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Vocabulary Insertion and Competion

1 Overview

- In this lecture, we look more at the technical implementation of Vocabulary Insertion. and ways of capturing different kinds of allomorphy.

This lecture largely follows Embick 2015, Chs. 4 and 7.

- The primary concern here is developing a technical implementation of competition in our theory of Vocabulary Insertion.
  - The observation is that a single underlying morpheme can receive different exponents in different contexts, a phenomenon known as allomorphy.
  - Furthermore, a single exponent can realize several distinct bundles of features, a phenomenon known as syncretism.
  - The way this is modeled in DM is to assume that different Vocabulary Items can compete to realize any given single bundle of features.
  - Embick's (2015) goal in Chapter 4 is to formalize a version of Vocabulary Insertion that properly accounts for this kind of competition within functional morphemes.

This is not very different from what I covered in our discussion of Bobaljik (2017). The focus here is more on the technical details.

- On the assumption that roots come with phonological forms when they enter the derivation, a different mechanism is needed to explain stem allomorphy.
  - Embick turns to this in Section 5 of Chapter 7, where he discusses Readjustment rules.
  - These are rules that affect the underlying form of roots or stems in certain morphophonological contexts, essentially rewriting part of a root.
  - On this view, there is no competition for realizing different forms of roots.
- In this discussion we will look at some empirical cases that support this division of labour while focusing on the technical elements of Vocabulary Insertion.
  - We'll mostly draw on irregularities of the English verbal systems, since, despite how simple it is, it clearly shows the various interactions between features and Vocabulary Insertion one might expect.
  - The critical thing here will be seeing that functional morphemes compete for insertion into specific nodes, but stem allomorphy does not behave the same way.
  - This empirical division motivates the having two ways to explain allomorphy in the theory.

2 Formalizing Vocabulary Insertion

- Embick (2015: 85) provides the following basic schema for Vocabulary Items:

(1) *Vocabulary Item*:

$$\underbrace{[\alpha\beta\gamma]}_{\text{Synsem features}} \leftrightarrow \underbrace{/\text{X}/}_{\text{Phonological exponent}}$$

This is similar to the one I outlined in the discussion of Bobaljik 2017.

  - The phonological exponent, as we've seen, is just the phonological material that gets inserted in a terminal node by Vocabulary Insertion.
  - Synsem here is short for 'syntacticosemantic', referring to features such as [past] ('past'), [def] ('definite'), [pl] ('plural').
  - These should be distinguished from phonological features, like [voice] or [coronal].

Embick 2015: 6

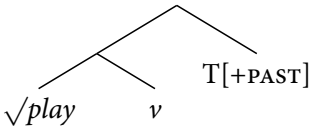
- A simple example is the English past tense affix:

(2) T[+past] ↔ *-ed*

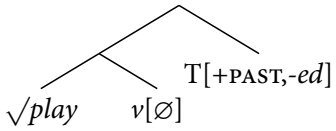
I assume here that category is just a feature (a common view in Minimalist syntax). Embick frequently uses binary features (that is, features that can receive a + or – value). I'll point out places where it may not be obvious what they mean.

- This will insert the exponent *-ed* into a terminal with features T and [+past].
- This can be sketched in a similar way to what we've seen over the last two weeks:

(3) a. *Before insertion*:



b. *After insertion*:



Trees here have been simplified since we only care about the terminals.

- However there are many ways we might choose to formalize this system:

i. Is Vocabulary Insertion *additive* or *replacive*?
  - The trees above show material being added, but we could think of Vocabulary Insertion *replacing* material in terminal.

ii. What happens to features when an exponent is added to a terminal?
  - The trees above show the features being preserved after Vocabulary Insertion, but it is possible they are deleted.

iii. How does Vocabulary Insertion choose the correct Vocabulary Item?
  - There can, in principle, be more than one Vocabulary Item that realizes a feature. How do we determine which one gets chosen?

2.1 Additive or replacive Vocabulary Insertion?

- Vocabulary Insertion in (3) is shown as an *additive* process.
  - Terminals bear features, and phonological material is added to these terminals.
- However, it is possible to model Vocabulary Insertion as a replacive process as well, which is what Embick opts to do.
- Following Halle (1990), he assumes that all functional morphemes come with a variable Q.

(4) *Schema of a functional morpheme with features α and β*:
$[\alpha, \beta, Q]$

- Vocabulary Insertion replaces Q with a phonological exponent, which can be seen as the value of the variable.
  - This can be formalized with the notation $[Q/X]$, to be read 'Phonological form /X/ is substituted for Q'.

This is similar to the notation used for assignment modification in semantics, only the order of the terms has been reversed here; see (Heim and Kratzer 1998: 112).

- We can break Vocabulary Insertion down into three steps at this point:

(5) a. *Start with the a functional morpheme*:
T[+PAST, Q]
b. *Select the correct vocabulary item*:
T[+PAST] ↔ *-ed*
c. *Substitute Q for the phonological exponent*:
T[+PAST, Q][Q/*-ed*] → T[+PAST,*-ed*]

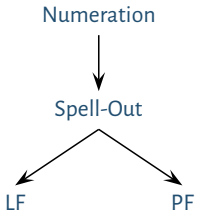
- Substitution, however, is the last step of this process.
  - Step (5b) must be fleshed out – nothing here explains how the right Vocabulary Item is to be selected.
  - However, before we talk about this in Section 2.3, let us first discuss what happens to synsem features after substitution has occurred.

Spoiler: The Subset Principle will explain this.

- Also worth noting: Although we understand Vocabulary Insertion to be this three-step process, we will still usually write it as a two-step process as shown in (3), reserving the Q notation for when we need that level of detail.

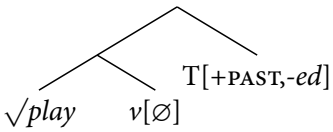
2.2 Are synsem features deleted?

- As shown above in (4), functional morphemes are thought to be composed of synsem features plus the variable *Q*.
  - Functional morphemes such as these are terminal nodes in the syntactic derivation.
  - As such, these morphemes will be sent to both the LF and PF interfaces after S-Structure/Spell Out.
  - On the LF side, the synsem features on any such node will, by hypothesis, be interpreted in the semantics.
  - On the PF side, the synsem features determine which Vocabulary Item to apply to the node they occur in.



- The way things work, it is necessary for synsem features to be available up to the point of Vocabulary Insertion.
  - But it is not obvious that it is necessary for them to be retained after this point.
- The replacive approach outlined above predicts, as is, that Vocabulary Insertion only replaces *Q* and does not affect other features in a functional head.
  - The alternative is to posit that, in addition to replacing *Q*, the rest of the features are deleted when Vocabulary Insertion occurs.
  - This is shown in all the representations above; phonological exponents are displayed alongside synsem features.

(6) *After insertion*:



- Embick notes that there are cases where it looks like specific exponents can trigger Impoverishment in nearby nodes.
- Embick points to Bobaljik (2000), who discusses a possible instance of this in the language Chukchi (Chukotko–Kamchatkan; North-east Siberia) where certain forms of the object agreement suffix on verbs seem to condition the form of the subject agreement.

He also cites Noyer's (1997) dissertation, but I did not have time to look through that for an example.

- Specifically, he notes that a 3rd person object suffix used with 3rd person singular subjects appears to bleed the appearance of the appropriate 3rd person subject prefix.

(7) *Chukchi* (Bobaljik 2000):

a. ɣəmnan ətɬjon tə-ɬʔu-ɣʔen.
1SG.ERG 3SG.ABS 1.SG.SUBJ-see-3SG.OBJ
'I saw him/her/it.'

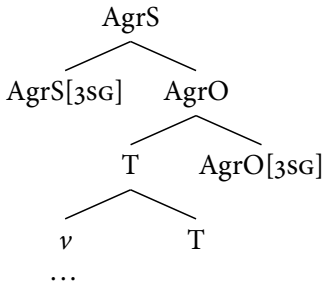
b. ərɣənan ətɬjon ne-ɬʔu-ɣʔen.
3PL.ERG 3SG.ABS 3.SUBJ-see-3SG.OBJ
'They saw him/her/it.'

c. ənan ətɬjon ɬʔu-nin.
3SG.ERG 3SG.ABS see-3SG.OBJ
'(S)he saw him/her/it.'

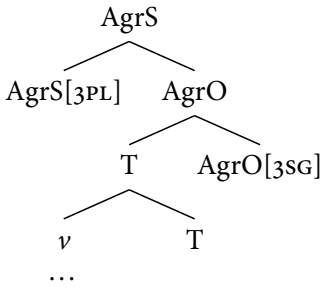
- Normally, the 3rd person transitive subject prefix *ne-*, visible in (7b), must appear when the subject is 3rd person, singular.
- This prefix is absent in (7c), despite being obligatory in forms that do not have the *-nin* (singular) or *-ninet* (plural) suffix suffix.

- There is no reason to think that (7b) and (7c) have wildly different structures or that different features underlie [-ɣʔen] and [-nin]. The only difference between them is the number on the subject agreement marker.

(8) a. (*ne)-ɬʔu-nin



b. ne-ɬʔu-ɣʔen



- Notice here that the features on AgrO are the same regardless of whether AgrS is [3SG] or [3PL].

- We can understand the alternation of the [3SG] ArgO suffix as a simple case of allomorphy; the prefix is just

(9) a. AgrO[3SG] ↔ -nin / AgrS[3]
b. AgrO[3SG] ↔ -ɣʔen / Elsewhere

- Critically, however, the appearance of the prefix [ne-] seems only to be conditioned on the the third person singular feature in AgrS:

(10) AgrS[3] ↔ ne-

- The issue is that there is no way to specify this rule (see below) to

- If we say that AgrS[3] is realized as ∅ AgrO bears a 3sg feature, then we incorrectly predict that there should be no prefix in (7b).

- Bobaljik suggests instead that the features on AgrS delete in the context of the exponent [-nin].

- But notice that even here, Vocabulary Insertion does not delete the features on the node it affects.
- It's the features inserted on a previous node, leading to subsequent impoverishment.

2.3 Competition and allomorphy

- We can now ask about how selection of Vocabulary Items works.
- We know that is is possible for a single functional morpheme to receive several different realizations on the surface.

(11) *T[PAST] allomorphy in English*:
  a. *-ed*: *play-ed*, *watch-ed*, *kiss-ed*
  b. *-t*: *ben-t*, *sen-t*, *lef-t*
  c. *-∅*: *hit-∅*, *quit-∅*, *sang-∅*

While it is the case that *-ed* is pronounced [t] in, *e.g.*, *kissed* [kɪst], this is phonologically predictable since *-ed* follows a voiceless fricative. In cases like *sent*, however, the [t] pronunciation is not predictable from the phonology. Since this is not predictable, this exponent must be listed separately.

- This suggests that we need at least three Vocabulary Items that express the T[+PASS].

(12) *Preliminary Vocabulary Items*:
  a. T[+PAST] ↔ *-ed*
  b. T[+PAST] ↔ *-t*
  c. T[+PAST] ↔ *-∅*

- These cannot be the final forms of our Vocabulary Items, though.
  - Nothing about these rules prevents us from creating forms like **leaved* or **kiss-∅*.
  - A theoretical approach of this sort must make it so that certain exponents appear in certain context.
  - In this case, certain allomorphs of the past tense suffix occur with certain roots.

Notice, too, the root allomorphy in *leave*. We will be talking about that later in this lecture, but we will focus on functional allomorphy first.

- Therefore, we need to do two things:
  i. We must restrict certain Vocabulary Items to apply in certain environments.
  ii. We must add some mechanism that ensures that such restrictions are obeyed.
- We add restrictions by amending the Vocabulary Item schema in (1) to include information about where an exponent can be inserted:

(13) *Vocabulary Item with restriction*:

$$\underbrace{[\alpha\beta\gamma]}_{\text{Synsem features}} \leftrightarrow \underbrace{/\text{X}/}_{\text{Phonological exponent}} \; / \; \underbrace{\ldots\_\_}_{\text{Contextual restriction}}$$

This is similar to the one I outlined in the discussion of Bobaljik 2017.

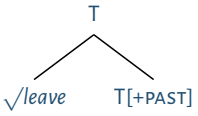
- Using this schema, we can revise the Vocabulary Items in (12):

(14) *Revised Vocabulary Items*:
  a. T[+PAST] ↔ *-t* / {$\sqrt{bend}$, $\sqrt{send}$, $\sqrt{leave}$, …}
  b. T[+PAST] ↔ *-∅* / {$\sqrt{hit}$, $\sqrt{quit}$, $\sqrt{sing}$, …}
  c. T[+PAST] ↔ *-ed*

  - The restrictions tell us where each exponent can be inserted. For instance, -∅ can follow $\sqrt{}$*sing* or $\sqrt{}$*hit*, but not *bend*.
  - The form without any contextual restriction here is a DEFAULT FORM. It needs no contextual information to apply.

For this reason, it is the past tense suffix of choice for novel and nonce verbs.

- We now need to ensure that these restrictions are obeyed, so that if a Vocabulary Item is restricted to a specific environment, it must apply in that environment.
  - In principle, any two Vocabulary Items with a matching feature specification that are not excluded by the contextual restriction could be inserted in the same node.
    - For instance, both *-ed* and *-t* have the same features.
    - Either of these could apply to T[PAST] after *leave*, as the contextual restrictions on them do not restrict them to some other environment.
  - The idea here is that Vocabulary Items compete with one another. They are ordered or ranked, with the highest ranked item chosen for insertion.



- We don't want to simply stipulate that *-t* wins in a competition with *-ed* follwing $\sqrt{}$*leave*. Ideally, this should fall out from something else.
- This is where the SUBSET PRINCIPLE, given in its usual form in (15), comes in.
  - The Subset Principle ensures that the specificity of rules determines the order in which they apply.
  - More highly specified rules should apply before more general rules.

(15) *Subset Principle* (Halle 1997):
The phonological exponent of a Vocabulary Item is inserted into a position if the item matches all or a subset of the features specified in the terminal morpheme. Insertion does not take place if the Vocabulary Item contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

You'll notice that this definition of the Subset Principle does not explicitly refer to contextual restriction of a Vocabulary Item. Nonetheless, Halle and Marantz (1993: 123–124) seem to have the spirit of the Subset Principle in mind when they discuss English tense inflection.

- This effectively tells us that (14a) should be ordered before (14c), as the former is more specified than the latter.
  - Since (14a) is ordered before (14c), it wins the competition and is inserted into T[+PAST].
  - Since *-ed* does not win, **leaved* is not produced.

The Subset Principle also tells us that (14b) is ordered before (14c), but that is not relevant for the case at hand.

- This gives us a way to talk about BLOCKING effects under DM.
  - Blocking, recall, occurs when an irregular form exists, blocking use the regular form of a word.
  - The form **leaved* is a POTENTIAL WORD – it follows the regular rules of English morphology – but it is, nonetheless, unacceptable in most (if not all) varieties.

Blocking was introduced back during our first lecture!

This is striking, since it's obvious what **leaved* should mean.

- This solves half of the problem: Contextually specified Vocabulary Items in tandem with the Subset Principle prevent **leaved* from being derived.
  - This is a two-part problem, though, because we still have to deal with the stem allomorphy.
  - Nothing, so far, prevents a form like **leavt* from occurring; in fact, without any further adjustment, we predict that this is what we *should* get.
  - There are some more issues that we need to discuss first, however, so I postpone this discussion to Section 3.
- Furthermore, as framed above, it's not clear how DM can capture blocking.
  - If words correspond to M-Words, how can irregular forms block regular forms if Vocabulary Insertion targets only syntactic terminals?
- There has been concern in the morphological literature, dating back at least to Kiparsky 1982, that it might be possible to apply a rule more than once or that a more general rule may apply after a more specific one has applied.
  - We want to make sure that *one and only one exponent* is inserted into any given terminal.

(16) a. **lefted* (lef-t-ed)
b. **oxens* (ox-en-s)
c. **playededed* (play-ed-ed-ed)

- This requires a bit of a stipulation, but we can capture this by assuming that any given morpheme comes with exactly one *Q* variable.

2.4 Syncretism

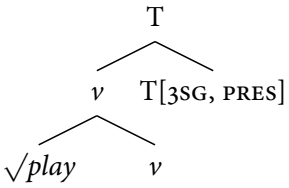
- In addition to blocking effects, UNDERSPECIFCATION of the features in Vocabulary Items allows us to explain the phenomenon of SYNCRETISM.

See Chapter 5 of Embick (2015) for a longer discussion of syncretism in DM.

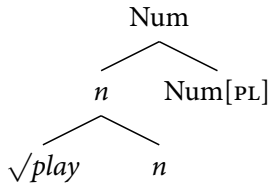
  - As we've seen, Vocabulary Insertion does not require every feature in a syntactic terminal to be specified in a Vocabulary Item for that Vocabulary Item to apply to that terminal.
  - As required by the Subset Principle (15), the features on a Vocabulary Item need only be a subset of the features of the terminal.
- This means that a single Vocabulary Item may apply to terminals with different feature specifications.
  - As Embick (2015: 113) defines it, syncretism 'refers to situations in which distinct syntacticosemantic environments (*i.e.*, distinct sets of synsem features bundled into a morpheme) show the same phonological exponent'.
  - Syncretism, therefore, occurs when the same Vocabulary Item applies can apply to more than one functional morpheme.

- Critically, syncretism isn't just accidental homophony. To take an obvious case, consider English plural inflection on nouns, and 3rd person singular agreement on verbs.

(17) a. The child plays.



b. I saw the plays.



(18) a. T[3SG, PRES] ↔ /-z/ b. Num[PL] ↔ /-z/

  - The exponents for T[3SG, PRES] and Num[PL] are phonological identical (both are /-z/).
  - But they are not syncretic since different Vocabulary Items are responsible for the phonological forms each of these eventually receives. They share no features in common.
  - In other words, it is an accident that these two affixes have the same phonological form.

- Syncretism on this view occurs only when the features on each terminal overlap and are realized by the same exponent.
- Embick (2015: 127–129) gives the example of pronouns from Seychelles Creole, a French-based creole spoken in the Seychelles.

(19) *Seychelles Creole Pronominals*:

Num.	Pers.	Subject	Strong	Possessive
SG	**1**	*mõ*	*mua*	*mõ*
	2	*u*	*u*	*u*
	3	*i*	*li*	*sõ*
PL	**1**	*nu*	*nu*	*nu*
	2	*zot*	*zot*	*zot*
	3	*zot*	*zot*	*zot*

  - Pronouns come in three varieties: Subject, Strong, and Possessive.
  - There are two numbers and three persons, for a total of 18 possible combinations.
  - Looking at the chart above, a number of cells sharing features have identical phonological forms within different persons and numbers.
    - The subject and possessive form of the 1SG pronoun are the same.
    - The forms of all of the 2SG pronouns are the same.
    - The forms of all of the 1PL pronouns are the same.
    - The forms of all of the 2PL and 3PL are the same.

It is not clear to me what is meant by strong here. Don't worry about it though.

- By using underspecified Vocabulary Items, we can capture the patterns we see in (19):

(20) *Vocabulary Items*:

a.	[-1, -2, -PL, +POSS] ↔ *sõ*	e.	[+1, -PL] ↔ *mõ*
b.	[-1, -2, -PL, +STR] ↔ *li*	f.	[+2, -PL] ↔ *u*
c.	[-1, -2, -PL, +SUBJ] ↔ *i*	g.	[+1, +PL] ↔ *nu*
d.	[+1, -2, -PL, +STR] ↔ *mua*	h.	[+PL] ↔ *zot*

Following Embick, [-1, -2] maps onto 3rd person. [-PL] is singular, [+STR] corresponds to strong, [+POSS] corresponds to possessive.

  - While there are 18 possible feature bundles in the syntax, only 8 Vocabulary Items are actually necessary.

- The ordering of these elements is mediated by the Subset Principle. The Vocabulary Items with the most features are selected before those with fewer features.
- Consider the pronoun in (21). There is no Vocabulary Item in (20) that matches the features on this pronoun exactly.

(21) D[+1, -2, -PL, +SUBJ, *Q*]

  - However, the Vocabulary Item in (20e) with the exponent *mõ* has a feature specification that is a (proper) subset of the features on this pronoun.
  - This is consistent with the first clause of the Subset Principle, and so we expect that *mõ* will be inserted into (21).

'The phonological exponent of a Vocabulary Item is inserted into a position if the item matches all or a subset of the features specified in the terminal morpheme'.

- Now consider the pronoun in (22). Again, there is no Vocabulary Item in (20) that matches the features on this pronoun exactly.

(22) D[+1, -2, +PL, +STR, *Q*]

  - Here, there are two Vocabulary Items with feature specifications that are (proper) subsets of the features on this pronoun: *nu* (20g) and *zot* (20h).
  - Since both of these Vocabulary Items are specified for a subset of the features on the pronoun, they could both, in principle, apply to the pronoun.
  - This is where the third clause of the Subset Principle comes in. The one with more features specified must win, meaning that *nu* is inserted in (22).

'Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.'.

2.5 Summary

- Above, we formalized the system of Vocabulary Insertion.
  - Vocabulary Insertion *replaces* a variable *Q* with a phonological exponent in functional morphemes.
  - This process does not delete synsem features contained in the morpheme.
  - The choice of the Vocabulary Item that applies to any given terminal is regulated by the Subset Principle.

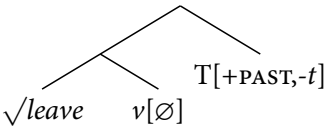
- The Subset Principle plays a key role in setting up COMPETITION between Vocabulary Items, explaining several one-to-many and many-to-one mappings between synsem features and the vocabulary.
  - In principle, several Vocabulary Items may compete for application to a single terminal.
  - Allomorphy, where a single terminal may receive different exponents, is limited by contextual specification on Vocabulary Items.
  - Syncretism, where a single Vocabulary Item may apply to distinct terminals, is determined by underspecifying the features of Vocabulary Items.
  - The Subset Principle demands that only the most highly specified Vocabulary Item apply to any given terminal, providing a unified account of both allomorphy and syncretism.

3 Stem allomorphy

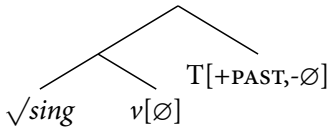
- Let us now return to an issue that I raised earlier: Stem allomorphy.
  - In our discussion of allomorphy in Section 2.3, we saw that it was possible to explain the allmorphy of functional elements like tense by contextually specifying them:
- This worked fine for examples like *play* where there is no phonological change to the root. However, irregular forms like *left* and *sang* pose problems.

(23) *Vocabulary Items* (Repeated from (14)):
  a. T[+PAST] ↔ *-t* / {$\sqrt{}$*bend*, $\sqrt{}$*send*, $\sqrt{}$*leave*, …}
  b. T[+PAST] ↔ *-∅* / {$\sqrt{}$*hit*, $\sqrt{}$*quit*, $\sqrt{}$*sing*, …}
  c. T[+PAST] ↔ *-ed*

(24) a. *After Vocab Insertion*:



b. *After Vocab Insertion*:



Compare tree (6).

  - The trees in (29) are exactly what we expect to get from the Vocabulary Items in (23).
  - The problem is that without any further changes, these predict the forms **leavt* and **sing* (as a past tense form).
- Clearly it is necessary to say something else about these examples, since we currently predict unattested forms.
  - These are both cases of STEM ALLOMORPHY, where the verb stem or root undergoes some sort of phonological change in certain morphosyntactic environments.

  - More broadly, these are sometimes descriptively called NON-AFFIXAL, REPLACIVE, or NON-CONCATENATIVE morphological changes, so called because the morphological change is not effected by simply adding an affix

Fábregas and Scalise (2012) use the term *replacive morphology*.

3.1 Readjustment rules

- Under DM, the stem allomorphy of the sort seen in *leave* and *sing* is derived through the use of READJUSTMENT RULES.
  - A readjustment rule is a contextually specified rule that changes the underlying phonological content of some material, usually a root.
  - Readjustment rules are triggered by certain morphemes and only apply to certain morphemes. They are not meant to be general rules.
- For a case like *sang* above, we can sketch what such a rule might look like.

(25) *Readjustment rule*: Change vowel in phonological representation of $\sqrt{sing}$ with rules triggered by T[+PAST].

- Embick (2015: 203) does not commit to any particular formalism, since there are many issues behind formulating readjustment rules.
  - For concreteness, we could adopt a simplified version of what Halle and Marantz (1993: 128) use:

(26) $V \rightarrow /æ/ \;/\; C_1\_\_C_2$ [+PAST], where $C_1VC_2 \in \{/sɪŋ/, /ɹɪŋ/, \ldots\}$

- A similar rule could be proposed for *left*:

(27) Rime $\rightarrow /ɛf/ \;/\; C\_\_$ [+PAST], where C Rime = /liv/

- How these are formalized will often depend on the phonological change that occurs and assumptions about what the underlying representations of individual roots are.
- What is critical is that the analysis separates Vocabulary Insertion at T[+PAST] from the change to the phonological form of the Root.

3.2 OK, but why do it this way?

- The analysis here divides allomorphy into two operations:
  - Readjustment Rules account for changes in the form of the stem.
  - Vocabulary Insertion accounts for contextual allomorphy of functional elements.
- As Embick (2015: 203–204) notes, a simpler, more parsimonious theory would be to treat all realization (and therefore all allomorphy) with a single mechanism.

One should reasonably feel the pressure here of Minimalist views about reducing the number of levels and operations in a theory to as few as possible.

- The argument, however is an empirical one.
  - Embick (2015: 204): 'The central point is that the realization of morphemes and the realization of non-affixal morphology do not block each other'.

3.2.1 *Stem changes do not block affixal morphemes*

- To start, focusing on *sang*, one could imagine that the relation between stem allomorphy and affixal allomorphy is reversed so that the stem change is what blocks the appearance of regular affixes.
- This can be stated in a theory where there is no distinction between Vocabulary Insertion and Readjustment Rules. We can sketch it as below, where ⟨Stem Change⟩ stands in for however you would encode such a thing.

(28) *Hypothetical stem-changing Vocabulary Item*:

$$\text{T}[+\text{PAST}] \leftrightarrow \langle\text{Stem Change}\rangle \;/\; \{\sqrt{sing}, \sqrt{ring}\} \_\_$$

This is vary similar an Item-and-Process-style rule. Compare the discussion of *drive* and *drove* from pp. 9–11 of the handout on Morphemes and morphological structures.

  - Since this is more specified than the default *-ed* Vocabulary Item (23c), the Subset Principle would require the stem change rather than the regular affix.
  - By this means, the stem change would block the regular form.

- Embick (2015) presents two arguments against this approach:

  i. There isn't always a stem change to block the regular affix.
  ii. Affixation and stem changes are not in complementary distribution.

- Consider a case like *hit*: The past tense matches the stem form.

  - In other words there is no rule like (28) that one could write to block insertion of *-ed* because there is no phonological change to the root.
  - However, Embick notes immediately that all this can be taken to show is that blocking doesn't require a stem change.
  - Furthermore, if you allow null affixes (as we have), then blocking without a stem change isn't surprising.

I suppose you could stipulate /ɪ/ → /ɪ/ or even ∅ → ∅ as the stem change, but I have a hard time imagining what sort of evidence could support such a claim.

It is worth noting, though, that part of this discussion responds to morphemeless, Item-and-Process approaches like Anderson 1992, which lack null morphemes.

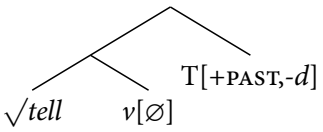
- The stronger point is that stem changes do not prevent affixation from occurring and, conversely, affixation appears to trigger stem changes.

  - This means that the two phenomena cannot be in a blocking relation, since they co-occur.

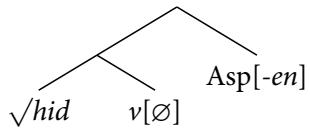
See Halle and Marantz 1993: 129–132.

- A case in point is the English verb *tell*, which in the past tense takes the regular past tense suffix and a stem vowel change, producing *told*.
- This sort of pattern is found in many irregular particples in English as well; take, for example, *freeze*/*frozen* or *drive*/*driven*, where a vowel change accompanies affixation of *-en*.

(29) a. *After Vocab Insertion*:



b. *After Vocab Insertion*:



(30) *Potential Readjustment Rules*:

a. $V \rightarrow /o/ \;/\; C_1\_\_C_2$ Asp, where $C_1VC_2 \in \{$tɛl, sɛl, …$\}$

b. $V \rightarrow /ɪ/ \;/\; C_1\_\_C_2$ [+PAST], where $C_1VC_2 \in \{$haɪ̯d, ɹaɪ̯d, baɪ̯t, …$\}$

- This sort of so-called double marking is easily explained on a theory where Vocabulary Insertion handles the realization of functional material and Readjustment Rules handle non-affixal changes.
  - For *told*, we don't need to say anything special about how *-ed* is realized; it's just the default form.
  - We need only put √*tell* on the list of things that undergo Readjustment.
  - Since the realization of *-ed* and *tol-* are the result of two different grammatical operations, there is no expectation that they should be able to block each other.
- This leads to a final interesting point on this theory: Blocking occurs at the morpheme level, not the word level.
  - Some lexicalist theories posit that, because the form *left* exists in the lexicon, the form **leaved* will be blocked.
  - Because there is no Lexicon, DM cannot appeal to this sort of stipulation, especially since Vocabulary Insertion must target Subwords (*i.e.*, terminals).
  - This means that there is no way to stipulate a blocking effect at the level of the (M-)word.

Terms

blocking A phenomenon where the existence of an irregular morphological form prevents the use of the regular (predictable) form.

DM Distributed Morphology

Impoverishment In Distributed Morphology (DM), deletion of features from a morphosyntactic representation, prior to Vocabulary Insertion, with the result that impoverishment yields surface neutralization of underlying contrasts.

potential word A word that can be generated by morphological rules but is not included in the lexicon of a language.

readjustment rule In DM, rules that alter the form of an underlying representation (typically a root) in some morphological context.

Subset Principle 'The phonological exponent of a Vocabulary Item is inserted into a position if the item matches all or a subset of the features specified in that position. Insertion does not take place if the Vocabulary Item contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.'(Halle 1997)

syncretism Situations in which distinct syntacticosemantic environments (*i.e.*, distinct sets of synsem features bundled into a morpheme) show the same phonological exponent (Embick 2015).

synsem feature Features from the universal inventory of syntacticosemantic features; *e.g.*, [PAST] ('past'), [DEF] ('definite'), [PL] ('plural'), *etc*. (Embick 2015).

underspecifcation Describes Vocabulary Items that have a subset of the features that can be specified in a single syntactic terminal that it can apply to. This is one mechanism that can lead to syncretism (the other being Impoverishment).

Vocabulary Insertion In DM, an operation pairing syntactic terminals with phonological underlying representations.

Vocabulary Item In DM, objects in which phonological exponents are paired with conditions on insertion, stated in terms of features of functional morphemes.

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