Approaching *Polymorphy*

David Embick, University of Pennsylvania

*****

Sociedad Argentina de Análisis Filosófico (SADAF)

Buenos Aires

December, 2016

Contents

1
Plan; Context; Effects

1.1 Introduction

I will try to connect three distinct effects/phenomena:

(E1) Apparently Non-Unique Competition (ANUC): it appears that the same structure (with the same Root in it) can be realized with multiple forms for an affix: e.g. *cover-Ø*, *cover-age*, (not gerund) *cover-ing*.

(E2) What I will call the *confus-al* effect: speakers have an intuition about *confusal* (e.g. that it could be a "possible word of their language") that they do not have with e.g. incorrect past tense forms like **bended*).

(E3) Apparently non-local effects in allomorph selection, in which a suffix apparently sees a prefix (not linearly adjacent): e.g. *per-mit* and *com-mit* show nominals *permit*, *permission*, not *permitment*; but *comission*, *commitment*— and not (for me) noun *commit*.

The line of argument suggests that effects (E1-3) arise because **certain** morphemes show *polymorphy*:

polymorphy $=_{\text{def}}$ insertion at a morpheme that allows "ties", such that multiple Vocabulary Items are able to apply to that morpheme (one per derivation).

Polymorphy involves a morpheme in the same syntactic object and the same local context being pronounced in more than one way. Two main points in today's talk:

1. Trying to understand (E1-3) together; how this motivates an analysis with polymorphy; and how polymorphy produces (E1-3).

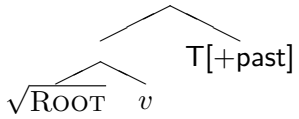
2. If we implement polymorphy, we see that it appears to be a (possible) property of some morphemes and not others. We will look at how to divide morphemes along these lines in a way that connects with current ongoing discussions of contextual effects on "lexical" meaning.

In fact, part of the project I have in mind here involves establishing clearly that (E1-3) in fact hold. The unification theme centered on polymorphy is a way of illustrating what is at issue.

1.2 Competition etc.

Some assumptions about morphology; Late Insertion of phonology, through objects called *Vocabulary Items*. E.g. English past tense:

(1) Past tense verb



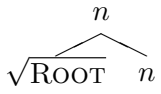
(2) Vocabulary Items for T[+past]

a. T[+past] ↔ -t/{$\sqrt{\text{BEND}}$, $\sqrt{\text{LEAVE}}$,...}___
b. T[+past] ↔ -Ø/{$\sqrt{\text{HIT}}$, $\sqrt{\text{QUIT}}$,...}___
c. T[+past] ↔ -ed

The VIs in (2) are (partially) ordered by specificity, such that the more specific VI with *-t* blocks the default with *-d* when e.g. $\sqrt{\text{BEND}}$ is present.

In derivational morphology (=category defining heads); same idea (Embick and Marantz 2008, Embick 2010):

(3) noun



(4) Nominals

"derived"	**gerund**
marri-age	marry-ing
destruct-ion	destroy-ing
refus-al	refus-ing
confus-ion	confus-ing
⋮	⋮

(5) Nominalizations

n	↔ -al/	LIST1⌒___
n	↔ -age/	LIST2⌒___
n	↔ -tion/	LIST3⌒___
n	↔ ⋮	⋮
n	↔ -Ø/	$\sqrt{\text{ROOT}}$⌒___

That is, the realization of these derivational morphemes (those that will be implicated in (E1-3) is brought about in the same way as the realization of the Tense morpheme. Today:

- This cannot be the whole story given (E1-3)

Some of the matters related to (E1-3) are discussed in Halle (1973), and we will see clear connections with the *Potential Lexicon* posited by Halle in the discussion later. Some more recent works on derivational morphology also touch on these matters to different degrees; for example

- Embick and Marantz (2008) note that realization of n's with e.g. $\sqrt{\text{COVER}}$ might involve multiple potential winners, and talk about two ways of accounting for such effects that are not explored in detail.
- Borer (2013) points at the complex issues surrounding the Potential Lexicon as well in an important footnote (Ch.1, Fn.6); she also puts many of these questions to the side. But like the previous bullet (and this paper), she concludes that the same structure can be realized in multiple ways.

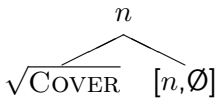
Neither of these accounts pursues these issues in a way that involves a strong conclusion.

1.3 On ANUC

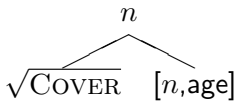
As noted above, Embick and Marantz (2008) note that there might be something like "multiple winners"; here's the quote:

> ...it is also important to note that in some cases it is not clear that differences in feature content are responsible for differences in form and interpretation. One set of cases in which these issues are highlighted involves instances in which the same Root surfaces in more than one root nominalization. So, for example, we assume that the single Root $\sqrt{\text{COVER}}$ forms two different root nominals: *cover* and *coverage*:

(6) cover



(7) coverage



At this point the central question concerns the status of the n heads in these two trees: are they the same, or are they different? If we assume the latter– i.e., that there is some head n_1 in *cover*, and some head n_2 in *coverage*, then the differences in allomorphy and interpretation can be explained with reference to this difference. This could very well be the correct analysis in this particular case.

A second option is that there is one n in these two structures. In order for this analysis to work, we have to configure the VI process so that the same Root may appear on more than one list, as in (8):

(8) Vocabulary Items, n Inner Domain

$n \leftrightarrow$ -Ø/LIST__
LIST = $\sqrt{\text{CAT}}$, $\sqrt{\text{DOG}}$, $\sqrt{\text{COVER}}$...
$n \leftrightarrow$ -age/LIST2__
LIST2 = $\sqrt{\text{MARRY}}$, $\sqrt{\text{BOND}}$, $\sqrt{\text{COVER}}$...

In (8), the Root $\sqrt{\text{COVER}}$ appears on more than one list. If we treat VI in such a way that two VIs that are not related to one another by inclusion are not ordered, and therefore one cannot always take precedence over the other, then either could be inserted. Thus in a grammar containing (8) and the "non-ordering" assumption just mentioned, both *cover* and *coverage* could be derived. [**Footnote:** We put aside the question of what would be involved in "choosing" the correct outcome in any particular instance of use.] In this scenario, there is part of the grammar in which *cover* and *coverage* are identical. The interpretive difference between these forms arise from the fact that they are used to refer to different parts of semantic space, perhaps in the way that *sofa* and *couch*, or, as we discuss below, *thief* and *stealer* are in competition at the level of use (not grammaticality).]

There are two types of analyses sketched in the quote:

Multiple x: Appeal to different varieties of x morphemes; different allomorphs appearing with the same Root realize different x heads.

Polymorphy: There is a single x, whose realization is not subject to "winner take all competition".[1,2]

Later we will see how the different approaches can be tested.

BACKGROUND: Halle (1973) notes this kind of effect:

(9) approbation recitation proposition transmission reversion

(Cp. *approval recital proposal transmittal reversal*)

Also compare:

(10) No doublets(?)

a. derivation description conversion confusion permission observation obligation omission accusation

b. *derival *describal *conversal *confusal *permittal *observal *accusal (but cf. Jespersen, MEG 6.22.22) [Halle's note]

See below.

Foundational works on blocking like Kiparsky (1983:15) recognize cases of "multiple affixes with the same root" in ways that are quite important for my discussion later (although there are issues with many of the examples cited there). Some possible examples of ANUC are as follows:

(11) a. cover, cover-age, cover-ing
case, case-ment, cas-ing
place, place-ment
carry, carriage
department, departure
variance, variation

b. transmit; transmitt-al, transmiss-ion
recite; recit-al, recit-ation
propose; propos-al, propos-tion
reverse; revers-al, revers-ion (Halle 1973)
transfer, transferral, transference
conference, conferment, conferral

[1]More precisely, the competition works in a different way— there is still some competition, in the sense that the morpheme is only realized once.

[2]In the particular version outlined in the 2008 paper, Roots are capable of appearing on multiple lists (i.e. with more than one Vocabulary Item). There are alternatives to this; e.g., letting all relevant Vocabulary Items apply freely, subject to morphophonological and perhaps "diacritic" constraints. The latter type of theory is close to Halle (1973); see below.

Some comments on examples of this type:

Observation 1. In "marginal" cases it will depend on how much decomposition we posit, and where we draw the lines for lexical relatedness (polysemy versus homophony). For example, are both *departure* and *department* formed from the same Root? See section 4.

Observation 2. A lot of these involve the Latinate part of the English vocabulary, and the prefixed verbs with bound Roots, for reasons we will talk about as the discussion proceeds.

Observation 3. There are many instances in which there are multiple affixes with the same Root that might not involve polymorphy per se; rather there would be either

> **Case 1:** E.g. different n morphemes involved, with different features. I think this is something that happens, but it doesn't account for all of the things we are trying to explain.
>
> **Case 2:** Different structures; this is more obvious for some examples than for others. If we have an agentive noun *cover-er*, this involves verbal structure below the nominal head. Other cases are more interesting— e.g. *form* versus *form-ation* might involve a type of deverbal nominal that is not a gerund and whose default realization is *-(a)tion*: as in e.g. *color-iz-ation* (cf. Embick (2010) and Borer (2013)).

Observation 4. Finally, due to the way that underspecification works (and the way in which languages re-use exponents), the same exponents are often found in different structures. For example, we find *-ing* systematically in gerunds, and *-er* systematically in agentive nominals, but we also find these exponents in other structures; compare:

(12) line, lin-er, lin-ing
fill, fill-er, fill-ing
ice, (ic-er), ic-ing
tone, ton-er, (ton-ing)
clothes, (cloth-er), cloth-ing

The related theme that particular exponents are not associated with consistent semantics is clear in the literature from early days (think e.g. Chomsky (1970)), and will also play a role in section 3.

1.4 On *Confusal*

I've simply asserted that speakers' intuitions are such that e.g. *confusal* is different from e.g. past tense **bend-ed*. I think most speakers share this intuition; we will be trying to see if we can make it more concrete through experimentation.

The most famous discussion of the (E2) phenomenon is Halle (1973), whose theory involves (1) a morpheme list; (2) word formation rules; and (3) the famous Filter (this adds special meanings and

phonological idiosyncrasies in addition to filtering). Halle uses the Filter to account for the *confusal* effect because "...it appears somewhat forced to incorporate this information in the morpheme list or in the word formation rules." Thus:

> Finally, "gaps" in the dictionary like those illustrated in [*confusal etc.; DE] would be accounted for by providing the "missing" words with the rule feature [–Lexical Insertion]. In other words, the fact that English lacks the nouns **derival* and **arrivation* would be reflected in the grammar by marking these words, which would be generated by the word formation rules, as not being subject to lexical insertion and therefore incapable of appearing in any actual sentence of the language, in spite of the fact that they are neither semantically nor syntactically or phonologically anomalous. (1973:5)

We should reflect on what it means to say that it would be "forced" to put "this information" (there might be several things going on) in the morpheme list or in the rules. It is also worth thinking about how the relevant effects are analyzed in different theories.

In any case, Halle (1973) says that *confusal* etc. are derived, and then filtered out.

Later we will see the effects of trying to incorporate an account of (E2) (and (E1)) into a current version of a morpheme list (a Vocabulary). We will relate the discussion to questions raised in Halle's paper:

- That is, the question to address is whether *confusal* is (i) not derived by e.g my grammar, but is potentially derivable (if I add $\sqrt{\text{CONFUSE}}$ to a particular list), or (ii) derived by my grammar but "not used".

This kind of question can also be usefully connected with experimental research, although exactly how remains to be seen.

1.5 On Non-Local Interactions

One proposal that is discussed frequently with reference to allomorphic locality is that morphemes can only see each other under linear adjacency:

(13) **Linear Locality:** Allomorphy requires strict linear adjacency.

Something like this is discussed in Aronoff (1976) (who rejects it for reasons discussed below); it is incorporated into Embick (2010), where it interacts with phase locality.

Two points:

Point 1: Aronoff argues that "deverbal" *-ment* attaches "most productively" to things that are prefixed with *en-* and *be-*: *encroachment*, *bewilderment*, *embezzlement*, *bedazzlement*. Aronoff takes this pattern to refute a theory based on morpheme adjacency (many have followed him on this; e.g. Borer 2013, recently).

Two points:

First, it seems that this is a tendency: *crypt*, *encrypt*, ***encryptment***, *encryption*.

Second, importantly, such a pattern is formally not a problem for linear adjacency:

(14) a. Lots of Roots are on the list associated with these prefixes; and
b. Most of these are also on the list for n realized as *-ment*.

Since both the prefix and the suffix are linearly adjacent to the Root, this can be stated:

(15) Where $\sqrt{\text{ROOT}}_i$, $\sqrt{\text{ROOT}}_j$ are like those noted above:
a. pr $\leftrightarrow$ en-/___$^\frown$LIST of $\sqrt{\text{ROOTS}}_i$
pr $\leftrightarrow$ be-/___$^\frown$LIST of $\sqrt{\text{ROOTS}}_j$
b. $n \leftrightarrow$ -ment/LIST of $\sqrt{\text{ROOTS}}_{ij}{}^\frown$___

The question as to why there is a correlation like this is not addressed, but this could be attributed to diachrony etc.

Point 2: On the other hand, phenomena where the prefix and the suffix are sensitive to each other for the same Root **are** problematic for adjacency. So for example (and putting parentheses around forms that are not found rather than *-ing them), forms with $\sqrt{\text{MIT}}$:

(16) permit, permiss-ion, (permitt-al), (permit-ment)
(commit), commiss-ion, committ-al, commit-ment

Having to say things like "*-ment* realizes n attached to $\sqrt{\text{MIT}}$ with *co-* but not with *per-*" is not compatible with strict linear adjacency.

N.B. In the same way that it is (i) not possible to assign a meaning to $\sqrt{\text{MIT}}$, or to $\sqrt{\text{CEIVE}}$, and (ii) not possible to predict which prefixes and suffixes can co-occur, it appears to be the case that (iii) the prefixes are essentially polymorphic. More on this later.

2
Polymorphy

2.1 Theoretical Options

Moving towards the idea that (E1-3) call for something like polymorphy as defined at the beginning of the handout; three theories to be examined:

(T1) Multiple x: Derive the effects by positing different n morphemes for each of the allomorphs in question: e.g. *cover-Ø* has n_1, *cover-age* has n_2, etc. Competition is as it is elsewhere.

(T2) Competition′: Extend the content of lists such that a single Root will appear on the list for multiple VIs that are in principle able to apply to a given morpheme. Change the competition mechanisms to adapt to this.

(T3) Polymorphy: Realization of certain morphemes is such that all relevant forms (=morphophonologically ok) are generated by the grammar. Change competition mechanism to adapt to this.

As I noted earlier with reference to Halle (1973), there are different places in the linguistic system to account for forms that "do not exist" (I'm not saying *ungrammatical* here for obvious reasons). With this in mind,

(T1) puts the explanation of ANUC effects into the inventory of functional morphemes;

(T2) puts it into the Vocabulary (theory of lists...), along with the theory of competition; and

(T3) changes the theory of competition, and puts more weight on the theory of use (=what there happens to be an established semantic space for).

We'll develop ways of comparing these theories in the next sections. The bullet points are these:

- All three theories say something about (E1) ANUC (although they say different things about it).
- (T1) does not extend naturally to (E2), the *confusal* effect. (T2) and (T3) do (although they say slightly different things about it).
- (T3) is able to account for (E3), apparently non-local selection; (T2) does not extend naturally to (E3)

2.2 Some Initial Comparisons

There are some interesting things to be said about (T1). To begin with, it is difficult to test explicitly in the absence of a worked-out theory of the x-feature space; and this depends on whether we are talking about v, n, a (or p...).

Let's see what it would look like when implemented. A "typical" Vocabulary might look something like (17) (recall section 2):

(17) realizations of n

$n \leftrightarrow$ -ment /{$\sqrt{\text{IMPROVE}}$, $\sqrt{\text{BASE}}$(?)...} ___
$n \leftrightarrow$ -(t)ion /{$\sqrt{\text{DESTROY}}$, $\sqrt{}$-DUCE, $\sqrt{\text{INVADE}}$...} ___
$n \leftrightarrow$ -al /{$\sqrt{\text{ARRIVE}}$, $\sqrt{\text{REFUSE}}$,...} ___
$n \leftrightarrow$ -age /{$\sqrt{\text{MARRY}}$, $\sqrt{\text{CARRY}}$,...} ___
$n \leftrightarrow$ -ity /{$\sqrt{\text{ATROC}}$, $\sqrt{\text{CURIOUS}}$, [a,-able]...} ___
$n \leftrightarrow$ -Ø /{$\sqrt{\text{BREAK}}$, $\sqrt{\text{CAT}}$,...} ___
$n \leftrightarrow$ -ing /{$\sqrt{\text{HOLD}}$, $\sqrt{\text{FIX}}$,...} ___

Now: consider what happens when we add one of our ANUC examples (here, $\sqrt{\text{COVER}}$):

(18) realizations of n, 2

$n \leftrightarrow$ -ment /{$\sqrt{\text{IMPROVE}}$, $\sqrt{\text{BASE}}$(?)...} ___
$n \leftrightarrow$ -(t)ion /{$\sqrt{\text{DESTROY}}$, $\sqrt{}$-DUCE, $\sqrt{\text{INVADE}}$...} ___
$n \leftrightarrow$ -al /{$\sqrt{\text{ARRIVE}}$, $\sqrt{\text{REFUSE}}$,...} ___
$n \leftrightarrow$ -age /{$\sqrt{\text{MARRY}}$, $\sqrt{\text{CARRY}}$, $\sqrt{\text{COVER}}$...} ___
$n \leftrightarrow$ -ity /{$\sqrt{\text{ATROC}}$, $\sqrt{\text{CURIOUS}}$, [a,-able]...} ___
$n \leftrightarrow$ -Ø /{$\sqrt{\text{BREAK}}$, $\sqrt{\text{CAT}}$, $\sqrt{\text{COVER}}$ ...} ___
$n \leftrightarrow$ -ing /{$\sqrt{\text{HOLD}}$, $\sqrt{\text{FIX}}$,...} ___

This modification is inadequate as it stands since— as noted above— the point of this exercise is to handle ANUC with (T1), i.e. with multiple n morphemes. So, we need to modify the VIs that contain lists referring to $\sqrt{\text{COVER}}$ so that they now apply to distinct n morphemes:

(19) realizations of n, 3

$n \leftrightarrow$ -ment /{$\sqrt{\text{IMPROVE}}$, $\sqrt{\text{BASE}}$(?)...} ___
$n \leftrightarrow$ -(t)ion /{$\sqrt{\text{DESTROY}}$, $\sqrt{}$-DUCE, $\sqrt{\text{INVADE}}$...} ___
$n \leftrightarrow$ -al /{$\sqrt{\text{ARRIVE}}$, $\sqrt{\text{REFUSE}}$,...} ___
$n_1 \leftrightarrow$ -age /{$\sqrt{\text{MARRY}}$, $\sqrt{\text{CARRY}}$, $\sqrt{\text{COVER}}$...} ___
$n \leftrightarrow$ -ity /{$\sqrt{\text{ATROC}}$, $\sqrt{\text{CURIOUS}}$, [a,-able]...} ___
$n_2 \leftrightarrow$ -Ø /{$\sqrt{\text{BREAK}}$, $\sqrt{\text{CAT}}$, $\sqrt{\text{COVER}}$ ...} ___
$n_3 \leftrightarrow$ -ing /{$\sqrt{\text{HOLD}}$, $\sqrt{\text{FIX}}$, $\sqrt{\text{COVER}}$, ...} ___

Some key points; not knock down arguments, but suggestive:

(20) a. Most likely we would wind up with seven different n morphemes if we kept doing this.

b. What is the syntactic or semantic basis for these distinctions? Do we expect the n_i's to differ in identifiable ways? It is hard to imagine what this would look like.

c. But then, the different n morphemes serve only to get the morphophonology right; effectively, they serve as diacritics.

d. $\Rightarrow$ But that is tantamount to admitting that it isn't something about the content of n morphemes that is relevant here; i.e. it is the **form** of the n that seems to be important.

It would be possible to keep beating one's head against the last point. However, there is another argument against (T1), which comes from (E3). Things like:

(21) permit, permiss-ion, (permitt-al), (permit-ment)
(commit), commiss-ion, committ-al, commit-ment

We see that $\sqrt{\text{MIT}}$ has to be on the lists for *-ment*, *-tion*, *-al*, and *-Ø*. That is, for four different n_i morphemes (just considering these few data points). But: in order to know which form of n to choose, the prefix seems to matter.

- This kind of "non-local" effect is not something that we can handle with (T1).

To see this (and assuming [[PR $\sqrt{\text{ROOT}}$] n], for concreteness):

One obvious attempt would involve statements to the effect that in structures like [[PR $\sqrt{\text{ROOT}}$] n], specific prefixes are able to require particular n morphemes. So, for instance, letting n_4 be the one that is realized as *-ment* we could try to say:

(22) n_4 selects *Co-*/PR but not e.g. *per-*/PR.

This would give us *commitment* but not *permitment*. The problems with this analysis are

Problem 1: It is a hack— the selection does not involve synsem properties of n_4, or the prefix PR; it serves only to get the allomorphy right; and, more importantly

Problem 2: The solution goes wrong when we put other bound Roots into the equation. So, for example, with (22) we should have *con-* cooccurring with *-ment* irrespective of the Root choice, since the relation is between the PR and n. But this would give us e.g. *conceivement*, which we do not want to derive if (T1) is correct.

There's a more general idea at play here that we can consider with respect to (T1). This theory is well-suited for dealing with (E1), ANUC, but has difficulties with (E3) (put (E2) to the side for a moment). The idea:

- If the Multiple-x theory is correct, then the conditions of locality that apply to allomorphy more generally should be obeyed in all instances of ANUC. Put differently: if we found that typical allomorphic locality was flaunted *exactly in what looks like instances of ANUC*, this would be an argument **against** Multiple-x.

Another way of thinking about it is that if these cases of prefixes being "visible" to suffixes (or vice versa) were typical, we would revise the theory of allomorphic locality. But to the extent they seem to be restricted to morphemes that show ANUC, the observation is relevant to the theory of why we find things like (E1-3) and not to the theory of allomorphic locality itself.

2.3 The Argument for Polymorphy

On the face of it (T2) and (T3) are quite similar.

To implement (T2), we could modify the provisional Vocabulary employed above along the lines of Version 2, repeated here:

(23) realizations of n, 2 (repeated)

n	$\leftrightarrow$	-ment	/{$\sqrt{\text{IMPROVE}}$, $\sqrt{\text{BASE}}$(?)...} ___
n	$\leftrightarrow$	-(t)ion	/{$\sqrt{\text{DESTROY}}$, $\sqrt{\text{-DUCE}}$, $\sqrt{\text{INVADE}}$...} ___
n	$\leftrightarrow$	-al	/{$\sqrt{\text{ARRIVE}}$, $\sqrt{\text{REFUSE}}$,...} ___
n	$\leftrightarrow$	-age	/{$\sqrt{\text{MARRY}}$, $\sqrt{\text{CARRY}}$, $\sqrt{\text{COVER}}$...} ___
n	$\leftrightarrow$	-ity	/{$\sqrt{\text{ATROC}}$, $\sqrt{\text{CURIOUS}}$, [a,-able]...} ___
n	$\leftrightarrow$	-Ø	/{$\sqrt{\text{BREAK}}$, $\sqrt{\text{CAT}}$, $\sqrt{\text{COVER}}$ ...} ___
n	$\leftrightarrow$	-ing	/{$\sqrt{\text{HOLD}}$, $\sqrt{\text{FIX}}$,...} ___

While this Vocabulary does not serve the purposes of (T1), it does work for (T2), as long as we say something about competition.

Note that in many types of realization, a typical case is that Vocabulary Items associated with lists will win out over a default, but will not actually compete with each other, because the lists are disjoint; for example:

(24) Vocabulary Items for T[+past]

a. T[+past] $\leftrightarrow$ -t/{$\sqrt{\text{BEND}}$, $\sqrt{\text{LEAVE}}$,...}___

b. T[+past] $\leftrightarrow$ -Ø/{$\sqrt{\text{HIT}}$, $\sqrt{\text{QUIT}}$,...}___

c. T[+past] $\leftrightarrow$ -ed

The first two VIs beat the second; but they are not ordered by specificity with respect to one another inherently, since they are equally specific. But, in this type of example, it doesn't matter, because there is no overlap in list membership, hence no circumstances in which one needs to beat the other.

Back to (23). Here, there is overlap and potential competition among VIs, since more than one VI has $\sqrt{\text{COVER}}$ on its list. In order to make sure that VIs that make reference to the same Root do not block each other in (23), it is necessary to modify the competition mechanism; here is one way to do this:

(25) **Competition′:** When Vocabulary Items applying to x are absolutely tied with respect to specificity and refer to the same Root in their lists for context, they are both in principle able to apply. In any particular derivation, only one does (positional blocking).

What (25) says is that with ties, there is something like "free choice" (=speakers choose what to do in a particular use of the grammar); this is how it produces ANUC effects.

To implement **(T3)**, we need something like Competition′, and the idea that the part that extends the lists (like in (23)) is unnecessary. One way to do this is to hold that insertion (for particular morphemes) is "Free Up to Morphophonology":

(26) **Insertion "Free Up to Morphophonology" (FUMP)**: Polymorphic morpheme X is realized by all the Vocabulary Items that can apply to it (based on its inherent content), in a way that is constrained only by morphophonology.

This is a version of the Potential Lexicon, restricted to certain morphemes.

- As far as FUMP goes, many things could be considered, including [+latinate] (so we wouldn't necessarily derive *cat-ment* etc.), along with various morphophonological things (if we think that e.g. *cover-ity* sounds odd relative to e.g. *cover-ment*), and so on. (Halle 1973 talks about this in terms of productivity).

Both (T2) and (T3) produce ANUC (E1). They say different things about (E2) *confusal* effects, which I believe will have to be investigated experimentally:

- (T2) says that this form is not derived because $\sqrt{\text{CONFUSE}}$ is not on the list for the Vocabulary Item that inserts *-al*. The action is in the grammar.
- (T3) says that this form is derived by the grammar. However, there is no "semantic space" associated with this form (i.e. it is not used).

Things are not quite like this when non-local effects are taken into account, though. Let's take $\sqrt{\text{MIT}}$ as we did earlier: *permit, permission, (permittal), (permitment)*; *(commit), commission, committal, commitment*.

Point 1. It seems like (T2) needs to say things like "the Root $\sqrt{\text{MIT}}$ is on the list for the VI that inserts *-al*, but only when *co-* is present (and *trans-*, etc.), not when *per-* is present". But this is not the kind of thing that works if we are trying to maintain the idea that lists do not contain complex objects, and that exceptions to linear locality theory fall under ANUC.

Point 2. On the other hand (T3) says that all of these forms are grammatical, but only some of them have associated semantic spaces that they are used for. This looks like a reason to move to (T3) (but, of course, we should think about this very carefully).

The interim conclusion:

- Polymorphy (T3) extends to explain (E1-3) in a straightforward way, which is good assuming that we want to connect these effects.

As noted, with respect to (E2) polymorphy allows *confusal* to be derived, as opposed to theories that need $\sqrt{\text{CONFUSE}}$ to be on a list before this happens. This is something that should be tested.

By way of general (=somewhat vague) summary, consider that there are two things involved in the theory of blocking that is outlined in Embick and Marantz (2008):

1. **(B1) Positional Blocking:** A morpheme can only be realized once by Vocabulary Insertion per derivation. Thus when it is realized by one Vocabulary Item, others that could apply to it are precluded from applying. (This is *Uniqueness* in Embick 2015).
2. **(B2) Properties of Lists:** As originally conceived, lists were structured so that there was no ambiguity as to what would happen in a particular structure: either a VI referring to a particular Root would apply, or the default would. This is a sort of uniqueness due to properties that lists happen to have.

The particular competition logic that is reflected in the *Subset Principle* version of insertion collaborates with these two separate notions and the way they operate together. With Competition′ we decouple (B1) and (B2).

To Do

1. Examine what polymorphy does in terms of lexical meaning spaces (3-4)
2. Propose an account of why polymorphy is possible for some morphemes and not for others (5).

In fact the focus in (3-4) is on a slightly broader question, concerning the conditions under which we might want to say we have the same root (=polysemy, or something like it) versus different, homophonous roots (homophony). We'll approach this in a few steps, and then return to tie everything together in 5.

3
Root Identity and Polysemy/Homophony

Some questions to consider:

1. What does polymorphy do? It effectively allows the exponent of a head to pick out a particular part of the meaning space associated with a Root (in the typical case, anyway). How does this work?
2. How do we know in the first place whether we have one Root, or multiple (homophonous) Roots?
3. How do these ideas relate to the proposal that polymorphy is only potentially found with certain morphemes?

3.1 Polysemy versus Homophony

It seems like there are good reasons to recognize something called *homophony* for Roots (and for functional morphemes, homophonous Vocabulary Items; I will touch on this later).

- So, for example, we might think that the Roots underlying *bank* 'financial institution' and *bank* 'side of a river, etc.' are distinct, in spite of their phonological identity.

We represent these as distinct objects; e.g

1. $\sqrt{\text{BANK}}_{254}$ and $\sqrt{\text{BANK}}_{879}$
2. For immediate purposes this is equivalent to "late insertion" $\sqrt{254} \leftrightarrow$ /bæŋk/, $\sqrt{879} \leftrightarrow$ /bæŋk/.

However, there are challenges to the intuition at play.

- Borer (2013), for example, admits no homophony: Roots are *only* phonological indices; that means one $\sqrt{\text{BANK}}$.
- At the other extreme would be a theory with homophony everywhere: *book* "thing" and *book* "contents" would be based on two distinct Roots.

The question, of course, is what different kinds of middle ground look like (and how to argue for them empirically).

Why is this hard? Consider what our intuitions about identity might have to say about sets like these:

(27) a. slug-Ø‘gastropod’
slug-Ø‘bullet’
slug-Ø‘shot of liquid for drinking’
slug-Ø‘fake coin’
to slug ‘to hit’
slugg-ish ‘unusually slow, lacking in energy’
⋮

b. con-ceive
re-ceive
de-ceive
⋮

c. $\sqrt{\text{COVER}}$-Ø
$\sqrt{\text{COVER}}$-age
$\sqrt{\text{COVER}}$-ing

Or (Spanish)

(28) a. foc-a ‘seal’
foc-o ‘spotlight, focus, etc.’

b. cerez-a ‘cherry’
cerez-o ‘cherry tree’

c. ray-a ‘line, stripe, part in hair, crease, scratch, (manta) ray, etc.’
ray-o ‘ray (of the sun), lightning bolt, spoke’

d. ⋮

How many roots $\sqrt{\text{Slug}}$, $\sqrt{\text{Ceive}}$, $\sqrt{\text{Cover}}$, $\sqrt{\text{Foc}}$, $\sqrt{\text{Cerez}}$, $\sqrt{\text{Ray}}$... are there? On what basis would we be able to draw lines?

Or, using an example we will discuss below:

- How would we say that the Root $\sqrt{\text{Straw}}$ appears both in the noun *straw* and the compound *strawberry*?

We'll talk about ways of partitioning Root identity that can distinguish between *bank*/*bank* and *strawberry*/*straw*. Some of the distinctions that are made will then inform the hypothesis about where polymorphy could be found.

3.2 Background

Aronoff (1976, ch.2) addresses the criteria for Root identity, in the context of his discussion of bound roots (like $\sqrt{\text{MIT}}$) and compounds.

A lot of the second chapter of Aronoff (1976) is an argument that morphemes are not *minimal meaningful units* (Aronoff cites Hockett 1958's morpheme "...the smallest individually meaningful element in the utterances of a language."). The goal is to argue against this, and replace of the semantic definition of the morpheme:

> ...we will isolate a class of morphemes, show that there is no way in which the members of this class can be said to have any meaning at all, and then demonstrate that there are phonological criteria which allow us to isolate occurrences of these meaningless morphemes. (7)

KEY POINT: We are talking about identifying morphemes *on the basis of something other than meaning*.

Aronoff assumes that the meanings he is interested in (for minimal units, words, whatever) are *signs* in the sense of Saussure.

- We should think about this assumption. It might be more typical now to think that morphemes have denotations in the sense defined by another semantic tradition, and that the sign is something else (e.g. it could be that the *use* of words etc. implicates the sign).
- It's important to be careful about what we are "adopting" from the theory of signs because a lot of the literature seems to assume that it is the arbitrariness of sound/meaning connections that makes for a Saussurean sign.
- But that is only part of the picture (moreover it is found in earlier authors). The part of Saussure's theory that is much more interesting has to do with competition— i.e, the extent to which the meaning of a sign is determined by other signs. The locus (or loci) of competition in the grammar is, of course, the central theme in the discussion between theories with word/word, word/phrase, or phrase/phrase blocking, versus theories that restrict competition (on the most extreme view I know of, to morpheme realization, Embick and Marantz 2008).

Importantly, Aronoff's arguments about meaningless morphemes lead him to conclude that *words* are minimal meaningful units:

> ...below the level of the word we encounter morphemes which, while they must be assumed to be real linguistic elements, have no meaning which can be assigned independently of each of the individual words in which they occur.(10)

There are two important responses to this line of reasoning:

> **First,** from the fact that *some* morphemes do not have a minimal sign meaning, it does not follow that *all* morphemes are meaningless.

Second, it does not follow from the fact that some morphemes find their meaning in context that "the word" is a meaningful unit (or the only meaningful unit). Among other things we will want to ask *whether two morphemes anywhere inside of a complex word can interact in such a way as to give the contextually-determined meanings that Aronoff is attributing to the word.*

⇒To the extent that this does not happen– i.e., to the extent that only local relationships among morphemes yield the relevant meaning effects– then we are actually going to want to privilege the morpheme even for this part of the theory of sound/meaning connections; not the word.

3.3 Compounds and Bound Roots

In any case, the kinds of things Aronoff has in mind are compounds of different types, and bound Roots:

(29) Compounds

a. cran-berry (*cran-* does not exist elsewhere)

b. black-berry (need not be black in color)

c. goose-berry, straw-berry (have nothing to do with geese or straw)

(30) Bound Roots (no fixed meaning for Root or prefixes)

a. re-ceive, per-ceive, con-ceive...

b. re-mit, com-mit, e-mit...

Aronoff considers a theory of "allo-meanings"— contextually activated meanings of "underdetermined meanings— but worries about appealing to such a notion, given his idea that words can just be idiosyncratic.

With respect to Root identity, starting with compounds:

> In the particular case with which we are dealing [berries; de], the device of underspecification and contextual filling leads to a particularly unsatisfying result. Since, as noted, some blackberries are red, and since something cannot be both black and red at the same time, the two allo-meanings of #*black*# will be contradictory and will share almost no semantic features (color?). Allowing a device which permits such a situation is very dangerous; it essentially gives homophony as the only criterion for deciding whether two things are instances of the same meaningful entity.(11)

We should ask here precisely how the "special" meaning of *blackberry* stand in relation to *black*. Is *black* activated in its "basic" meanings, which are then suppressed? [Cf. Fiorentino and Poeppel on *teacup* and *bellhop*.] Activating a meaning in addition to the ones found out of context is different from removing all meaning from the basic object as a way of avoiding contradiction.

Then, bound roots:

- The key notion here is that there are formal (=morphological) reasons for positing a single Root $\sqrt{\text{MIT}}$: in particular, the alternation between *mit* and *mis*:

  (31) per-mit, com-mit, e-mit...per-miss-ion, com-miss-ion, e-miss-ion

The idea here is that something more than phonological identity is required for Root identity; essentially, this reduces to avoidance of multiply-listed "strange" allomorphy:

> A morpheme is a phonetic string which can be connected to a linguistic entity outside the string. What is important is not its meaning, but its arbitrariness.

By "outside the string" he has in mind allomorphy *mit*/*miss*, or *stand*/*stood*. Add to (27) some observations from Aronoff on $\sqrt{\text{STAND}}$, in(32) (adapted)

(32)
a. I stood in the corner/stood the chairs in the corner.
b. I stood it as long as I could, and then left.
c. In Mary's day, Q stood for "complex symbol".
d. For unknown reasons Nixon stood out more than Elvis did.
e. Elvis stood in for Nixon? Seriously?!?
f. The rival team stood down and the overt fight was avoided.
g. We stood around for an hour and thought about slugs.

The meanings are quite different (as different as the $\sqrt{\text{SLUG}}$ meanings?); A's conclusion:

> ...all occurrences of the string *stand* which alternate systematically with *stood* in the past tense are instances of the same *morpheme*. This means that the various verbs *stand* [like those above;de] are all instances of a single morpheme, the same morpheme which occurs in *understand* and *withstand*. However, they are not all instances of the same sign, for, as we have seen, a morpheme need not be a sign at all. (16)

Presumably this reflection relates to what we reflected on for e.g. *black* in *blackberry*. Unless I have missed something it's not clear that the criteria for identity will yield the result that there is just one *black*. Aronoff (11) considers the possibility that there are multiple *black* morphemes, but does not return to it after his summary statement on identity and how morphemes are defined:

> The morpheme is traditionally defined as the minimal sign: an arbitrary constant union of sound and meaning. This definition must be adjusted to include such morphemes as *mit*, which have no constant meaning. Now, *mit* is clearly a constant phonetic string (at the level of the input to the phonology). It is also arbitrarily linked to something. However, it is linked not to a meaning but to a phonological rule, the rule which changes *t* to *s*... The original definition of the morpheme has three aspects: constant form, arbitrary link, constant meaning. In order to include *mit* in the class of morphemes, we need only broaden the third, that of constant meaning, to include a phonological operation as well. This broadened meaning will allow us to include *stand* and *take* also. The rule to which they are arbitrarily linked spells out the past tense. (15)

This expands on the "more than phonology" idea. He concludes the thought with

> That I include a meaning and a phonological rule in the same class of entities, and speak of mere broadening in doing so, may strike some as odd. but I only wish to point, perhaps a little dramatically, to what is essential about a morpheme: not that it mean, but rather merely that we be able to recognize it. A morpheme is a phonetic string which can be connected to a linguistic entity outside that string. What is important is not its meaning, but its arbitrariness. (15)

So it isn't at all clear what we should be doing on this approach with $\sqrt{\text{BLACK}}$, $\sqrt{\text{SLUG}}$, etc., where there is no funny allomorphy to suggest identity.

To this point, then, three types of views:

- Homophony everywhere.
- Intermediate: There are grammatical criteria for distinguishing polysemy and homophony. The Aronoff (1976) version, which is often assumed, does well with (certain) bound roots, but not elsewhere.
- No Homophony (Borer 2013).

In (4) we will examine another (partial) intermediate view.

4
Root Identity: An Approach in Outline

4.1 Some Assumptions

I will talk about "lexical meanings" in terms of a space:

- A "Root meaning space" Π ("polysemy space"; though see below). One could ask how this space relates to *concepts*, how its dimensionality is determined, and so on.

Within this space, the way that we speak of particular Roots has to take into account the idea that Roots might differ in terms of how coherent their associated spaces are:

1. In a typical case, a Root points to a set of related Π meanings $\pi_1 ... \pi_n$ (which π_i are activated depends on the morphemes in the local context of the Root). A Root might also point to "unrelated meanings" (*stand, understand*; *lady*, *bug*, *ladybug*) etc. (Trying to restrict homophony but perhaps not the the extent of e.g. Borer 2013.)

2. In special cases like $\sqrt{\text{MIT}}$, the π_i set is produced only in conjunction with a contextual element (i.e. the prefix); so there is no "basic" meaning. (In my view we recognize this as a special case (=no "basic" meaning) because it seems to stand out compared to e.g. $\sqrt{\text{CAT}}$; but this could be a difference in degree, not in kind.)

For relating different meanings (in Π-space) of the same Root:

- There are operations on Π-space that we call polysemy: e.g. "regular" ones (for *book* etc., object/content), and also "irregular" (presumably you have to just learn that $\sqrt{\text{GLOBE}}$ and $\sqrt{\text{SPHERE}}$ relate to different aspects of a similar meaning space).

In the case of *globe* versus *sphere*, as noted in the bullet point it might not be that there is an operation per se; rather, the relevant information simply has to be encoded in some form.

The operations that take place in Π space are different in kind from those that are examined in other parts of semantic theory. With this in mind, I will also make use of the idea that semantic operations are partitioned, such that some morphemes have "typically" compositional meanings:

(33) **Typical Compositional Meaning (TCM)**: Roughly, involving meaning operations among grammatical objects, in ways that do not appear to affect Π-space.

It is convenient to point to examples in order to illustrate the kind of distinction that I have in mind:

(34) a. E.g., Tense[+past] does what it does to verbs in a way that does not appear to affect Π-meanings.

b. But e.g. n, beyond perhaps doing something to semantic type, effectively only operates on Π-spaces when Root attached.

The intuition is that some morphemes are involved in typical compositional operations, while others (aside from what they do syntactically) are active in Π-space. Some morphemes— e.g. Aspect, which figures importantly in the locality discussion in Anagnostopoulou and Samioti (2014)— have a complicated status (see below for comments).

Finally, I am going to assume with Marantz (2013) that there is a difference between the action that takes place in Π-space, versus outright idiomaticity of the *kick the bucket* type:

- Π-space action $\neq$ idiomaticity

This might be a difficult line to draw when we get down to particulars. The intuition (in this handout, anyway) is that action in Π space directly involves activating meanings for a Root, in a way that does not implicate TCM. In idiomaticity, on the other hand, all of the Root meanings are "typical", and there is TCM; there just happens to exist a convention that says that I can use *kick the bucket* to mean something like 'die'.

4.2 Operating on Π-Space

What is allowed under "operation on Π-space" might be fairly broad; I would extend it to things like the following:

1. "typical" allosemy (=determined by category-defining head),
2. prefixed verbs in Germanic with special meanings (*stehen*, *verstehen*),
3. bound Roots with prefixes in English (and in various Romance languages)
4. N-N (or A-N) compounds (more broadly, compounds in which there isn't enough structure to produce a TCM interpretation).

As far as the triggers for Π-space action are concerned, there are other types of morphemes and features beyond category-defining heads that appear to be relevant:

1. **Example 1.** In the analysis of Π-meaning effects in Greek participles, Asp(ect) (a particular kind of stativizing head) gets involved with Root meanings (Anagnostopoulou and Samioti (2014)).
2. **Example 2.** Gender— Borer (2013) talks about issues with positing multiple homophony for Roots, and argues that Roots are only phonological. Some of her illustrations relate to LGM. For the Root $\sqrt{\text{PKD}}$ she gives the following forms:

(35) paqad 'order'
nipqad 'be absent'
piqqed 'command'
hipqid 'deposit; entrust'
hitpaqqed 'be counted'
paqad 'sergeant'
mipqad 'census'
mipqada 'army HQ'

Her main point has to do with how many homophonous Roots you would have to posit here if we wanted to stick with the idea that Roots have a "core meaning".

Interestingly, she notes that the last two examples are both of the *mišqal* form, the last with a feminine suffix. In terms of what we said above, it looks like the gender feature [+fem] here provides the LGM for this Π-meaning.

On the theme of e.g. gender features triggering operations on Π-meanings:

- This appears to be quite restricted, in the sense that— as far as I know— it is not possible in familiar languages with gender to use "the wrong gender" with *confusal*-type possibilities or intentions.
- This kind of makes sense to me— the general idea would be that creating new Root/feature combinations is quite restricted. There are two ideas here, one about features and the second about how they affect insertion:

(36) a. Association of Roots with arbitrary class features is often "fixed"– i.e., once speakers have memorized the association between $\sqrt{593}$ and [$+\alpha$], they cannot just produce derivations with another feature "at will".

b. Feature-differentiated morphemes are subject to deterministic Vocabulary Insertion (not polymorphy).

I think it would be worthwhile looking at lots of gender systems, or languages in which there are systems of classifiers, to see if Π-meaning effects are more pronounced than they are in e.g. typical Romance or Germanic languages.

4.3 Some observations: Prefixes and Compounds

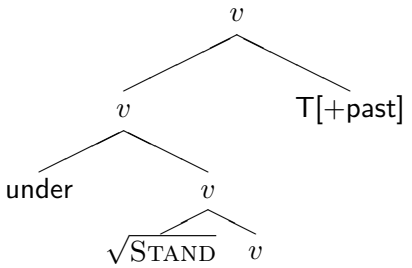
Here are a few different examples that we have used above, looked at in terms of the discussion that has been framed to this point.

For convenience, let us take *stand* and its relation to *understand* (and *withstand*) as an example. This example stands in for a range of things that are found in Germanic (German and Dutch have good examples of this throughout the verbal system).

- In other languages— here is German for illustration— there are important issues about locality and constituent structure that arise in considering the relevant phenomena. German has things like English *under* that are bound to verbs when they occur with them: "inseparable" prefixes. So, for example, German *stehen* 'stand', *ver-stehen* 'understand'. German also has "separable" prefixes that are stranded when the main verb moves; e.g. *stehen* 'stand', *aufstehen* 'stand up', *Steh mal auf!* 'stand up!'. Crucially, *both inseparable and separable prefixes can produce non-TCM meanings*: e.g. *hören* 'hear', *auf-hören* 'stop'.
  - This observation is important for theories that maintain a sharp division between lexicon (or "morphology") and syntax;
  - It is also potentially important for understanding what locality conditions might apply to Π-space interactions.

For *understand*, the idea would be that there is some basic meaning space associated with $\sqrt{\text{STAND}}$ (and with $[\sqrt{\text{STAND}}\ v]$). When we derive *understand* (past tense to make another point):

(37) understand (cp. [[under $\sqrt{\text{STAND}}$] v])



Here, *under* triggers an operation on Π-space that points to a meaning-space that is disjoint from the one pointed to by the verb $\sqrt{\text{STAND}}$ by itself. However:

- The same Root $\sqrt{\text{STAND}}$ is in *stand* and *understand*. We see this from the irregular realization of the past tense: *stood*, *understood*.

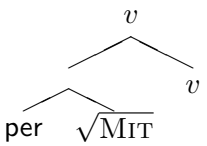
In German, a lot of the prefixed verbs have irregular past tenses etc.; some do not though. Remember that in an approach that requires irregular morphophonology when there is no shared meaning, this means that the irregular ones share a Root, while the regular ones don't (this is an odd consequence).

- Open question: Are the *stand* meanings of $\sqrt{\text{STAND}}$ activated when *understand* is derived (produced, processed)?

There is starting to be evidence for e.g. online decomposition in e.g. *verstehen* and *aufstehen*, but this question goes beyond that.

In the case of e.g. *per-mit*, there is actually no question of this type directly, since, as discussed above, both the prefix and the Root appear to have no particular meaning associated with them:

(38) permit



That is, *per* and $\sqrt{\text{MIT}}$ mutually point to a particular part of Π-meaning space.

***

Compounds provide some interesting examples of LGM effects. Three types (recall the discussion above):

(39) a. cran-berry etc. (*cran-* type)

b. straw-berry, goose-berry etc. (non-head "opaque")

c. lady-bird (cp. lady-bug); bell-hop etc. (head/non-head opaque)

Q: What are *cran-* and *straw-* doing in *cranberry* and *strawberry*?

A: $\Rightarrow$ Pointing to Π space; i.e. picking out a particular meaning space, in these cases, a type of berry.

It is important here that N-N compounds are put together in a way that is not interpreted in a TCM way (the default is "N_1 pertains to N_2 in some way that is subject to convention").

Observations:

1. The action on Π-spaces is "uni-directional" in the case of *cranberry*, because *cran* doesn't do anything more than specify part of the *berry* meaning.
2. The action in *strawberry*, on the other hand, is reciprocal; there is action on the *berry* space, and, in addition, action on *straw*, since we don't have its transparent meaning active here. Compare (and contrast) *permit* etc.
3. The reciprocal effect raises some interesting questions for phase theory. Essentially, categorized [Root n] has to have its Π meaning space affected by another [Root x] that it has been merged with. It could be that reasoning about this gives us some insight into the constituent structure and derivation of "smaller" objects.
4. It is also what is happening in "fully opaque" things like *ladybird* (as opposed to *ladybug*), and presumably things like *per-mit* as well. The two pieces LGM condition each other in a way that picks out a particular Π-space.

Here is the part that is going to be crucial for understanding polymorphy:

- ⋆ For the opaque (*cran*, *straw*, etc.) compounds, it does not matter that the first element either (i) doesn't have a typical meaning, or (ii) doesn't have its typical meaning in the compound. ***The primary effect of these objects is to create effects on*** Π***-space.***

The main idea is that from some point of view, a lot of these compounds could be seen as

(40) X-Noun

Where the actual identity of X doesn't matter ($=$ typical meaning suppressed or not activated). It is for this reason that it does not matter even if the first element has an independent existence or not (*cran*- morphs). This latter type could only possible serve as a pointer.

- Along these lines we might ask if there are compounds with *cran*- heads (*straw-blick*) or with both *cran*-morphs (*gart-blick*).

We'll see more about compounds after we talk about identity.

5
Bringing the Threads Together

5.1 Introductory Review

Two things to be dealt with:

1. A pressing question, which applies to (T2) and (T3), is why some morphemes (e.g. these n we have been considering) can apparently show polymorphy, whereas other morphemes (e.g. Tense, cp. **bend-ed*) do not. I will look at the question of which morphemes *could in principle* show polymorphy in a way that relates to current discussions of grammatical domains for lexical meaning, or polysemy resolution (allosemy).
2. The question of when there is Root identity: is there one $\sqrt{\text{STRAW}}$ in *straw* and *strawberry*? How many $\sqrt{\text{SLUG}}$ roots are there? There will be a partial answer to the identity question.

The interesting part of this is that the same factors figure in the answers to these questions.

One more bit of background. I will make use of the notion that there are locality domains involved in specifying operations in Π-space, and that these are different from those involved in "outright idiomaticity" (Marantz 2013 makes such a distinction).

Since I am more interested in types of morphemes in this talk, I will assume intentionally vague (41); concrete proposals are discussed in Marantz (2013), Anagnostopoulou and Samioti (2014), Borer (2013), and a number of other places:

(41) **Local Grammatical Mediation (LGM):** An object (see below) in the local context of the Root specifies an operation in Π-space. (I have *object* here because LGM effects could be triggered by morphemes, or the forms of morphemes (=polymorphy), or possibly Roots (in compounds; see below).)

If we connect LGM to phase theory (as in Marantz 2013), then it will follow that outer categorial morphemes cannot get involved directly with the Π-space of the Root. In the theory advanced below, this will also mean that polymorphy is subject to phase locality.

5.2 Polymorphy; its Limits

Here is a proposal, which builds directly on the idea that morphemes can be LGM or not, and TCM or not:

(42) **Polymorphy Hypothesis:** Polymorphy is possible for morphemes that are (i) local to a Root in the sense covered by LGM, and (ii) not typically compositional in the sense of TCM.

The intuition embodied in (42) is that polymorphic effects arise precisely where the role of the variant phonological forms is to serve as pointers to Π-spaces. So that e.g. *cover*, *covering*, and *coverage* could all be $[\sqrt{\text{COVER}}\ n]$, with the exponents pointing to the appropriate Π-addresses.

There is a sense in which polymorphic effects are driven by freedom of choice.

- You can think about this in terms of what happens in compounds. If there were only one Root that could cooccur in compounds with $\sqrt{\text{BERRY}}$ then you would have only two LGM-determined Π-spaces for *berry*.
- Take nouns that only have -Ø suffixes— e.g. *slug*. This has many meanings: (i) gastropod; (ii) shot of liquid; (iii) bullet; (iv) false coin. There is nothing LGM that determines which of these is active in a given derivation. [So we have to ask where the polysemy/homophony divide is; Borer 2013 has an important discussion of this point.]

The general idea that "differences are interpretable" is part of Saussure. Notice that, for what its worth, polymorphic effects are producible in writing. Linguists do it reflexively (...); e.g. "I'm talking about case, not Case; and she is talking about Kase." (cp. with a part of Derrida's *différance*).

Many people point to something like the "Principle of Contrast" (e.g. Clark 1987) in this respect as well. According to the Polymorphy Hypothesis, only *certain* differences are interpretable:

- With LGM morphemes that are –TCM, the different exponents serve the function of picking out different aspects of Π-space.
- With other morphemes that are TCM, e.g. Tense, there is no polymorphy by (42). Thus, if we heard both *dive-d* and *dove* as the past tense of *dive* (my English), the effect is that of **variation**, not polymorphy.

Brief aside. With respect to the $\pm$TCM distinction, there are (as always) some interesting intermediate cases.

Consider Asp(ect). Asp of the "stative passive" variety plays an important role in Anagnostopoulou and Samioti (2014) and Marantz (2013):

1. In the Greek data they examine, it appears that Asp affects (what I would call the Π-meaning of) the Root, in spite of the presence of an overt intervening verbalizer.
2. Marantz argues that certain v morphemes are eliminated, such that the Asp morpheme and the Root are local "adjacent" for interpretive purposes. This "elimination" (and adjacency proposal) have analogues on the PF side (cf. Embick 2010).

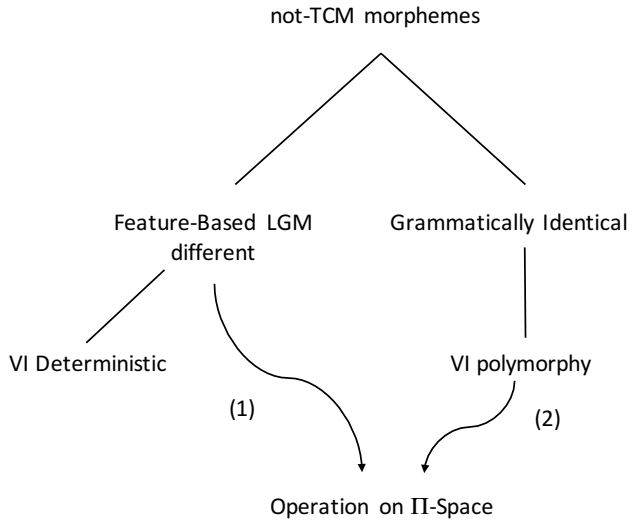
3. Tense morphemes appear to be local to Roots for allomorphy (*ben-t*, *hit-Ø*, *sang-Ø*); but they do not appear to get involved in Π-meaning spaces. So why would Asp be different from Tense?

As a direction to investigate, it seems like this might be because this kind of Asp involves states, of a type that are often implicated in "lower" verbal meanings (think verb classes etc.) But this has not been looked at carefully. [Likewise one would like to look at number features in addition to gender.]

5.3 Polymorphy: Summary

I have proposed that the morphemes that show polymorphy are a subset of the morphemes that have Π-meaning effects (the not-TCM morphemes).

Graphically:



For the (1) and the (2) in the diagram, the question to ask is whether the same kinds of Π-operations are associated with both features and exponents; see below.

Here are the main conclusions:

> **Conclusion 1:** To account for all of (E1-3), it looks like we must admit polymorphy for certain morphemes, in a way that connects with the Potential Lexicon of Halle (1973).
>
> **Conclusion 2:** An immediate question to ask is which morphemes can show polymorphy. I have tried to connect this with current work on locality for interpretation, by advancing the hypothesis that potentially polymorphic morphemes are those that are local to a Root (LGM), and not always typically compositional (–TCM).

Conclusion 3: This puts the theory of polymorphy (and, for that matter, the theory of polysemy) as subparts of the theory of what kinds of grammatical objects affect Π-meanings. In turn, it must be asked where the dividing lines between Π-effects and idiomaticity are.

One important consequence that I believe is worth raising involves a bit of a puzzle; it looks like this

A Consequence: Architecturally...evidently features (synsem objects), Root choices (debatably synsem objects), and exponents (not synsem objects) can trigger operations on Π-space. (Check out (1) and (2) in the figure). These look like "the same" operations, but that hasn't been conclusively determined. To the extent that we are talking about the same operations, we would not be dealing with LF meanings in this discussion, since LF cannot see what happens at PF. The question then is how to reconcile this idea with the idea that the set of meaning-related effects under discussion appear to care about syntactic locality.

At the very least there is a lot of work to be done in these areas, I hope that by connecting some themes and looking at things that are often put to the side that I will have provided something of a foundation for further investigation.

5.4 Root Identity: A (Partial) Hypothesis

Recall that there are some questions about the polysemy/homophony boundary that are not resolved by appealing to semantics or morphophonology:

1. In the case of e.g. *blackboard*, which need not be black, there is no semantic identity connecting this *black* with the *black* in *the black table*.
2. At the same time, there is no "shared irregular morphophonology" here, of the type found with *stand* and *stood*, or *mit* and *mis*, etc

So unless we want to say that there is massive homophony, there needs to be some way of identifying why there might be just one $\sqrt{\text{BLACK}}$ in cases of this type.

A hypothesis:

Identity Hypothesis Root identity is maintained under LGM effects induced by TCM morphemes.

It is easier to say this in prose: when you have a Root like e.g. $\sqrt{\text{STRAW}}$, in *The straw is in the barn*, the compound *strawberry* is analyzed with the same $\sqrt{\text{STRAW}}$, because there is something in the local context $\sqrt{\text{STRAW}}$— the noun *berry*— that affects its Π-meaning space.

More carefully:

1. *straw* picks out something in the Π-meaning space of $\sqrt{\text{BERRY}}$.

2. then, there is a question as to whether the typical meaning space of *straw* (when there is no LGM) is activated and suppressed, or just not activated in the first place.

This will be illustrated below. For the moment, note that the idea that there could be "no activation" of typical meanings in LGM contexts provides one way of thinking about this: in idioms there is full activation of typical meanings, and then a convention for use.

- In Π-meaning interactions, on the other hand, typical meanings are not activated in certain LGM contexts.

Recall that

1. In some examples, there are no meanings to suppress: e.g. with *cran* morphs. Here, the role of N_1 is simply to provide an LGM effect for N_2.

2. Bound Roots with prefixes are LGM-affecting each other; the net result is an address in Π-space. The question of how to divide labor between the Prefix and the Root might or might not be important.

All the examples discussed above are chosen because they have LGM. On the other hand, in *The bank is open until seven* and *Bill took a long walk along the bank of the river*, there is nothing LGM that specifies a Π-operation for *bank*. So, by (5.4) these would be two Roots (distinguished by indices, same phonology).

5.5 Root Identity: Some Observations

In no particular order, a number of themes that connect with the questions about identity raised above.

1. Concerning the boundary between Π-meaning operations, and what we have been calling idioms; a question; : in compounds with argument structure, could ever get true Π-meaning effects?. We get special meanings; e.g. *apple-polisher* 'type of sycophant'. But it might be correct to say that both *apple* and *polish* are "fully present" here on their typical meanings, with the "special" meaning being an additional convention on how this grammatical object is used.

2. Along these lines, think about *strawberry* "sore or bruise, caused by friction"; *raspberry* "derisive noise made in a particular manner".

3. What about $\sqrt{\text{SLUG}}$ Roots? If we think about these carefully, things start to get even more interesting. To start with, there is nothing LGM to tell us that we are talking about gastropods, liquid, bullets, fake coins, etc. (restricting attention to nouns).

4. Does this mean that we should posit multiple Roots $\sqrt{\text{SLUG}}_1$, $\sqrt{\text{SLUG}}_2$... ? Possibly, although we do not have a measure of Π-meaning closeness to tell us when— in the absence of LGM effects— we are dealing with one Root or two. Are the *slug* meanings "closer" than the *bank* meanings? Maybe,

maybe not; but more generally we would need some metric to tell us about Π-*meaning relatedness in the absence of morphophonological effects/LGM effects*. Here a sort of data-driven/experimental combination approach might be useful.

5. What would prevent us from treating some meanings of *slug* as idiomatic, so that we say that $\sqrt{\text{SLUG}}$ has the 'gastropod' meaning, but by convention can be used to refer to shots of whiskey, bullets, etc. (or vice versa...)?

6. It doesn't seem like idiomatic interpretation is only found with objects that involve TCM in the first place. That is, things that are not TCM like $[\sqrt{\text{SLUG}}\ n]$ probably are candidates for idiomatic meanings. Consider e.g. *dog* on the "special" meanings 'unattractive person', 'underperformer', 'close friend', etc.

***

As I have stressed at various points above, a number of the questions raised in this section (and in other places) are going to have to be addressed in an integrated research program that looks closely at the mental representation of Roots using theoretical and experimental tools. Main points/issues:

1. It is generally believed that there are ways of distinguishing certain types of polysemy from homophony experimentally.
2. What is not clear is how to deal with the question of what happens when a "typical" meaning is not activated. Three options have been raised at various points: (i) activation of meaning; (ii) non-activation; (iii) activation versus suppression.
3. It could be, for example, that LGM on Π-space involves (i) or (ii), whereas idiomaticity involves (iii). Showing this (and deciding between (i) and (ii) for polysemy) is the task.

We have some preliminary designs for experiments to address this, I hope soon to have something concrete to say.

5.6 Why—?

Evidently the system privileges freedom of choice for the part of the grammar that partitions the Π-meaning space; but not, I would say, the part of the grammar where the grammar interacts "internally". We could reflect on why this might be the case.

Bibliography

Anagnostopoulou, Elena, and Yota Samioti (2014) "Domains within words and their meanings: A case study," in Artemis Alexiadou, Hagit Borer, and Florian Schäfer, eds., *The syntax of Roots and the roots of Syntax*, Oxford University Press, Oxford, 81–111.

Aronoff, Mark (1976) *Word Formation in Generative Grammar*, MIT Press, Cambridge, MA.

Borer, Hagit (2013) *Taking Form*, volume Structuring Sense Volume 3, Oxford University Press, Oxford.

Chomsky, Noam (1970) "Remarks on Nominalization," in R. Jacobs and P. Rosenbaum, eds., *Readings in English Transformational Grammar*, Georgetown University Press, Washington D.C., 184–221.

Clark, Eve (1987) "The principle of contrast: A constraint on language acquisition," in Brian MacWhinney, ed., *Mechanisms of language acquisition*, Erlbaum, Hillsdale, NJ.

Embick, David (2010) *Localism versus Globalism in Morphology and Phonology*, MIT Press, Cambridge, MA.

Embick, David, and Alec Marantz (2008) "Architecture and Blocking," *Linguistic Inquiry* 39:1, 1–53.

Halle, Morris (1973) "Prolegomena to a Theory of Word Formation," *Linguistic Inquiry* 3–16.

Kiparsky, Paul (1983) "Word formation and the lexicon," in *Proceedings of the 1982 Mid-America Linguistics Conference*, 3–29.

Marantz, Alec (2013) "Locality domains for contextual allomorphy across the interfaces," in Ora Matushansky and Alec Marantz, eds., *Distributed Morphology Today: Morphemes for Morris Halle*, MIT Press, Cambridge, MA.

Saussure, Ferdinand de (1986) *Course in General Linguistics*, Open Court, Chicago and La Salle, Illinois.