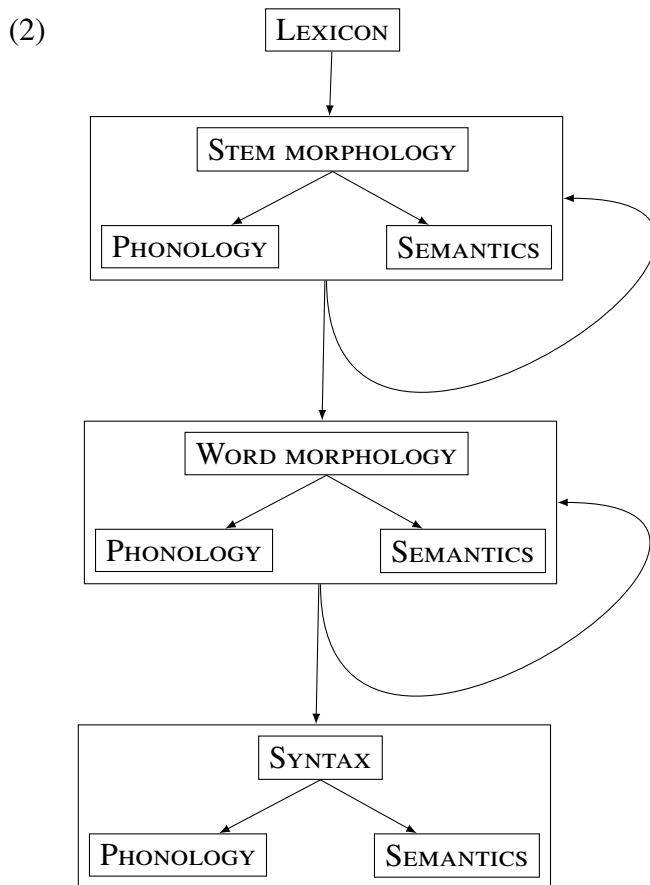


Two Approaches to Locality in Morphology

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- (1) Stratal OT has inherited the core assumptions of Lexical Morphology.
 - a. Morpheme-based, like Distributed Morphology (DM), unlike “a-morphous” Paradigm Function Morphology (PFM).
 - b. Generative (“inferential”), like classical lexicalism. Morphology combines stems and affixes and computes the morphosyntactic, phonological, and semantic properties of the resulting combinations by merging the corresponding properties of their parts to derive fully interpreted words that are inputs to the syntax.
 - c. Halle 1973, Aronoff 1976, Aronoff 1994, Carstairs 1987, Chomsky 1995, Wunderlich and Fabri 1994; Wunderlich 1996 (Minimalist Morphology), Hankamer and Mikkelsen 2002, 2005, Williams 2007, Ackema:2007, . . .
 - d. I argue that generative lexicalist morphology is preferable to DM-style interpretive (realizational) approaches, which treat morphology as the spellout of syntactic structure.



- (3) The traditional motivation for lexicalism: differences between the structure and derivation of words and clauses justify their modular separation.

- a. Displacement of morphemes in words is local and conditioned by morphotactic constraints: there is no \bar{A} -movement, A-movement, or scrambling within words, and probably no head movement (Gribanova and Harizanov 2016).
 - b. Also, there is no syntactic movement out of words, or into words, i.e. words cannot be discontinuous. (Endoclitization is phonological!)
 - c. Consequently no traces inside words, and no anaphoric dependencies on parts of them apart from discourse anaphora, no obligatory control, and no structural case. Words do not contain sentences or referential expressions as constituents.
 - d. Syntax obeys locality principles such as subadjacency, whereas morphological processes – including not just allomorphy but morpheme selection – are subject to the much stricter locality constraints. The contexts in which morphemes are inserted and allomorphy is determined are limited by adjacency and cyclicity (inward sensitivity).
 - e. Morphemes and their allomorphs may be confined to specific phonological contexts, whereas syntax is phonology-free.
 - f. words are subject to their own proprietary level-ordered phonology, which provide cues to their morphological buildup.
 - g. Even theories that assimilate morphology to syntax end up rebuilding a modular divide between them *within* the syntax and *within* the PF and LF processes that interpret its output: Syntax and morphology are “separate modules”, . . . “distinct in their computational character and information types, and narrowly restricted in their interaction” (Rezac 2011, cf. Arregi and Nevins 2012: 341).
- (4) Morphemes
- a. The minimal lexical entries of a language.
 - b. A morpheme contain phonological, morphological, morphosyntactic, and semantic information that specifies what it can be combined with, and what the predictable properties of each combinations are. Also allomorphy and/or allosemy.
- (5) Example: the plural suffix
- a. Phonological form: /s/
 - b. Meaning:

$$\llbracket /s/ \rrbracket = \lambda P \lambda x [|\text{atomic-parts}(x)| > 1 \wedge \forall z [z \in \text{atomic-parts}(x) \rightarrow P(z)]]$$
 where the function ‘atomic-parts’ maps an individual into the set of its atomic parts.
 - c. Categorical and subcategorization properties:

$$\left. \begin{array}{l} \\ \end{array} \right]_{\text{Word}, \text{N}} \text{ — } \left. \begin{array}{l} \\ \end{array} \right]$$
- (6) Morphology
- a. No rules inserting morphemes—so extrinsic ordering is not available.
 - b. A base combines with an affix (or with another base, in the case of compounding) into a new element which bears their unified features. The combination is semantically and phonologically interpreted and may then become the base for further affixation or compounding, subject to the applicable constraints.
- (7) Morphology is in principle unbounded, like syntax
- a. *crime* → *criminal* → *criminalize* → *decriminalize* → *disdecriminalize* → *redisdecriminalize* → *redisdecriminalization* → *redisdecriminalizational*
 - b. (((re-(dis-(de-(((crimin)_N-al)_A-ize)_V)_V)-ation)_N)-al)_A
 - c. The morphology incrementally generates a constituent structure, argument structure, meaning, and lexical phonological representation for the word.

- (8) Consequences
- Predicts bottom-up (cyclic) word-building. No need to stipulate bottom-up Vocabulary Insertion as in realizational models.
 - Derives Mirror Principle.
 - Derives cyclicity of word phonology.
 - Derives the empirically correct locality constraints.
 - Predicts anticyclicity of antiscopal morphology.
- (9) The Mirror Principle is the empirical generalization that morphological constituent structure and the order of affixes correspond to syntactic/semantic scope (Baker 1985).
- $((\text{im-pos})_{\text{V-able}})_{\text{A}}$ ‘what can be imposed’
 - $(\text{un}-((\text{pos})_{\text{V-able}})_{\text{A}})_{\text{A}}$ ‘what cannot be posed’
- (10)
- | | | |
|--------------------|--------------------|----------|
| (Léih-(büch-erèi)) | ((Tier-quäl)-eréi) | |
| lending-book-ery | animal-abuse-ing | |
| ‘lending library’ | ‘animal abuse’ | (German) |
 - | | | |
|---------------------|---------------------|--|
| mis-reinterpret | re-misinterpret | |
| pre-coproduction | co-preproduction | |
| neo-antifascism | anti-neofascism | |
| re-denazify | de-renazify | |
| pseudo-nonpolitical | non-pseudopolitical | |
 - | | | |
|-------------------|-------------------|-----------------------|
| (yug-pag)-cuar | (yug-cuar)-pag | |
| person-big-little | person-little-big | |
| ‘little giant’ | ‘big midget’ | (Yup’ik, Mithun 2000) |
- (11) Cyclic phonology: the phonological properties of bases are passed on to their derivatives, modulo the phonological processes that those derivatives themselves are subject to.
- $\text{de}[\text{t}^{\text{h}}]\grave{\text{e}}\text{rmin}\acute{\text{a}}\text{t}\acute{\text{i}}\text{o}\text{n}$, $\text{cont}\grave{\text{a}}\text{min}\acute{\text{a}}\text{t}\acute{\text{i}}\text{o}\text{n}$, $\text{int}\grave{\text{u}}\text{mid}\acute{\text{a}}\text{t}\acute{\text{i}}\text{o}\text{n}$ (cf. $\text{d}\acute{\text{e}}\text{t}\acute{\text{e}}\text{r}\text{m}\acute{\text{i}}\text{n}\acute{\text{e}}$, $\text{cont}\acute{\text{a}}\text{m}\acute{\text{i}}\text{n}\acute{\text{a}}\text{t}\acute{\text{e}}$, $\text{int}\acute{\text{u}}\text{m}\acute{\text{i}}\text{d}\acute{\text{a}}\text{t}\acute{\text{e}}$)
 - $\text{gl}\grave{\text{o}}[\text{r}]\text{aliz}\acute{\text{a}}\text{t}\acute{\text{i}}\text{o}\text{n}$, $\grave{\text{u}}\text{til}\acute{\text{i}}\text{z}\acute{\text{a}}\text{t}\acute{\text{i}}\text{o}\text{n}$, $\text{br}\acute{\text{u}}\text{t}\acute{\text{a}}\text{l}\acute{\text{i}}\text{z}\acute{\text{a}}\text{t}\acute{\text{i}}\text{o}\text{n}$, $\text{v}\acute{\text{i}}\text{t}\acute{\text{a}}\text{l}\acute{\text{i}}\text{z}\acute{\text{a}}\text{t}\acute{\text{i}}\text{o}\text{n}$, $\text{t}\acute{\text{o}}\text{t}\acute{\text{a}}\text{l}\acute{\text{i}}\text{z}\acute{\text{a}}\text{t}\acute{\text{i}}\text{o}\text{n}$ (cf. $\text{gl}\acute{\text{o}}\text{t}\text{t}\text{a}\text{l}\text{i}\text{z}\acute{\text{e}}$, $\acute{\text{u}}\text{t}\text{i}\text{l}\text{i}\text{z}\acute{\text{e}}$. . .)
 - Productivity: *pàlatalizáció* vs. *pronòminalizáció*
 - $\acute{\text{e}}\text{st}\acute{\text{e}}\text{r} \rightarrow \acute{\text{e}}\text{st}\acute{\text{e}}\text{r}\acute{\text{i}}\text{f}\acute{\text{y}} \rightarrow \grave{\text{i}}\text{nt}\acute{\text{e}}\text{r}\acute{\text{e}}\text{st}\acute{\text{e}}\text{r}\acute{\text{i}}\text{f}\acute{\text{y}} \rightarrow \grave{\text{i}}\text{nt}\acute{\text{e}}\text{r}\acute{\text{e}}\text{st}\acute{\text{e}}\text{r}\acute{\text{i}}\text{f}\acute{\text{i}}\text{c}\acute{\text{a}}\text{t}\acute{\text{i}}\text{o}\text{n}$ [${}_{\text{I}}\text{nt}\acute{\text{e}}\text{r}\acute{\text{e}}\text{,st}\acute{\text{e}}\text{r}\acute{\text{i}}\text{f}\acute{\text{i}}\text{k}\acute{\text{e}}\text{i}\text{f}\acute{\text{a}}\text{n}$], $\grave{\text{i}}\text{nt}\acute{\text{e}}\text{r}\acute{\text{e}}\text{st}\acute{\text{e}}\text{r}\acute{\text{i}}\text{f}\acute{\text{i}}\text{c}\acute{\text{a}}\text{t}\acute{\text{o}}\text{r}\acute{\text{y}}$ [${}_{\text{I}}\text{nt}\acute{\text{e}}\text{r}\acute{\text{e}}\text{'st}\acute{\text{e}}\text{r}\acute{\text{i}}\text{f}\acute{\text{i}}\text{k}\acute{\text{e}}\text{,t}\acute{\text{or}}\text{i}$]
- (12) Cyclicity as a source of phonological opacity
- $$\begin{array}{ccccccc} \text{k}\acute{\text{r}} & \xrightarrow{\text{M}} & \text{k}\acute{\text{r}} & \text{-i} & \xrightarrow{\text{P}} & \text{k}\acute{\text{a}}\text{r} & \text{-i} & \xrightarrow{\text{M}} & \text{k}\acute{\text{a}}\text{r} & \text{-i} & \text{-ya} & \xrightarrow{\text{P}} & \text{k}\acute{\text{a}}\text{r} & \text{-}\emptyset & \text{-ya} & \xrightarrow{\text{M}} & \text{k}\acute{\text{a}}\text{r} & \text{-}\emptyset & \text{-ya} & \text{-te} \\ \text{do} & & \text{do} & \text{-CS} & & \text{do} & \text{-CS} & & \text{do} & \text{-CS} & \text{-PASS} & & \text{do} & \text{-PASS} & & \text{do} & \text{-PASS} & \text{-3SG} \end{array}$$
- $\lambda x\lambda y [y \text{ do } x] \rightarrow \lambda x\lambda y\lambda z [z \text{ cause } [y \text{ do } x]] \rightarrow \lambda x\lambda y\exists z [z \text{ cause } [y \text{ do } x]]$
- Morphosyntactic/semantic and phonological interpretation go hand in hand. The causative affix adds a Causer argument bearing the highest Th-role. The passive affix “demotes” it, which is to say it existentially binds it and renders it ineligible for structural Case. The remaining two arguments receive abstract structural case; the resulting representations provide the input to the syntax.
- (13) Locality: derives Carstairs’ (1987) generalization that morphological selection is local and inward-sensitive: the choice of morphemes and allomorphs can be sensitive to the identity of the adjacent stemward affix and to the accumulated morphosyntactic featural content of the base, not to affixes deeper inside or further away in the word structure.

- (a) $[[[A + B] C]]$ (b) $[[[A + B] C]]$ (c) $[A + B]$ (d) $[[[[A + B] C] D]]$
-
- C can depend on B B can't depend on C mutual dependency OK D can't depend on B

These constraints govern the selection of morphemes and allomorphs. They do not apply to (morpho)phonological alternations. For principled reasons: morphology selects, morphophonology accommodates the shape of morphemes to the selected context.

(14) Case (13b)

- a. Follows directly from bottom-up word-building, entailed by the Lexicalist architecture. The choice of morphemes and allomorphs can only be determined by the context that is current at the point of insertion. The affixation process can't be sensitive to upcoming material, simply because that material is not present at the point of affixation.
- b. In models where morphology spells out syntactic structures, upcoming material is present, and we need to impose locality constraints that prevent spellout rules from referring to it.

(15) Case (13c)

- a. Follows since roots and affixes are not cyclic constituents.
- b. Further prediction: mutual selection in the first cycle.

(16) An example of mutual selection in the first cycle: Sanskrit 'see'

- a. The root *dr̥ś* appears in all tenses, as well as in derived verbs and derived nouns (17a),
- b. *with one exception*: the suppletive allomorph *paś* appears before the unaccented active imperfective suffix *-ya*, and nowhere else (17b).

- (17) a. Pres.Pass. *dr̥ś-yá-te* 'is seen', Imperf.Act. *á-dr̥ś-ya-ta* 'was seen', Perf. *da-dárś-a*, Aorists *á-darś-a-t* and *á-drāk-ṣ-ī-t*, Fut. *drakṣ-yá-ti*, PPP. *dr̥ṣ-tá-*, Inf. *dr̥ṣ-tum*, Absol. *dr̥ṣ-ṭvā-*, Ger. *darś-anīya-*, Caus. *darś-áy-a-ti*, Desid. *dí-dr̥k-ṣa-te*, Desid.Caus. *dí-darś-ay-iṣ-a-ti*, N. *darśá-* 'seeing', N. *-dárśa-* 'appearance', *draṣ-ṭr-* 'seer', and many other derived nominals.
- b. Pres.Act. *pás-ya-ti* 'sees', Imperf.Act. *á-pás-ya-t* 'saw', Pres.Part. *pás-ya-nt-* 'seeing', N. *pás-ya-* 'seer', *súrya-m-pás-ya-* 'seeing the sun (acc.)'.
- c. Other such root/suffix pairs: *śad* ~ *śī* 'fall', *jñā* ~ *jā* 'know'...

- (18) Lexical entry of roots: (a) $\left\{ \begin{array}{l} \text{darś} \\ \text{paś} / \text{___}[-\text{Perfective}] \end{array} \right\}$, (b) $\left\{ \begin{array}{l} \text{śad} \\ \text{śī} / \text{___}[-\text{Perfective}] \end{array} \right\} \dots$

- (19) Lexical entry of pres.act. imperfective: $\left\{ \begin{array}{l} [-\text{Perfective}] \\ \text{a} \\ \text{ya} / \text{paś}, \dots \text{___} \\ \text{nā} / \text{jā}, \dots \text{___} \\ \dots \end{array} \right\}$

(20) Case (13d)

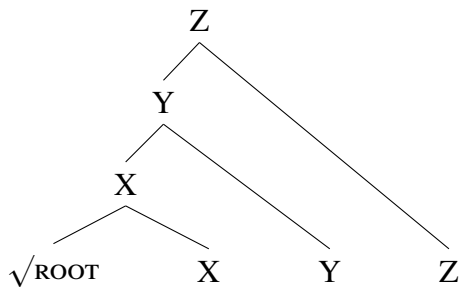
- a. Follows if the internal morphological composition of the stem is opaque once it has been phonologically and semantically interpreted.
- b. BRACKETING ERASURE: Pesetsky 1979, Kiparsky 1982, Embick 2010: 44.
- c. In generative lexical morphology bracketing erasure is independently motivated to make the internal morphological structure of words invisible to the syntax (Zwicky 1992).
 - For example, syntax does not distinguish between intrinsic plurals like *people*, *cattle* and derived plurals like *persons*, *cows*, or between monomorphemic mass nouns like
 - *gear* and morphologically derived mass nouns like *equipment*. But morphology does.

- Intrinsic plurals can receive a Theta-role in compounds, derived plurals cannot: *people-oriented* but not **persons-oriented*, *cattle-raising* but not **animals-raising*.
 - Intrinsic plurals can be verbalized, but derived ones cannot: they *peopled*/**personsed* the land, *they cattled* (**cowsed*) *us all up against the police vans*.
 - At the word level, verbalization of nouns is productive, but nouns derived from verbs at that level cannot be re-verbalized: *to gear* (*up*), but not **to equipment* (*up*).
- d. Not clear why you would need it in DM, since you've already done your syntax when you get to spellout.
- (21) What does Distributed Morphology predict about morphological locality?
- a. It depends on whether spellout happens before linearization (Embick 2010, 2015) or after linearization (Arregi and Nevins 2012).
 - b. It also depends on whether spellout destroys featural content on the base (Bobaljik 2000).
 - c. It also depends on whether its contextual window is limited by strict adjacency (Embick) or extends over spans of contiguous heads in an extended projection (Svenonius 2012, Merchant 2015).
 - d. It also depends on when roots are introduced in the derivation—late (Marantz 1995, 2013) or early (Harley 2014).

(22) Embick 2010, 2015 on allomorphy:

- a. Two morphemes can see each other for allomorphic purposes only if they are active in the same phase-cyclic domain.
- b. A morpheme *X* can see a morpheme *Y* for allomorphy only when *X* is concatenated with *Y*: $X \hat{\ } Y$ or $Y \hat{\ } X$.
- c. Vocabulary Insertion proceeds from the inside-out.

(23) By (22a), Vocabulary Insertion takes place first at *X*, then at *Y*, then at *Z*.



Allomorphy can be conditioned by the morphosyntactic or phonological features of an adjacent stemward item, and by the morphosyntactic features of an adjacent outward item.

- a. Vocabulary Insertion at *X* can see the $\sqrt{\text{ROOT}}$ and the morphosyntactic features of *Y*, but it cannot see *Z*.
 - b. Vocabulary Insertion at node *Y* can see the already inserted Vocabulary Item at *X*, but only the morphosyntactic features of *Z*.
- (24)
- a. An empty node that has no overt exponent is transparent (Embick 2015, Marantz 2013).
 - b. Enforced by PRUNING operation. (Surprising in a theory such as DM, for empty nodes bear morphosyntactic features that are otherwise visible, and in particular can *trigger* allomorphy selection.)
 - c. Can't look outside category-changing cyclic heads.
- (25)
- a. In a lexicalist framework a morpheme is entirely visible if it is already present and remains visible until bracketing erasure.

b. So the ban on outward sensitivity precludes reference to both the morphosyntactic properties of external suffixes and to their phonological properties.

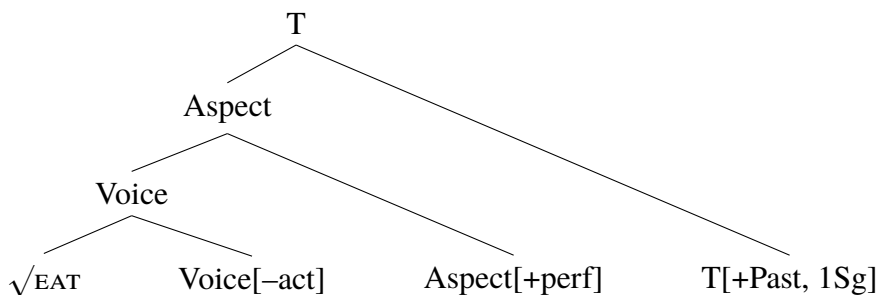
(26) Merchant 2015 argues that these locality conditions are too stringent, on the basis of the Modern Greek data in (27). They represent the suppletive paradigm of the verb ‘to eat’, in which the imperfective and perfective forms are based on different roots. Merchant notes that, under his analysis, the aspectual root suppletion is nonlocally conditioned, in violation of (22).

(27) Merchant’s morphological segmentation of Modern Greek *tróy/fay* ‘eat’

| | | | |
|--------------------------------|------------------|------------------------------|-------------------|
| ACTIVE IMPERFECTIVE NONPAST | | ACTIVE PERFECTIVE NONPAST | |
| 1Sg tró-o | 1Pl tró-me | 1Sg fá-o | 1Pl fá-me |
| 2Sg tro-s | 2Pl tró-te | 2Sg fa-s | 2Pl fá-te |
| 3Sg tró-i | 3Pl tró-n(e) | 3Sg fá-i | 3Pl fá-n(e) |
| NONACTIVE IMPERFECTIVE NONPAST | | NONACTIVE PERFECTIVE NONPAST | |
| 1Sg tróy-ome | 1Pl troy-ómaste | 1Sg fayó-θ-ó | 1Pl fayó-θ-úme |
| 2Sg tróy-ese | 2Pl tróy-este | 2Sg fayó-θ-ís | 2Pl fayó-θ-íte |
| 3Sg tróy-ete | 3Pl tróy-onde | 3Sg fayó-θ-í | 3Pl fayó-θ-ún |
| ACTIVE IMPERFECTIVE PAST | | ACTIVE PERFECTIVE PAST | |
| 1Sg é-troy-a | 1Pl tróy-ame | 1Sg é-fay-a | 1Pl fáy-ame |
| 2Sg é-troy-es | 2Pl tróy-ate | 2Sg é-fay-es | 2Pl fáy-ate |
| 3Sg é-troy-e | 3Pl é-troy-an | 3Sg é-fay-e | 3Pl é-fay-an |
| NONACTIVE IMPERFECTIVE PAST | | NONACTIVE PERFECTIVE PAST | |
| 1Sg troy-ómun | 1Pl troy-ómastan | 1Sg fayó-θ-ik-a | 1Pl fayó-θ-ik-ame |
| 2Sg troy-ósun | 2Pl troy-ósastan | 2Sg fayó-θ-ik-es | 2Pl fayó-θ-ik-ate |
| 3Sg troy-ótan | 3Pl tróy-ondan | 3Sg fayó-θ-ik-e | 3Pl fayó-θ-ik-an |

NB: The augment *e-* is deleted if it ends up unaccented.

(28) The allomorph *fayó-* is selected in the context of nonactive Voice and perfective Aspect, *-θ-ik-* in (27). Assuming the syntactic representation (28) as the input to the spellout, the distribution of the allomorph *fayó-* is a problem.



- a. Since the theory enforces bottom-up Vocabulary Insertion, it requires the root allomorph *fayó-* to be selected by Voice in the most deeply embedded constituent. But that is too small a window, for the root allomorph depends on Aspect, housed in the next constituent.
 - b. Merchant therefore argues that the adjacency condition on contextual allomorphy must be weakened to allow non-adjacent selection within a SPAN of contiguous heads in an extended projection, as proposed by Svenonius 2012.
 - c. That would allow *any* of the morphemes in the entire structure (28) to play a role in selecting the allomorphs of any of the other morphemes in it — a very weak form of locality
- (29) In lexicalist morphology, locality conditions are defined on morphemes in the classical sense, rather than on terminal nodes of abstract syntactic structures. The lexical entry of the root has three allomorphs (if we adopt Merchant’s segmentation).

$$\left. \begin{array}{l} \text{tro} \\ \text{fay}[+\text{Perfective}] \\ \text{fayo}[+\text{Perfective}] / \text{---}[-\text{Active}] \end{array} \right\}$$

- (30) The suffixes are:
- $\theta[-\text{Active}, +\text{Perfective}]$
 - $\text{ik}[-\text{Active}, +\text{Perfective}, +\text{Past}]$
 - $\text{ame}[+\text{Speaker}, +\text{Plural}]$
- (31) Lexicalist derivation of *fayo- θ -ik-ame* ‘we were eaten’
- In the first cycle, the $[-\text{Active}, +\text{Perfective}]$ morpheme θ is added to the most specific allomorph compatible with that context, which is *fayo-*.
 - In the second cycle, the $[-\text{Active}, +\text{Perfective}, +\text{Past}]$ morpheme *ik* is added to *fayo- θ -*.
 - In the third cycle, the [1PI] morpheme *ame* is added, completing the derivation and yielding a morphosyntactically fully specified and phonologically well-formed verb form.
 - Each stem involves an morphosyntactic feature increment. Thus there is no vacuous affixation, but plenty of multiple exponence.
- (32) Other three-stem verbs
- ma θ en-*, *ma θ -*[+Perfective], *ma θ ev-*[+Perfective]___[-Active] ‘learn’
 - δ ern-*, *δ ir-*[+Perfective] *δ ar-*[+Perfective]___[-Active] ‘beat’
 - tref-*, *θ reps-*[+Perfective] *traf-*[+Perfective]___[-Active] ‘feed’
- The last example in (32) is another case of mutual selection: root allomorph *traf* before $[-\text{Active}]$ and $[-\text{Active}]$ allomorph *i* (instead of θ) after *traf*[+Perfective].
- (33) Two-stem verbs
- sern-*, *sir-*[-Active] ‘pull’
 - spaz-*, *spas-*[-Active] ‘break’
 - fern-*, *fer-*[-Active] ‘bring’
- (34) The point: the lexical approach, being based on actual morphemes rather than on syntactic terminals, eliminates the problem of non-local allomorphy selection in these data. Every morpheme need look only at the current context. For example, in the nonactive perfective past 1Sg. form *fayo- θ i-ka-me* ‘we were eaten’, the context that selects the allomorph *fayo* is present in the first cycle, so we correctly derive $[\text{fayo-}\theta]$.
- (35) The proposed theory dictates an analysis of anti-scopal morpheme order that makes novel predictions about phonological and semantic interpretation.
- (36) Semantically, case scopes over number and possessors. Nominals with case features cannot be possessed or pluralized. For example, **John’s in houses* cannot refer to an entity *in houses* that is possessed by John, and **many in houses* cannot refer to a plurality of such entities.
- $[[[\text{N}] \text{Poss}] \text{Case}]$
 - $[[[\text{N}] \text{Case}] \text{Poss}]$ uninterpretable
- (37) However, counter-scopal order of case and possessive suffixes is not uncommon, as in Finnish. The “wrong” morphology gets the “right” semantics (36a).

talo- i- ssa- si
house- Pl- Iness -2Sg
‘in your houses’

- (38) Generative lexicalist morphology accounts for the form and interpretation of these structures, and for the mismatch between them, in the following way. The structure (36b) crashes on the first cycle, where it cannot be interpreted. The structure (36a) would be interpretable, but is morphologically ill-formed; let us assume that it is ruled out by the following affix ordering constraint *Poss Case (Ryan 2010).
- (39) The remaining possibility is that the morphology generates a flat structure: [[N] Case Poss]
The semantics interprets this structure with Case scoping over Poss.
- (40) In the structure (36) the nominal stem plus Case do not form a cyclic domain of their own. That makes several predictions.
- Phonological prediction: the nominal stem is not phonologically combined with Case until the Possessor suffixes are added.
 - Morphological prediction: since Case and Possessor are introduced in the same cyclic domain, they can see each other and select each other.
- Both these predictions are confirmed.
- (41) Evidence that stems plus case endings do not undergo stem phonology prior to the addition of the possessive suffix is that a process triggered by possessive suffixes bleeds consonant gradation triggered by case endings.
Consonant gradation: /tt/ → t, /pp/ → p, /kk/ → k in the onset of a closed syllable
- /hattu-ssa/ → *hatussa* ‘in the hat’
 - /hattu-n/ → *hatun* ‘of the hat’
- (42) The possessive suffixes cause stem-final consonants which would otherwise trigger consonant gradation to be deleted. The possessive suffixes, listed in (42), attach lexically to stems and form words.
- | | Sg. | Pl. |
|----|-------|------|
| 1. | -ni | -mme |
| 2. | -si | -nne |
| 3. | -nsa, | -Vn |
- (43)
- In Finnish, every suffixed base must end in a vowel. That includes the nominal stems to which case endings and possessive suffixes are added. Case endings that end in consonants retain them if they remain final.
 - When possessive suffixes are added to them, however, their final consonants are always deleted. For example, the illative singular ending *-seen* loses its *-n* before all possessive suffixes: *huonee-seen* ‘into a/the room’, but *huonee-see~~n~~-si* ‘into your room’.
 - The evidence for non-cyclicity is that when possessive suffixes cause deletion of such final consonants, there is no degemination.
- (44)
- | | | | | | |
|---------|---------------|----------|-----------------------------|--------------------------|------------------|
| Nom.Sg. | /hattu/ | hattu | /hattu-si/ | hattusi | ‘(your) hat’ |
| Nom.Sg. | /hattu-ssa/ | hattussa | /hattu-ssa-si/ | hatussasi | ‘in (your) hat’ |
| Ess.Sg. | /hattu-na/ | hattuna | /hattu-na-si/ | hattunasi | ‘as (your) hats’ |
| Gen.Pl. | /hattu-i-ten/ | hattujen | /hattu-je n -si/ | hattujesi | ‘of your hats’ |
| Gen.Sg. | /hattu-n/ | hatun | /hattu- n -si/ | hattusi (*hatusi) | ‘of (your) hat’ |
| Nom.Pl. | /hattu-t/ | hatut | /hattu- t -si/ | hattusi (*hatusi) | ‘(your) hats’ |
- (45) If case endings and possessive endings are added together in the same cycle, these data follow from applying stem-final -C-deletion and consonant gradation in the unmarked (transparent) bleeding order predicted by Stratal OT.

- (46) Morphological evidence that Case and Possessor suffixes are introduced in the same cycle: mutual bidirectional selection relationships.
- Outward dependency: Comitative case *-ne* can *only* appear with a following Possessive suffix. E.g. *vaimo-i-ne-mme* ‘with our wives’, but not **vaimo-i-ne* ‘with wives’.
 - Inward dependency: that the 3.Sg. possessive suffix *-nsa* has an optional allomorph *-Vn* that attaches only to a case ending.

(47) The possessive suffix must “know” whether it follows a case ending, and the case ending must also “know” whether it precedes a possessive suffix.

- matkatavaro -i -ne -en/-nsa
luggage -Pl -Comitative -3Sg
‘with his/her/their luggage’
- matka -lla -an/-nsa
journey -Adessive -3Sg
‘on his/her/their journey’
- *matka-nsa* ‘his/her journey’
- matka-an ‘his/her journey’

(48) Nenets possessive suffixes stand outside case suffixes, in the same counter-scopal order as its distant relative Finnish.

ngəno -xəq -na -ta
boat -Pl -Loc -3SgPoss
‘in his boats’

Scope: (((Noun) Number) Possessor) Case

(49) Here too there is morphological evidence for affix bundling from bidirectionally sensitive allomorphy (Salminen 1997: 124). Both outward sensitivity (a) and inward sensitivity (b).

a. Outward sensitivity:

ngəno -xəh the Nom/Acc. dual ending is /-xəh/
boat -Du

‘two boats’ (Nom/Acc.)

ngəno -xəyu -da ... but it is /-xəyu-/ before a possessive suffix
boat -Du -3Sg

‘his two boats’ (Nom/Acc.)

b. Inward sensitivity

ngəno -rə 2Sg. Poss. is /-r-/ after a bare stem
boat -2SgPoss

ngəno -m -tə ... but /-t-/ after a case-marked stem
boat -Acc(Sg) -2SgPoss

(50) As as in Finnish, there is phonological evidence that case and possessor suffixes are bundled.

a. Final C-clusters eliminated by ə-epenthesis

/myad-q/ > *myadəq* ‘tent-Nom.Pl.’, /myad-m/ > *myadəm* ‘tent-Acc.Sg.’

- b. Medial clusters are OK
/ngop-ta/ ‘one(NomSg)-3Sg.Poss.’ → *ngobta* (*ngobəta) ‘his one’.
- c. ə-epenthesis is cyclic (overapplication)
/səl-t-q/ ‘return-Refl-Imp.2Sg.’ → *sələdəq* (*səltəq)
derivation: /səl/ \xrightarrow{M} səl-t \xrightarrow{P} sələt \xrightarrow{M} sələt-q \xrightarrow{P} sələdəq
- d. Case and Poss are added together
/myad-m-ta/ → *myata* ‘tent-Acc.Sg.-3Sg.Poss’

C-deletion conditioned by the outer suffix *-ta* bleeds ə-epenthesis before the inner suffix *-m*. The data show that /myad-m/ is not a cyclic constituent: if it were a cyclic constituent, epenthesis would apply on that constituent, producing the incorrect form **myadəmta*, or perhaps **myadəta*.

- (51) The Hungarian plural suffix is normally *-(o)k*, but it is *-(j)ai* before a possessive suffix (Carstairs 1987; Embick 2015). E.g. *kalap-ok* ‘hats’, but *kalap-jai-m* ‘my hats’, not **kalap-ok-om*).

| | ‘hat’ | ‘hats’ | ‘my hat’ | ‘my hats’ |
|------------|------------------|---------------------|---------------------|------------------------|
| nominative | <i>kalap</i> | <i>kalap-ok</i> | <i>kalap-om</i> | <i>kalap-jai-m</i> |
| accusative | <i>kalap-ot</i> | <i>kalap-ok-at</i> | <i>kalap-om-at</i> | <i>kalap-jai-m-at</i> |
| dative | <i>kalap-nak</i> | <i>kalap-ok-nak</i> | <i>kalap-om-nak</i> | <i>kalap-jai-m-nak</i> |
| | etc. | | | |

- (52) When possessive suffixes are closer to the base than case suffixes, in their scopal order, they do form a separate constituent with the base. Turkish “suspended affixation”:

- a. N-Pl-Poss-Case → N-Pl-Poss-~~Case~~
- b. N-Pl-Poss-Case → N-~~Pl-Poss~~-~~Case~~

kedi ve köpek-ler-im
cat and dog-Pl-1SgPoss
‘my cats and dogs’

- c. N-Pl-Poss-Case → *N-Pl-~~Poss-Case~~

- (53) a. What if morphotactics forces an ambiguous morpheme order?
- b. Then the anti-scopal interpretation requires anti-scopal affixation (“tucking in”) and the result is anti-scopal cyclic phonology.
- c. Root + Affix₁ undergoes phonological processes before a scopally higher Affix₂ splits them (the phenomenon called “endocyclicly” by Hyman and Orgun 2005).

- (54) Karimojong root-governed [ATR] vowel harmony (Lesley-Neumann 2007)

| | |
|---|--------------------------|
| α kα- rémérémé -tòè | εkε- αki -tàè |
| 1SG- stab.rpt -IND.PRES.PERF | 1SG- send -IND.PRES.PERF |
| ‘I have been stabbed repeatedly’ ‘I have been sent’ | |

- (55) Introfication of frequentive [+ATR] *-éénéné-* into a [-ATR] vowel harmony span.

| | | | | |
|--|----|-----|----------|-----|
| ε- | ɔ- | dóɲ | -éénéné- | tàè |
| 2SG -CAUS- pinch -frequently- -IND.PRES.PERF | | | | |
| ‘he has frequently caused to pinch’ | | | | |

- (56) Scope: (frequently(perf(pinch)))
‘there have frequently been times during which he has caused to pinch’
not ‘there has been a times during which he has frequently caused to pinch’

(57) Conclusions

- a. The Mirror Principle, cyclicity, and locality are direct consequences of the incremental and lexical character of word-building, rather than constraints or principles in their own right.
- b. In fact, they are just the manifestations of the proposed generative theory of word-formation in the domains of semantics/argument structure, phonology, and morphotactics.
- c. If syntactically generated structure is shipped to the morphology for spellout, nothing except the empirical facts compels bottom-up cyclicity and locality. An extrinsic constraint is needed to *impose* them on derivations.
- d. The locality constraints predicted by lexical morphology are more accurate than the ones proposed in DM.
- e. Lexical morphology intrinsically relates *semantic* scope mismatches to *phonological* anti-cyclicity and counter-cyclicity. This follows because phonological and semantic interpretation go hand in hand. The prediction cannot be had in DM, where semantic interpretation comes off the pre-spellout abstract morphemes and phonological interpretation comes off the post-spellout concrete morphemes.
- f. Lexicalist morphology provides a deeper explanation for word structure.

References

- Aronoff, Mark, 1976. *Word Formation in Generative Grammar*. Cambridge, Mass.: MIT Press.
- , 1994. *Morphology by Itself*. MIT Press.
- Arregi, Karlos and Andrew Nevins, 2012. *Morphotactics: Basque Auxiliaries and the Structure of Spellout*. Dordrecht: Springer.
- Baker, Mark, 1985. The Mirror Principle and morphosyntactic explanation. *Linguistic Inquiry*, 18: 373–415.
- Carstairs, Andrew, 1987. *Allomorphy in Inflexion*. Beckenham: Croom Helm.
- Chomsky, Noam, 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.
- Embick, David, 2010. *Localism versus Globalism in Morphology and Phonology*. Cambridge, Mass: MIT Press.
- , 2015. *The Morpheme*. Boston/Berlin: de Gruyter.
- Gribanova, Vera and Boris Harizanov, 2016. Whither head movement? Stanford Workshop on the Status of Head Movement in Linguistic Theory.
- Halle, Morris, 1973. Prolegomena to a theory of word-formation. *Linguistic Inquiry*, 4: 3–16.
- Hankamer, Jorge and Line Mikkelsen, 2002. A morphological analysis of definite nouns in Danish. *Journal of Germanic Linguistics*, 14: 137–175.
- , 2005. When movement must be blocked: A reply to Embick and Noyer. *Linguistic Inquiry*, 36(1): 85–125.
<http://dx.doi.org/10.1162/0024389052993664>
- Harley, Heidi, 2014. On the identity of roots. *Theoretical Linguistics*, 40: 225–276.
- Kiparsky, Paul, 1982. Lexical morphology and phonology. In I.-S. Yang (ed.), *Linguistics in the Morning Calm*. Seoul: Hanshin.

- Merchant, Jason, 2015. How much context is enough? two cases of span-conditioned allomorphy. *Linguistic Inquiry*, 46(2): 273–303.
http://dx.doi.org/10.1162/LING_a_00182
- Mithun, Marianne, 2000. The reordering of morphemes. In Spike Gildea (ed.), *Reconstructing Grammar: Comparative Linguistics and Grammaticalization*. Amsterdam: Benjamins.
- Pesetsky, David, 1979. Russian morphology and lexical theory.
<http://web.mit.edu/linguistics/people/faculty/pesetsky/russmorph.pdf>
- Rezac, Milan. 2011, 2011. *Phi-features and the modular architecture of language*. Dordrecht: Springer.
- Ryan, Kevin M., 2010. Variable affix order: Grammar and learning. *Language*, 86(4): 758–791.
- Salminen, Tapani, 1997. Tundra nenets.
<http://www.helsinki.fi/~tasalmin/sketch.html>
- Svenonius, Peter, 2012. Spanning. Lingbuzz.
<http://ling.auf.net/lingbuzz/001501>
- Williams, Edwin, 2007. Dumping lexicalism. In Gillian Ramchand and Charles Reiss (eds.), *The Oxford Handbook of Linguistic Interfaces*, pp. 353–421. Oxford: Oxford University Press.
- Wunderlich, Dieter, 1996. Minimalist morphology: The role of paradigms. In Geert Booij and Jaap van Marle (eds.), *Yearbook of Morphology 1995*. Dordrecht: Kluwer.
- Wunderlich, Dieter and Ray Fabri, 1994. Minimalist morphology: An approach to inflection. *Zeitschrift für Sprachwissenschaft*, 20: 236–294.
- Zwicky, Arnold M., 1992. Some choices in the theory of morphology. In *Formal grammar: theory and implementation*, Vancouver Studies in Cognitive Science 2, pp. 327–71. Oxford: Oxford University Press.