remains the same; word formation, in the sense of the internal structure of words, is fundamentally syntactic. The contribution of this work is just to propose that linear information is available to Vocabulary Insertion in addition to hierarchical information. Importantly, this requires an understanding of linearization which does not erase or overwrite hierarchical relations, but simply adds new information to existing hierarchical structures. This can be thought of as parallel to how Vocabulary Insertion itself works, as discussed in §1 (see the discussion around 14). It does not erase morphosyntactic features, but simply adds phonological information to it.

So, how does Vocabulary Insertion work within this theory? These data do not suggest that it works in a fundamentally different way from that in classical DM as proposed by Bobaljik (2000). For Bobaljik, and most subsequent work in DM, Vocabulary Insertion follows the same path of Merge in the syntax; it begins at the most deeply embedded node and works up. An important question thus becomes how do we constrain this type linearly based Vocabulary Insertion?

The Irish data give us the chance to comment on this, in combination with other work in Spanning, particularly Svenonius (2012) and Merchant (2015). In Irish, two notions become crucial. First, nodes must be linearly adjacent. This is so ingrained in the literature on portmanteaux that it is almost a truism. Second, the nodes must be in the same Extended Projection, as highlighted in previous work on Spanning. Importantly, this requires Vocabulary Insertion to operate over, and have access to, entire Extended Projections.

This has important consequences for the theory of the syntax-morphology interface at large. Particularly, it means that a strict, cyclic account in which morphological cycles perfectly match syntactic phases cannot be maintained. The Irish make this last point particularly sharply, as complementizers trigger allomorphy on, and even Lower into, elements in their Spell Out domains. Furthermore, there is strong reason to think that the elements which we have been analyzing as complementizers here act as phase heads as well (McCloskey, 2002).

But maybe this apparent problem in fact gives us an interesting insight into the nature of phases. Perhaps complementizers are syntactic phases precisely because they end Extended Projections. Thus, perhaps syntactic movement through these positions is required because they act as escape hatches from one Extended Projection to another. This type of thinking can be extended to the v phase as well. If v, like all little heads, is thought of as beginning the Extended Projection itself, not the root, then it is clear why movement must occur through this position; an element must enter an Extended Projection before it can exit it. Note that if we think of the categorizing heads as introducing Extended Projections themselves, then we can maintain the striking empirical finding of Embick (2010), namely that allomorphy does not ever seem to be able to see across these nodes. A full investigation of these suggestions is beyond the scope of this paper though, and I leave them here only to tantalize, or perhaps frustrate, readers.

Refer also to the discussion in §2.4.
To conclude this section, the contribution of this paper is given in (104), which updates our theory of Vocabulary Insertion.

(104)  \[ \text{Complete Theory of Vocabulary Insertion: \textit{SToVI Final}} \]

a. Vocabulary Insertion follows the path of syntactic Merge; it begins with the most deeply embedded node and working its way up (Bobaljik, 2000).

b. Vocabulary Insertion operates within \textit{Extended Projections}, determined by categorizing heads (Embick, 2010).

c. Vocabulary Insertion may operate over \textit{linearly adjacent nodes in an Extended Projection} (Svenonius, 2012; Merchant, 2015).

d. Suppletion may only be triggered within a morphological word (Bobaljik, 2012).

e. Suppletion may only be triggered by adjacent Spans (Merchant, 2015).

5 Conclusion

In this paper we investigated the morphological structure of the Irish verbal complex. We saw that buried within its complexities are a few interesting conclusions. First, a phase head, C, undergoes morphological Lowering into its Spell Out domain. Second, Vocabulary Insertion seems to allow us to Insert stretches of linearly adjacent heads, as long as these heads are members of the same extended projection.

The conclusions of this study are twofold. The first is to highlight the role of adjacency in morphological theory. It has always held quite a prominent position, but here we codified it even further into the theory of Vocabulary Insertion. Second, the importance of Extended Projections was stressed above all else. The Extended Projection provides us with a possible answer to the question we set out to explore: ‘What are morphological locality domains?’
References


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