Heads and Segments

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1   Introduction

A   Language variation is contingent on the properties of functors (Borer, 1984; sometimes called the Borer-Chomsky Conjecture)

   I a. What are functors?
       b. What properties of functors?
              i.   Formal Semantic properties?
              ii. Syntactic properties?
              iii. Phonological properties?

   II i.   THE vs. WILL; THIS vs. THAT; EVERY vs. SOME
        →   but can this give rise to a meaningful language variation?
       ii. *of* is a case assignor; *for* is a complementizer *and* a case assignor; genitive is available in English but not, e.g. in Romance for pre-nominal non-pronominal DPs.
        →   certainly we can derive some language variation from that. How much remains an open question. At least prima facie, we would require a lot of abstract syntactic functors.
       iii. ????

   III Purpose of this talk: to explore how much variation can be specifically reduced to the mode of valuation (=range assignment) to otherwise empty heads, and what role, if any, does the phonology of the range assignor play.

   IV A correlate of III: there are phonologically null range assignors out there but the fact that they don't have phonological realization has consequences for language variation.

B   ***Outline of Talk***
   I   Why functors (and not Content words)?
   II   The syntax of the S-function system
   III   Some immediate consequences
   IV   Why only the S-function system and not:
       i.   Roots (an argument from locality)
       ii. C-functors (categorizers, derivational categorial suffixes, e.g. *–able* and *–ation*)
   V   Extended Projections and ExP-segments
   VI   The domain of Content
   VII Two puzzles and Content by Phase
   VIII Modes of Range Assignment and the role of phonology
   IX   Range assignment and grammatical variation

2   Why not (Content) Words?

1. $/_\pi rose/$ vs. $/_\pi vered/$

> $/_\pi xyz/$ is a shorthand for phonological representation, otherwise not attempted

2. $/_\pi siren/$
    N?   V?   N+v_o?   V+n_o?

3. a.   The factory horns sirened throughout the raid
    b.   The factory horns sirened midday and everyone broke for lunch
    c.   The police car sirened the Porsche to a stop
    d.   The police car sirened up to the accident site
    e.   The police car sirened the daylight out of me   Clark and Clark (1979)

4. V1→V2→V3 ???

C   I   Does e.g. /$_\pi$siren/, a domain for the assignment of a single primary stress, have any important properties that bear on the syntax? On interpretation? And if so, why should that be?

      II   Words (=non-functors) don't actually need to have Content, although they do need to have phonology. NL utterances absolutely need syntax, phonology (broadly construed to include sign and orthography), and formal semantics, but Content for non-functors is entirely dispensable (and is this trivial, or does that actually translate to something important?)

5. a.   `Twas brillig, and the slithy toves
Did gyre and gimble in the wabe

    b.   `Twas and the (-y) (-s)
Did and in the:

    c.   joga brillig, dan gox slitho tove
bib gyre dan gimble ni haw wabe

    d.   bright and will in sing doves the

3   The Syntax of Functors

3.1 The Common Picture

6. a.   [$_{DP}$ [$_D$ *the*] [....
    b.   [$_{TP}$ [$_T$ PST] [$_{NEGP}$ [$_{NEG}$ *not* [....

7. a.   [$_{THE}$max NOT] [....
    b.   [$_{PST}$max PST] [$_{NOTP}$ NOT [....

3.2 An Alternative (cf. Borer, 2005a; 2013)

D   Functors spell out transitive functions with a *rigid designation*, by which we mean that their function, whether syntactic and semantic, has a constant truth value in all possible worlds (see Gajewski 2010).

8. a.   During the summer, water in the pond mostly evaporates.
        (salient: most water evaporates)
    b.   Water in the pond is mostly lost through evaporation.
        (salient: most events of loss are through evaporation; most water not necessarily lost)

9. Most water in the pond mostly evaporates

10. a.   [$_\#$ ≪e≫$_\#$ ...   [....
    b.   [$_\#$ MOST$^\#$ ≪e^{MOST}≫$_\#$ [....
    c.   MOST(ly)$^\#$[$_\#$ ≪e^{MOST}≫$_\#$ [....

11. a.   the dog's ear
    b.   a dog's ear

12. [$_{D-1}$[$_{D-2}$ THE^D ≪e^{THE}≫$_D$ [(dog's)]]   ≪e^{DEF}≫$_D$ [(ear)]]

E   By extension: all 'functional' heads merge as ≪e≫ and are assigned range (or valued) by semantic functors, themselves modifiers. Syntactically, *heads* project (definitionally); and modifiers are cases of *min/max*. In the relevant configuration, merging either as an (internal) specifier, or adjoined to the head

13.

4. Immediate Consequences; Immediate Queries

4.1. Consequences

F I Discourse Oriented vs. Sentence Oriented languages (see also hot Languages vs. cool languages, Tsao, 1977, Ross, 1982; Huang, 1984):
There is no cost, nor a variation, involved in assuming zero positions. Nor is there a cost associated with binding such positions from without – English allows that as well, with adverbs of quantification at the very least. While there is still going to be a difference, it will not be structural, but rather will be contingent on the specific inventory and realization of potential range assignors.

II Along similar lines, e.g. evidentials no longer need to be sentence external in e.g. English but sentence internal in e.g. Korean, and may represent, across the board, an open, projecting position assigned range either from within or from without the clause

III Adverbial negation, e.g. in Dutch and German, would be a range assignor to the relevant $\ll e\gg$ head.

IV Correlate: a universal inventory as well as universal order within Extended Projections can be maintained, pace construction specific licensing modes.

G It cannot be the case that structure projects from listed terminals. Rather, 'functional' structure emerges from the conjunction of the merger of an empty set and semantic functors, S-functors, which assign range to the empty set (and categorize it, as we shall see), and which themselves do not project.

4.2. Queries

H I a. What are functors, and do all of them look like this?
b. Any reason to think Content words don't work the same? Differently put, does
c. Anything *except* empty sets ever project?

II a. What is D? What is #? By extension, what is N? What is V?
b. What are the properties of clusters of functors, e.g. Extended Projections?

III Are there any well-formedness conditions on projecting empty sets?

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5 Roots, S-functors, C-functors

14. a. (*the*) [$\sqrt{\text{DREAM}} \ll e\gg_n$]   (*will*) [$\sqrt{\text{DREAM}} \ll e\gg_v$]
b. [[[[$\sqrt{\text{VERB}} \ll e\gg_n$] AL $\ll e\gg_a$] IZE $\ll e\gg_v$] ATION $\ll e\gg_n$]

15. a. THE $\ll e^{\text{THE}}\gg_D$ [$_{C=N}\sqrt{\text{DREAM}}$]   FUT $\ll e^{\text{FUT}}\gg_T$ [$_{C=V}\sqrt{\text{DREAM}}$]
b. [[[[$\sqrt{\text{VERB}}$] AL$_A$] IZE$_V$] ATION$_N$]

> C=N: C is N-equivalent in the context of D
> C=V: C is V-equivalent in the context of T

5.1. Not Roots: An Argument from Locality

I Fact: English past tense and plural marking are *always* regular for derived forms. All irregular cases of past marking and plural marking are root-adjacent.

J   Claim: 'irregular' realizations are stored with roots and can only be instantiated locally. All non-root adjacent contexts revert to default (see also Embick, 2003).

16. a.   [√SOLID] IFY] PST → /$_\pi$solidified/
     b.   [√FORM] ATION] PL → /$_\pi$formations/

17. a.   [√SING] PST → /$_\pi$sang/
     b.   [√GOOSE] PL → /$_\pi$geese/

18. *Locality lost:[1]*
    [√SING ≪e≫$_v$] PST
    [√GOOSE ≪e≫$_n$] PL

K   By extension, there are no ≪e≫$_{v,n,a}$ for derived N,V,A either (e.g. 14b and similar) (and see Borer, 2013 for a detailed argument against zero categorizers in English).

5.2. Some Preliminary Differences between S-functors and 'Categorizers'

L   I a. S-functor-≪e≫ pairs enter (non-trivial) Extended Projections, Categorizers do not.
        b. (Informally) S-functor-≪e≫ pairs select categories (potentially instantiated by a categorizer); categorizers do not select S-functor-≪e≫ pairs
        c. Categorial values are never satisfied non-locally (e.g. by discourse antecedents or through Spec-head relations)

    II The output of S-functor merger is compositional; the merger of categorizers need not be.

    III a. Categorizers: Function doesn't predict Form; Form *does* predict Function:
           -[V]N-affix may be *ation, ment, ance/ence, al*; but e.g. /$_\pi$ation/ *always* has an N instantiation (although not necessarily exclusively); V-affix may be *ize, -ate, -ify, -en*, but /$_\pi$ize/ always has a V instantiation
        b. S-functor-≪e≫ pairs: Function doesn't predict Form; Form *does not* predict Function:
           PL may be *–s, -en, -i* (foci) as well as multiple root allomorphs; /$_\pi$s/ may be plural, third person singular, genitive marker
           Differently put, syncretism, fusion, etc. are essentially unattested in derivational morphology

    → **S-functor-≪e≫ pairs**: fundamentally a syntactic realization of a semantic function: syntactically and semantically stable (including Content); phonologically erratic

    → **C-functors**: fundamentally syntactic functions with a phonological realization: syntactically and phonologically stable; Content-wise erratic (formal semantic status variable.)

6 Extended Projections

19. (Informally) -
    a. $F^{C1}+F^{C1}+F^{C1}+F^{C1}+F^{C1}+C1(+C2+C3)$ ← An Extended Projection
        vs.
    b. $C1+(C2+C3+)F^{C1}+F^{C1}+F^{C1}$ ....   (something else)

M   Suppose we view categorial properties such as N, V, A etc. as a device to partition the syntactic space. We can now say that categorizers, C-functors, are a syntactic function that divides space:

    $C_{N[V]}$: Projects N, defines complement space as V; realization: *-ation, -ment, -er, -ing* etc. (with e.g. *–er* also representing an additional semantic function $ER_{N[V]}$)

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[1] The paradigm presents a problem for DM, as noted in Embick, 2003, 2010, who proposes to solve it by assuming that zero-realized affixes are structurally transparent in the relevant context.

For the 'functional' domain, what defines a complement space is both the set of ExP-segments as a whole, and each ExP-segment on its own.

An Extended Projection W: {Ex[W]} is the set of all nodes which define their categorial complement as W.

20. a. $\varnothing\rightarrow$X, X $\in$ {Ex[N]]} / [_____ {Ex[N]]};
        $\varnothing\rightarrow$D / [_____ {Ex[N]]}
        $\varnothing\rightarrow$# / [_____ {Ex[N]};
        $\varnothing\rightarrow$Q / [_____ {Ex[N]};
        $\varnothing\rightarrow$CL / [_____ {Ex[N]}
    b.   {Ex[N]}: {D, Q, #, CL}, order universally fixed

N   I   *Extended Projection$_{Def}$*:
        a. For all X, X $\in$ {Ex[W]]}, X must dominate a W-equivalent C-core
        b. The hierarchy of ExP-segment labeling within any Extended Projection (type) is universally specified
        c. Subject to I, every ExP segment is optional, but its presence/absence has interpretational consequences.

    II *C-core$_{def}$*:
        a. α is a C-core iff α is C-equivalent and there is β such that β is contained in α and β is intransitive , and for all x, α dominates x and x dominates β, x is C-equivalent
        b. α is maximal iff there is no γ such that γ is C-core and γ immediately dominates α.

    > Where C stands for the traditional inventory of 'lexical' categories, and where, by assumption, all functors are transitive and hence β=root. Note that all instances of C are trivially C-equivalent

    III Functional Labels:
        a. D is the generalization over the type of range that can be assigned by a well-defined class of S-functors, themselves semantic and (potentially) devoid of category, to include (according to some) DEF, DEM, EVERY, EACH, MOST and possibly others
        b. T is the generalization over the type of range that can be assigned by a well-defined class of S-functors, themselves semantic and (potentially) devoid of category, to include (according to some) PST, FUT, and possibly others.

21. *Head-Pair: Division of Labor*

		≪e≫	*S-functor*
a.	project	yes	no
b.	has a category	yes (derived)	no
c.	has inherent semantics	no	yes
d.	selection	(of set)	yes, semantic

7.   Briefly, the Domain of Content

22.

		Content		Derived Content	Underived Content
	slith	no	*slithy*	N/A	no
	swarth	no	*swarthy*	N/A	yes
	blood	yes	*bloody*	yes	yes
	dirt	yes	*dirty*	yes	no

23. a.   *the slith/slithy; three slithies; every swarth* etc….
    b.   *edit-or-y-al-ize*; *natur-al-ize*; *civil-ize-ation*; *except-ion-al (*and compare with *special)…..*

O   ExP-segment boundaries are absolute barriers to Content compositionality

24. a.   *rapids; glasses; briefs* (PLURAL)
        brief*(s) design; glass*(s) frame; rapid*(s) boat

b. *eten* → *eten+tje*   Dutch
   food   food+diminutive → 'dinner'   COUNT
C. *czytała* → *od-czytała*   'present'   PERFECTIVE
               roz-czytała   'decode'   PERFECTIVE
               w-czytała   'upload'   PERFECTIVE   (Polish, Lazorczyk, 2010)

25. a. [$_D$ ≪e≫ [$_\#$ ≪e≫ [$_{CL}$ 'PL'   ≪e≫   [$_{C=N}$ *glass*   ]]]]
    b. [$_D$ ≪e≫ [$_\#$ ≪e≫ [$_{CL}$ 'DIM'   ≪e≫   [$_{C=N}$ *eten*   ]]]]
    b. [$_T$ ≪e≫ [$_{G-ASP}$ ≪e≫ [$_{PERF}$ PERF   ≪e≫   [$_{C=N}$ *czytała*]]]]
                                              od
                                              roz
   *w*

P An important footnote on phonology and Content: the grammatical function of OD, ROZ and W is
   identical. The Content that emerges is always perfective, but is idiosyncratically associated with
   the different realizations of these markers, all of which, otherwise, could enter compositional
   contexts as PERF alone with other roots.
   → The phonological realization of functors impacts Content (but not formal semantics).
      See Borer (2013) for more articulated arguments/examples.

7. Back to Locality and Two Puzzles[2]

7.1. Puzzle 1:

26. a. Mary will write the poem
    b. Mary wrote the poem

27.

28.
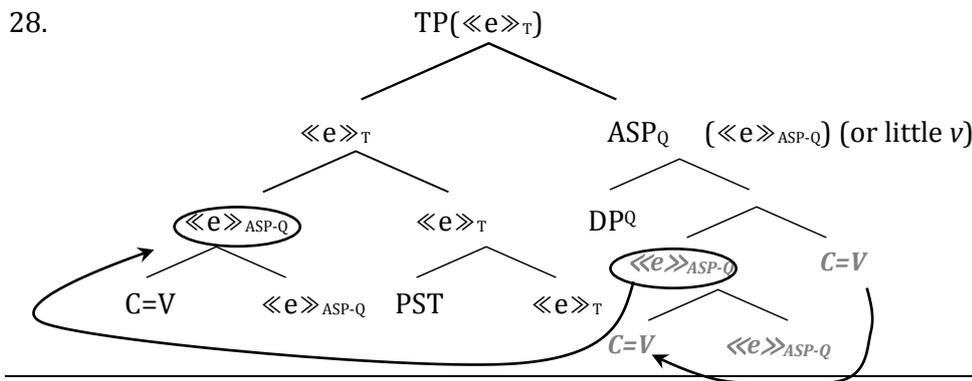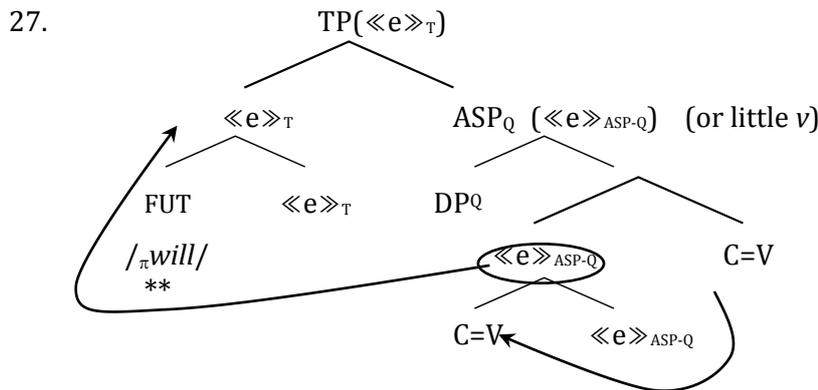
Q *Puzzle 1:*
   a. Why is movement systematically blocked in (27) and similar, but not in (28)?

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[2] I am assuming throughout that tense marking in English is accomplished through short head movement.
A conversion to an *Agree* system is possible, but is not attempted here.

    b. Harking back to our locality, how come √WRITE in a configuration such as (28) could still trigger /$_\pi$*wrote*/ although arguably it is not in a local relationship with PST?

7.2. Puzzle 2

29. ≪e≫$_i$ ≪e≫$_{ii}$ ≪e≫$_{iii}$ W$_{X[Y]}$ ≪e≫$_{vi}$ ≪e≫$_v$ C
        D   #   CL   ATION$_{N[V]}$ E   ASP   C=V

R   W$_{X[Y]}$:
    I   dominated by {Ex[N]} and dominates {Ex[V]}, but is not a member of either, and hence by definition can only be C.
    II But as it stands, it is not a well formed C-core, as an internal intransitive element, effectively a root, is missing.

30. a.   The formation of the ice crystals in seven minutes
      b.   the solidification of the gel by the chemist in three hours

31.
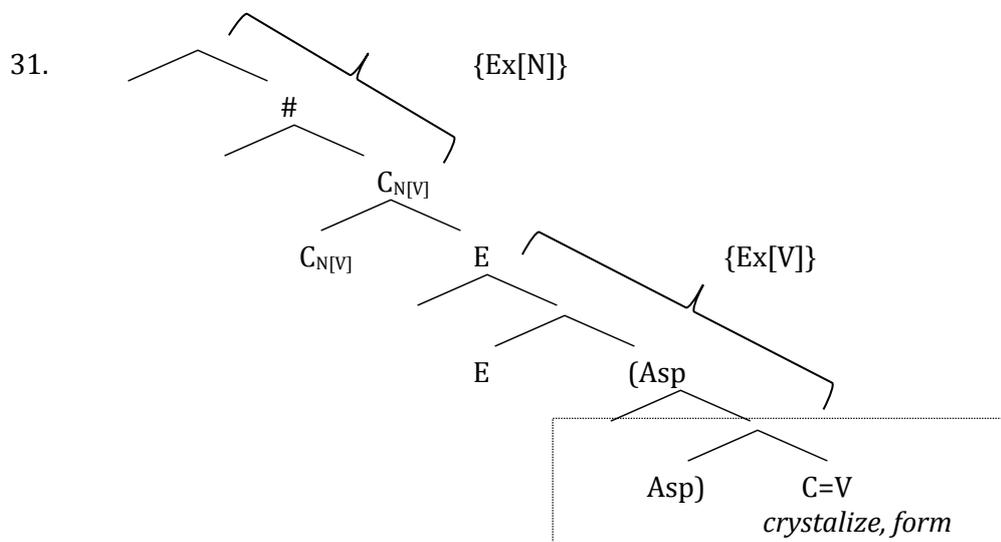
S   *Puzzle 2:*
    I   If this is, indeed, the derivation of AS-nominals (see Borer, 1999, 2003, 2012, 2013; Fu Roeper and Borer, 2001; see also Alexiadou, 2009, Sichel 2010, Roy (2009) i.a. for variants; see Marantz, 2001, 2012 for with similar relevant properties) how can we fix this derivation so that it doesn't violate our definition of Extended Projections?
    II Suppose we decide to move the verbal constituent in (31). That would rescue our Extended Projection. However, in the R-nominal *formation*, *-ation* attaches to V and to a V alone, while in (31), or so it would appear, it would be attaching to E (or the functional node of your choice). Why should there be such a systematic correlation between the realization of R-nominals and AS-nominals, then?
    III. And returning to puzzle 1, why are all the intermediate nodes so tenaciously null??? Could this be a coincidence???

7.3 Re-merge, Re-project: A Solution and a Caveat

32. a.   [$_{N\text{-}DIV}$DIV^{CL} ≪e≫ [$_{C=N}$√TOOTH]] → [$_{N\text{-}DIV}$DIV^{CL} ≪[$_{C=N}$√TOOTH]^{DIV}≫$_{CL}$ *[$_{C=N}$ √TOOTH]...*]
      b.   [$_{N\text{-}DIV}$DIV^{CL} ≪e≫ [$_{C=N}$√WOMAN]] → [$_{N\text{-}DIV}$DIV^{CL} ≪[$_{C=N}$√WOMAN]^{DIV}≫$_{CL}$ *[$_{C=N}$ √WOMAN]*]
      c.   [$_{N\text{-}DIV}$DIV^{CL} ≪e≫ [$_{C=N}$√BIRD]] → [$_{N\text{-}DIV}$DIV^{CL} ≪[$_{C=N}$√BIRD]^{DIV}≫$_{CL}$ *[$_{C=N}$ $^\pi$ √BIRD]...*]
      d.   [$_{N\text{-}DIV}$DIV^{CL} ≪e≫ [$_N$ indictment]] → [$_{N\text{-}DIV}$DIV^{CL} ≪[$_N$ indictment]^{DIV}≫$_{CL}$ *[$_N$ indictment]*]

      (see Ackema, Neeleman and Weerman, 1993 as well as Georgi and Müller, 2010).

33.

$$[_N[_V[_N \textit{civil}]iz]ation]$$

34.

$$[_N[_V[_N \textit{civil}]iz]ation]$$
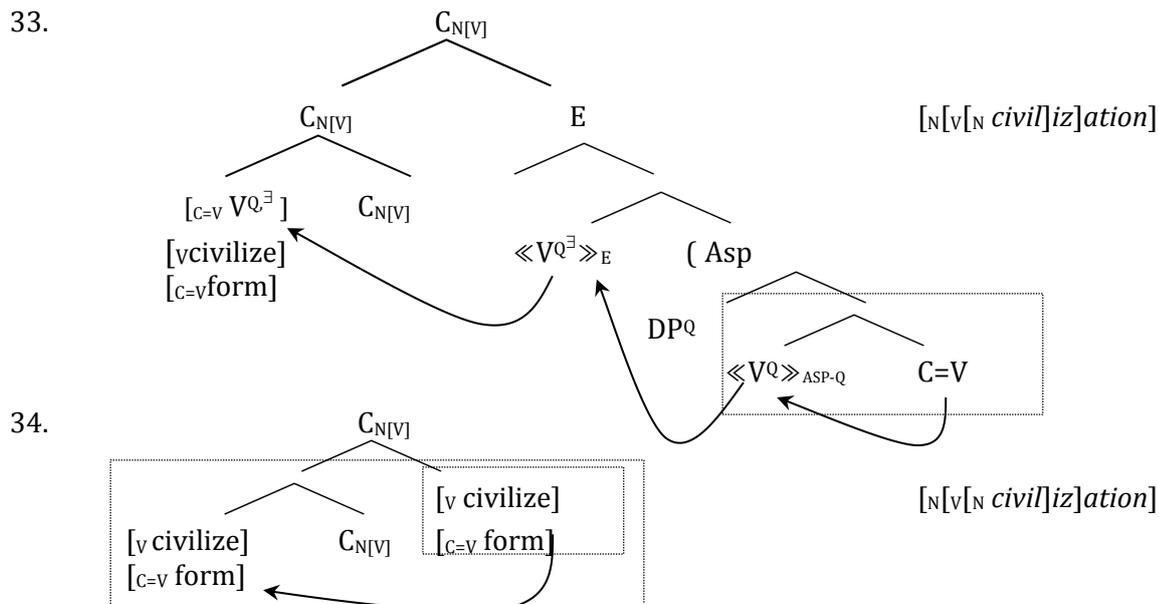
35. AS-nominals are always compositional (see also Marantz, 2001)

36. The transformation of the structure by linguist
The operator's connection of John and Mary (for 30 minutes)
The reading of this sentence by the linguist

T   Content by Phase (and hence the inevitability of a syntactic approach to complex words)

8. Modes of Range Assignment

U   I   Indirect assignment
   a. Spec-Head (cf. 11-0)
   b. Adverbs and similar (cf. 8, 10)
   → head always empty; re-merge and re-project possible (but clearly not mandated).
      Where occurring (and if subject to variation), otherwise conditioned

   II   Direct range assignment
   a. S-functors with a phonological index: e.g. $DEF_{/\pi\text{-}the/}$, $FUT_{/\pi\text{-}will/}$, $MAY_{/\pi\text{-}may\text{-}might/}$ etc. (F-morphs)
      →re-merge/re-project blocked
   b. S-functors without a phonological index: e.g. PST, 'PL' etc.
      →re-merge/re-project possible

V   Non-projecting terminals ($X^{min/max}$) must be phonologically visible.[3]
   a. re-merge/re-project is obligatory
   b. 'inflection' is truly amorphous (cf. Anderson, 1992, and contra, i.a. Halle and Marantz, 1993)
   c. but derivation is fully morphous (again in line with Anderson, 1992)
   → derivational morphemes are syntactic constituents
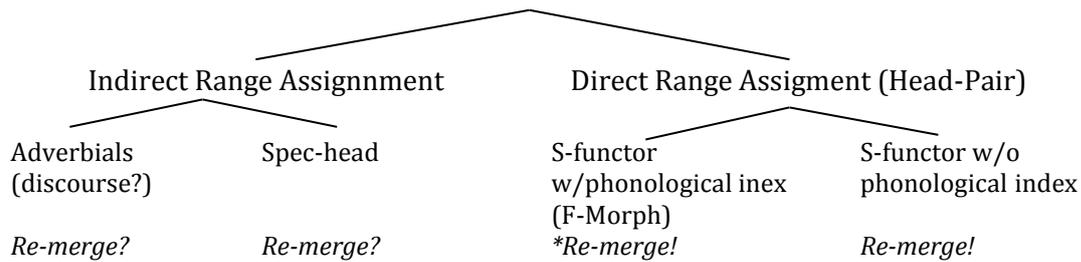   → inflectional 'morphemes' are not (although they do correspond to an abstract syntactic constituent

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37. a. $[_T PST^T \ll_{C=V}\sqrt{write/civilize}^{Q,PST}\gg_T$ $([_v [_{`adv'} ... [_{Asp\text{-}Q} \ll_{C=V}\sqrt{write/civilize}^Q\gg_{Asp\text{-}Q} [.......^*$
   b. $[\sqrt{write}^{(Q),PST}] \rightarrow /_\pi wrote/$; $[civilize^{(Q),PST}] \rightarrow$ default (*civilized*)

W   One phonological representation per Head-Pair

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[3] Note similarity with Kayne, this venue!

9. Range Assignment and Grammatical Variation – Consequences

X

	Indirect Range Assignnment		Direct Range Assigment (Head-Pair)	
Adverbials (discourse?)	Spec-head	S-functor w/phonological inex (F-Morph)	S-functor w/o phonological index	
Re-merge?	*Re-merge?*	**Re-merge!*	*Re-merge!*	

As typological footnote, we note the correlation between the loss of inflection (e.g. in Creole languages) and the emergence of extensive indirect range assignment, an extensive inventory of F-morphs, and to the loss of 'head' movement. Similarly, we note the typological correlation between syncretism and movement.

Y   I   All morphology is 'syntactic'

II However, what is or isn't a syntactic terminal correlates in different ways to phonological realization.
   a. 'Derivational morphemes' (so-called): units with discreet phonological realization and a syntactic fuction.
      i.   C-functors (project a category and define a categorial complement space)
      ii. Non-categorial, *min/max* prefixes.

      While not all grammars may allow 'complex' words in the relevant sense, the prediction is that those that do will have the same inventory and the same architecture regardless of realization (cf. Semitic).

   b. 'Inflection' is a grammatical misnomer, as such. Fundamentally, it is a *generalization over a type of phonological realization for ExP-segments*. Crucially, it has neither syntactic nor semantic properties which single it out as a coherent class.

      Here, we expect massive variation inter- and intra grammar contingent on the specific arbitrary phonological properties of S-functors, as well as on whether they are direct or indirect range assignors.

III a. [F-morph [F-morph [$_C$
   b. [F-morph [ABS   [$_C$
   c. [Abs   [ABS   [$_C$
   d. [*ABS   [F-Morph [$_C$

IV Collateral Damage (?) Participial ING and EN are not S-functors. Therefore, they cannot be aspectual markers, *as such,* nor can –*en* be the realization of the function licensing passive *as such* .What they *are* remains rather unclear, however, as they fall rather short of the full diagnostics of either categorizers or *min/max* affixes (see Borer, 2013 for some additional comments)

Z   We can, and should pursue the hypothesis that functional hierarchies are universal. While the nature of the range assignor in any particular configuration may not be evident, and while it is certainly a possibility (in this system) that not all ExP-segments are attested in every derivation, the *absence* of phonological realization for a functional head is an extremely poor predictor of its actual syntactic reality.

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