Polysynthesis in Nuu-chah-nulth and the Wakashan Language Family [1]

1.   Basic Facts

(1)   **Two Classes of Transitive Predicates in Nuu-chah-nulth (NCN)**

a.   <u>Free Roots</u>
Need not (cannot) appear suffixed to any other root in the language.

Example: *maakuk* 'buy'

Makukwit7is   cakup   maht'ii
maakuk-mit-7is   cakup   maht'ii
buy-PST-3.IND   man   house
A man bought a house.   (Wojdak 2003b; p.1)

b.   <u>Bound Roots</u>
Must appear suffixed to some other root in the language

Example: *-7aap* 'buy'

Maht'ii7amit7is   cakup
maht'ii-**7aap**-mit-7is   cakup
house-**buy**-PST-3.IND   man
A man bought a house.   (Wojdak 2003b; p.1)

(2)   **Core, Basic Properties of Bound Roots**

a.   <u>Bound roots in NCN *must* appear suffixed to some other root.</u>
* **7aap**-mit-7is   cakup   maht'ii
    buy-PST-3.IND   man   house   (Wojdak 2003b; p.1)

b.   <u>Bound roots can (optionally) be suffixed to the 'expletive morpheme' *7u*</u>
7u7aamit7is   cakup   maht'ii
7u-**7aap**-mit-7is   cakup   maht'ii
∅-**buy**-PST-3.IND   man   house
A man bought a house.   (Wojdak 2003b; p. 1)

c.   <u>When suffixed to 'expletive morpheme' *7u*, bound root must still take an object</u>
* 7u7aamit7is   cakup
   7u-**7aap**-mit-7is   cakup
   ∅-**buy**-PST-3.IND   man

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(3)   **Core, Basic Property of Free Roots**

Free roots can't ever be suffixed to any other root (even the expletive *7u-*)

a.   *   maht'ii-**maakuk**-mit-7is   cakup
                      house-**buy**-PST-3.IND   man   (Wojdak 2003b; p. 2)

b.   *   7u-**maakuk**-mit-7is   cakup   maht'ii
                      ∅-**buy**-PST-3.IND   man   house   (Wojdak 2003b; p. 2)

(4)   **Other Key Features of Nuu-chah-nulth Bound Roots**

a.   Centrality of the 'Bound Root' System
          Bound roots are by no means a 'peripheral' phenomenon in NCN.
          They are a central means for encoding meaning in the language.

          (i)   *Size of Inventory*
                      There are ~ 400 bound transitive roots in NCN (Wojdak 2003a)

          (ii)   *Frequency of Use*
                      Use of bound transitive roots in texts is very frequent

b.   Semantic and Phonological Diversity of 'Bound Roots'
          Besides their peculiar morphosyntax, there is *no other feature* bound roots share.

          • No semantic properties in common
          • No phonological properties in common (can be polysyllabic,
            monosyllabic, non-syllabic)

c.   Conceptual Overlap with 'Free Roots'
          Some bound roots are identical in meaning to independently occurring 'free roots'
          (cf. *7aap* 'buy' vs. *maakuk* 'buy')

          *In cases where such semantic overlap occurs, the bound root often (always?) has
          <u>no</u> etymological connection to the free root.*

These same basic facts hold throughout the Wakashan language family.

All Wakashan languages share a similar, extensive system of 'bound transitive roots'.

(CAVEAT: Not all Wakashan languages seem to allow suffixation to an 'expletive morpheme')

<u>OVERARCHING QUESTION:</u>   What is the nature of the 'bound roots' in NCN?
                                                              What is the 'right analysis' of the system?

2.   **First Possibilities: Lexical Word-Formation or Syntactic Incorporation?**

Initial Observation:

There is a clear 'thematic similarity' between the system of bound roots in NCN (as illustrated in (1) – (2)) and the general phenomenon of 'noun incorporation' across languages.

- In both, you form a complex predicate consisting of a transitive root V and a 'nominal root' N, where N is construed as the theme/direct-object of V.

… so maybe we can look to the literature on 'noun incorporation' for some possible approaches to the phenomenon of 'bound roots' in NCN!...

(5)   **Two Principle Approaches to Noun Incorporation**

     a.   Lexical Analysis
         The formation of the complex predicate occurs 'in the lexicon' (prior to syntax)
         The 'bound transitive root' is just a suffix (like '-ize' in English) which applies to Ns to create Vs.

     b.   Syntactic (Head-Movement) Analysis
         The formation of the complex predicate occurs 'in the syntax'
         The 'bound transitive root' is initially generated (merged) as a separate V-head. Syntactic H(ead)-movement then applies to the head of its NP complement, creating the complex predicate.
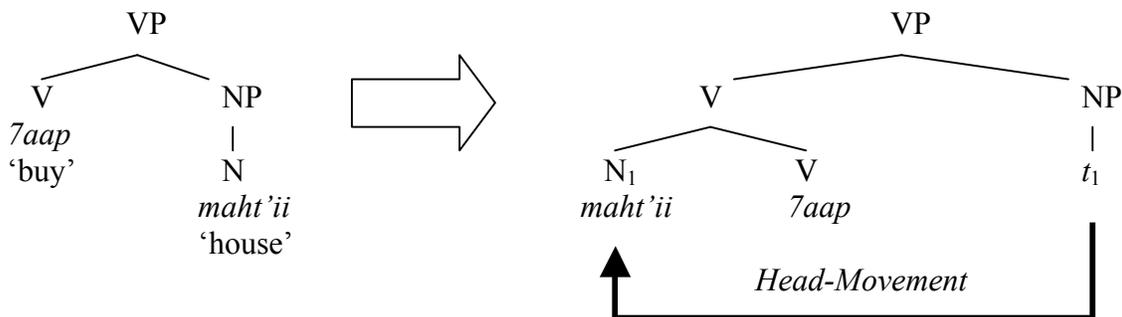
Interestingly, for each of these accounts, there is evidence supporting it over the other!

SPOILER ALERT:
We'll later see a *third* approach that captures all these *prima facie* conflicting data simultaneously!

(6)   **Evidence Supporting the Lexical Analysis**

   a.   <u>Restriction of 'Incorporation' to the Bound Roots (*cf.* Bach 1995 on Haisla)</u>

          Recall that free roots in NCN cannot appear suffixed to any other root (*cf.* (3))

          (i)   This follows straightforwardly from the lexical analysis.

          (ii)   *But, under the syntactic analysis, what <u>prevents</u> H-movement in such cases
                  (e.g (3a))??*

   b.   <u>Idiosyncratic Phonological Effects of 'Incorporation'</u>

          Unpredictable, idiosyncratic phonological rules sometimes take place with
          particular bound roots.

          (i)   Particular bound roots can induce the following changes on their 'host':

                  (*No change*)

                  Lengthened initial vowel
                  7u → 7uu   7uu → 7uu

                  Reduplication of initial syllable
                  7u → 7u7u   7uu → 7uu7uu

                  Reduplication of initial syllable, followed by lengthening of second vowel
                  7u → 7u7uu   7uu → 7uu7uu

                  Reduplication, lengthening of second vowel, shortening of first vowel
                  7u → 7u7uu   7uu → 7u7uu

                  Shortening of initial vowel, followed by reduplication of initial syllable
                  7u → 7u7u   7uu → 7u7u

          (ii)   When some roots combine with 'bound roots', they take an unpredictable
                  'combining form'

                  (*e.g. suuhaa* 'salmon' becomes *suw'*- when combining with a bound root)

          *If we assume that idiosyncratic / unpredictable / unproductive morpho-phonology
          occurs 'in the lexicon', then we must conclude that 'bound roots' combine with
          their 'hosts' in the lexicon.*

(7)   **Evidence Supporting the Syntactic Analysis**

a.   Subject / Object Asymmetries

We saw above that the understood *direct object* of a transitive bound root can function as the bound root's 'host').

(i)   Maht'ii7amit7is   cakup
        maht'ii-**7aap**-mit-7is   cakup
        house-**buy**-PST-3.IND   man
        A man bought a house.   (Wojdak 2003b; p.1)

(ii)   Haa7um7itl'as7is   n'uw'iiq
        ha7um-**7itl'as**-7is   n'uw'iiq
        food-**go.get**-3.IND   father
        Father went to get food.   (Wojdak 2003a; p. 277)

However, the understood <u>subject</u> can <u>never</u> function as the 'host'.

(iii)   * cakup-**7aap**-mit-7is   maht'ii
          man-**buy**-PST-3.IND   house   (Wojdak 2003b; p.2)
        A man bought a house.

(iv)   * n'uw'iiq-**7itl'as**-7is   ha7um
          father-**go.get**-3.IND   food
        Father went to get food.   (Wojdak 2003a; p. 278)

As famously argued by Baker (1988), this widely-encountered restriction on incorporation follows from the theory of syntactic Head-Movement (*i.e.,* the 'Head Movement Constraint' (HMC)).

(v)   *Head Movement Constraint (HMC):*
        A head H can only undergo movement to a head X if (i) X c-commands H, and (ii) XP *minimally dominates* HP

        $[_{XP} \ X \ \ [_{HP} \ H \ YP \ ] \ ]$ → $[_{XP} \ [X - H_1] \ [_{HP} \ t_1 \ YP \ ] \ ]$

(vi)   Incorporation of Subject Violates HMC

```
          VP                          V doesn't c-command Subj at
         /  \                         D-structure, so no H-movement to V
      Subj   V'
             /  \                     Subj can't undergo H-movement to
           V     Obj                  any higher heads, since only VP
                                      minimally dominates it.
```

b.   <u>No 'Doubling' of the Object</u>
We saw above that a bound root suffixed to the 'expletive morpheme' *7u* can and
must still take a separate direct object DP.

(i)   7u7aamit7is   cakup   *(maht'ii)
          7u-**7aap**-mit-7is   cakup   maht'ii
          ∅-**buy**-PST-3.IND   man   house
          A man bought a house.

However, a bound root suffixed to a semantically contentful host (interpreted as
the 'direct object') *cannot* still take a separate direct object DP

(ii)   Maht'ii7amit7is   cakup   (*maht'ii)
          maht'ii-**7aap**-mit-7is   cakup   maht'ii
          house-**buy**-PST-3.IND   man   house
          A man bought a house.

The impossibility of such structures follows from the H-movement account, since
semantically contentful hosts (interpreted as the 'direct object') are assumed to
underlyingly occupy the direct object position of the V.

SIDE-NOTE:
The impossibility of (ii) cannot be straightforwardly chalked up to issues of 'redundancy'. Such
structures <u>are</u> possible in other languages (including certain other *Wakashan* languages, an issue
we'll return to). The possibility of such 'doubling structures' in other languages is indeed often
understood as evidence *for* a 'lexical analysis' of incorporation in those languages….

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c.   <u>Discourse Transparency of the 'Incorporated' NP</u>
The host of a bound root can introduce a 'discourse referent', and can serve as the
antecedent for subsequent, cross-sentential anaphora.

(i)   **7innitl**-nak-sis.   7uklhaa-7is   Fido.
          dog-have-1.IND   name-3.IND   Fido
          I have a dog.   *His name is Fido.*   (Sawai 2002; p. 10)

The host of a bound root can also be anaphoric to previous discourse referents.

(ii)   7u-naak-sis   sapnii. 7uyii-mit-7is   **sapnii**-7ap 7am'iimit7i.
          ∅-have-1.IND bread   when-PST-3.IND **bread**-buy yesterday
          I have some bread.   *I bought the bread yesterday.* (Sawai 2002; p.10)

This follows from the H-movement account, since hosts are part of the syntactic
representation of the sentence.
(That is, *non*-discourse transparency of the incorporated N is sometimes taken as evidence for a
lexical analysis, on the grounds that sub-morphemes should *fail* to introduce discourse referents).

3.   Problems for Either of the Two 'Initial Possibilities'

We've seen that both the lexical analysis and the syntactic, H-movement analysis have certain evidence in their favor.
     However, there are also a number of facts that pose problems for <u>both</u> accounts…

SPOILER ALERT:
We'll soon introduce a *third* approach (Wojdak's 'PF analysis') that captures (i) all the facts laid out above, and (ii) all the following 'problematic facts'…

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(8)   **Apparent Violations of the Co-Ordinate Structure Constraint**

     The 'fusion' of the bound root to its host can appear to violate the CSC!

     a.   <u>Non-'Incorporated' Co-Ordinate Structure</u>

7uhaay'asci	tl'itl'ick'uk	7uh7iis	suukwaa
7u-**haay'as**-ci	tl'itl'ick'uk	7uh7iis	suukwaa
∅-**go.buy**-IMP	flour	and	sugar

     Go buy flour and sugar!   (Wojdak 2003b; p. 4)
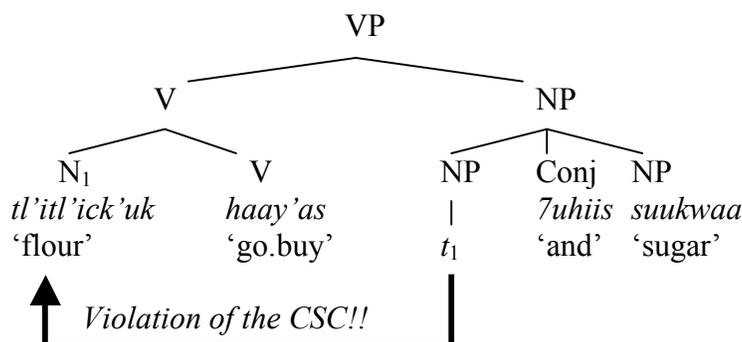
     b.   <u>Synonymous 'Incorporated' Structure</u>

tl'itl'ick'ukhaay'asci	7uh7iis	suukwaa
tl'itl'ick'uk-**haay'as**-ci	and	sugar
flour-**go.buy**-IMP	and	sugar

     Go buy flour and sugar!   (Wojdak 2003b; p. 4)

     c.   <u>Problems These Data Pose</u>   (*generally, this doesn't happen with incorporation*)

          (i)   *Lexical Account*
                 What is the conjunction in (8b) co-ordinating? The NP 'sugar' and the predicate? (*cf.* English: * *let's go cherry-picking and apples!*)

          (ii)   *Syntactic Account*
                 The postulated H-movement in (8b) would violate the CSC!

(9)   **Apparent Insensitivity of Bound Root to Lexical Category of the 'Host'**

In the data we've seen thus far, the bound root takes as 'host' either the expletive morpheme *7u* or a lexical N (construed as the direct object).

However, it's also possible for the bound root to take as 'host' a variety of syntactic elements!!

a.   <u>Bound Root Hosted by Adjective</u>

 (i)   7u**7iic**7is7alh ha7um 7aapinis
   7u-**7iic**-7is-7alh ha7um 7aapinis
   ∅-**eat**-3.IND-PL tasty apples
   They are eating delicious apples.   (Wojdak 2003b; p. 4)

 (ii)   ha7um7ic7is7alh 7aapinis
   ha7um-**7iic**-7is-7alh 7aapinis
   tasty-**eat**-3.IND-PL apples
   They are eating delicious apples.   (Wojdak 2003b; p. 4)

b.   <u>Bound Root Hosted by Quantifier</u>

 (i)   7u7is7is   7aya m'uks7i
   7u-**7is**-7is   7aya m'uks7i
   ∅-**on.beach**-3.IND many rocks
   There are many rocks on the beach. (Wojdak 2003a; p. 280)

 (ii)   7ayiis7is   m'uks7i
   7aya-**7is**-7is   m'uks7i
   many-**on.beach**-3.IND rocks
   There are many rocks on the beach. (Wojdak 2003a; p. 280)

c.   <u>Bound Roots Hosted by Numeral</u>

 (i)   7unaaksap'atlah   7atlap'ilh7i   nuuk
   7u-**naakw**-sap-7atl-mah 7atla-p'ilh-7i nuuk
   ∅-**have**-TNS-NOW-1.IND two-CLASS-DEF song
   I now give (him) the two songs. (Stonham 2004; p. 226)

 (ii)   7atlp'iilhnaksap'at   7astimxyak
   7atla-p'ilh-**naakw**-sap-7at 7astimxyak
   two-CLASS-**have**-TNS-PASS lullabye
   He now gives him two lullabyes. (Stonham 2004; p. 226)

d.   <u>Bound Roots Hosted by Verb</u>

(i)   7u7uutulhitsis   qahsitlitsuuk
         7u-**atulh**-mit-sis   qah-sitl-mit-suuk
         $\varnothing$-**dream**-PST-1.IND   die-PERF-PST-2.ABS
         I dreamed you died.   (Wojdak 2003b; p. 4)

(ii)   qaqah7atulhitsis   suwa
         qah-**atulh**-mit-sis   suwa
         die-**dream**-PST-1.IND   2.ABS
         I dreamed you died.   (Wojdak 2003; p. 4)

e.   <u>Problems These Data Pose</u>   (*generally, this doesn't happen with incorporation*)

(i)   *Lexical Account:*
         What are the 'subcategorization requirements' of the putative 'suffixes'?
         (One would have to assume that there are none.)

SIDE-NOTE:
Recall that, as a Wakashan language, it is (somewhat) controversial whether NCN even *has* lexical category distinctions…

(ii)   *Syntactic Account:*
         In examples (9a) – (9c), the 'host' of the bound root is an element that is understood to be a *modifier* of the direct object of the root.

         However, H-movement of a modifier of the direct object into the V would violate the HMC! (*cf.* Baker 1988)
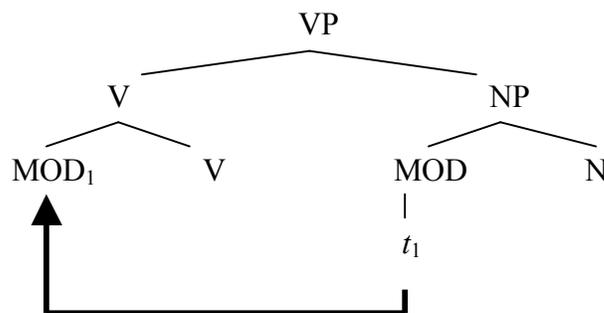
         Violation of the HMC!!
         (since VP doesn't *minimally dominate* the MOD)

(10)   **The 'Leftmost Root' Generalization**

The examples in (8), (9a) – (9c) above all display a particular interesting pattern:
The substantive root that is 'host' to the bound transitive predicate in the (ii)-examples is also the <u>leftmost</u> root in the complex DP in the (i)-examples.

Indeed, this 'leftmost root' generalization (stated more precisely below) is an obligatory constraint governing the choice of 'host' for the bound root.

a.   <u>The Leftmost Root Generalization (Wojdak 2003a,b; Waldie 2004)</u>
     If a bound transitive root R is suffixed to a substantive (non-expletive root) S, then *were S to surface instead in the direct object D of R, then S would be leftmost in D.*

     (i)   i.   7u**7iic**7is7alh   ha7um 7aapinis
                  7u-**7iic**-7is-7alh   ha7um 7aapinis
                  ∅-**eat**-3.IND-PL   tasty   apples
                  They are eating delicious apples.

            ii.   ha7um7ic7is7alh   7aapinis
                  ha7um-**7iic**-7is-7alh   7aapinis
                  tasty-**eat**-3.IND-PL   apples
                  They are eating delicious apples.

            iii. * 7aapinis-**7iic**-7is-7alh   ha7um
                    apple-**eat**-3.IND-PL   tasty   (Wojdak 2003b; p. 4)

     It's not just about choosing 'modifiers' over 'modified Ns'

     (ii)   7u-**naakw**-sitl   quu7as   [haw'ilh [yaq'at7itq   7u-7aalhuk-7at]]
            ∅-**have**-MOM   person   chief   REL.   ∅-look.after-PASS
            People have a chief who looks after them.

            haw'ilh-**naawk**-sitl   quu7as [yaq'at7itq   7u-7aalhuk-7at]
            chief-**have**-MOM   person   REL   ∅-look.after-PASS
            People have a chief who looks after them.   (Stonham 2004; p. 222)

     (iii) i.   7u-**u7aalh**-7is   7aya sack c'iima   Kim
                  ∅-**find**-3.IND   many sharp knife   Kim
                  Kim found a lot of sharp knives.

            ii.   7aya-**u7aalh**-7is   sack c'iima   Kim
                  many-**find**-3.IND   sharp knife   Kim
                  Kim found a lot of sharp knives.   (Waldie 2004; p. 49)

     (iv)   CSC examples (*cf.* (8))

b.   Problems These Data Pose   (*generally, this doesn't happen with incorporation*)

(i)   *Lexical Account*

Absolutely no means for predicting (or even enforcing) such an effect.

How could choice of host (determined in the lexicon) affect what NP the predicate can combine with, and how could such an affect have anything to do with linear order?

"These facts go unexplained by a lexical analysis, since there is no way of looking ahead to the syntax to state how the choice of noun, adjective or quantifier host is determined." (Wojdak 2003a; p. 285)

(ii)   *Syntactic Account*

In all cases where the host of the bound rood is a modifier of the direct object (adjective, numeral, quantifier), a H-movement analysis would need to appeal to H-movement that *violates the HMC* (see (9eii))

(11)   **No Semantic Effects of 'Incorporation'**

The 'incorporation' of a direct object into a transitive bound root has no effect upon the relative scope of the direct object.

a.   Illustration

(i)   7uutaqit7is   hisuk caakupiih   muunaa
       7u-**taq**-mit-7is   hisuk cakup-iih   muunaa
       ∅-**fix**-PST-3.IND   all   men-PL   motor
       All the men were working on an engine.   ($\forall > \exists$; $\exists > \forall$)

(ii)   muunaataqit7is   hisuk caakupiih
        muunaa-**taq**-mit-is   hisuk cakup-iih
        motor-**fix**-PST-3.IND   all   men-pl
        All the men were working on an engine.   ($\forall > \exists$; $\exists > \forall$)

b.   Problems These Data Pose   (*generally, this doesn't happen with incorporation*)

Typically, across languages, incorporated Ns must take narrow scope with respect to subjects.

Thus, both lexical and syntactic approaches to incorporation seek to derive obligatory narrow scope as a result. (*i.e.*, no 'QR' out of a lexical-item/complex head)

4.   A Third Possibility: The 'PF-Movement' Analysis

We've seen that there are certain features of the NCN system of 'bound transitive roots' that are problematic for *both* the lexical and syntactic, H-movement analyses.

In this section, we'll present an analysis that can handle:
   (i)   *the problematic facts in Section 3.,*
   (ii)   *the facts from Section 2 supporting the 'lexical analysis',*
   (iii)   *the facts from Section 2 supporting a 'syntactic analysis', and*
   (iv)   *all the basic facts from Section 1…*

SIDE-NOTE:

While the account sketched below will be attributed to Wojdak (2003a,b), I adopt a slightly different theory of 'PF-movement' from what she adopts in her papers.

My reasons for doing so is that Wojdak's treatment of 'PF-movement' is rather idiosyncratic (and in some respects unclear).

For that reason, I am here implementing her analysis in an architecture that is more commonly used (and thus rather better understood).

4.1   Technical Background: Distributed Morphology (DM) and PF-Movement

4.1.1   The Basics of Distributed Morphology (DM)

(12)   **The Overall 'Gestalt'**

   There is no lexicon.
   Morphology is 'post-syntactic'.
   'Morphology' is what occurs in the mapping from syntax to PF.
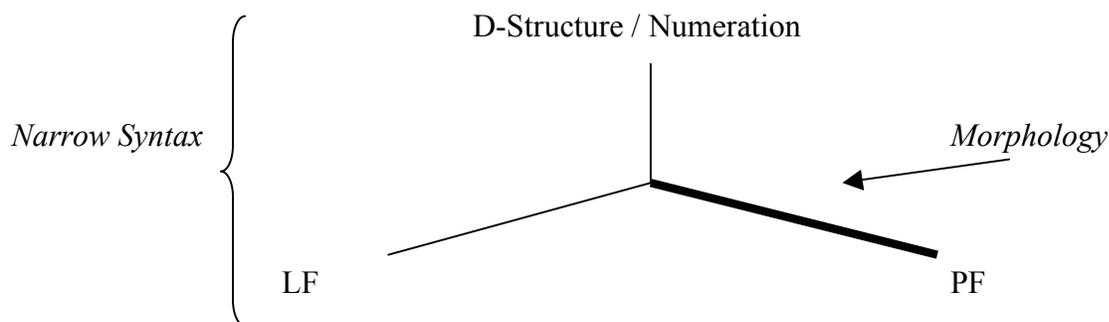
(13) **The Nature of 'Narrow Syntax'**

  a. Syntax manipulates totally abstract bundles of syntactic features:

    [$_T$ FUT] , [$_T$ PAST] , [$_{NUM}$ PL] , [$_N$ DAVE] , [$_N$ HEDGE] , [$_V$ TRIM]

  b. Syntax organizes these feature bundles into phrase structures:

```
                        TP
           ┌─────────────┴──────────────┐
          NP                            T'
           |                  ┌──────────┴──────────────┐
           N                  T                         VP
        [N DAVE]          [T FUT]            ┌───────────┴───────────┐
                                             V                       NP
                                         [V TRIM]            ┌────────┴────────┐
                                                             N               NUM
                                                         [N HEDGE]         [NUM PL]
```
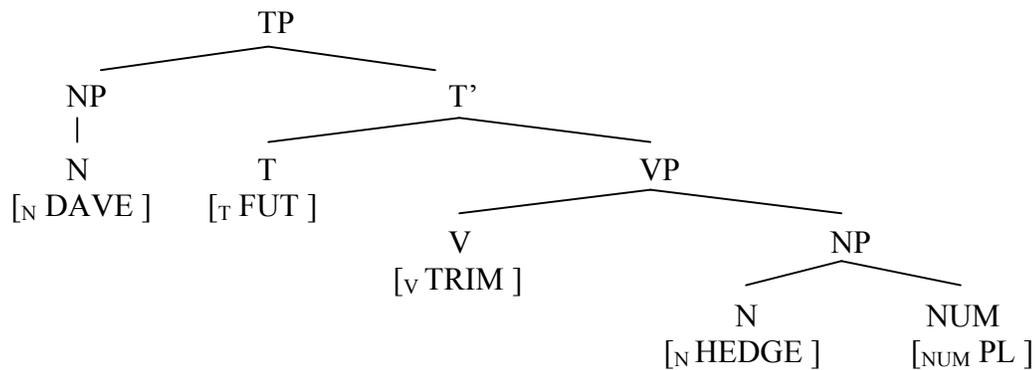
  c. Such phrase structures are the output of 'narrow syntax'.
    Thus they are the input to PF / Morphology

(14) **The Mapping of 'Narrow Syntax' to PF**

  As in other (earlier) approaches, the general 'functional' role played by 'morphology' is the mapping of '(narrow) syntax' representations like (13b) onto phonological representations.

  But, they key idea in DM is that this is <u>not</u> done by consulting a 'lexicon' (since such a thing doesn't exist).

  a. <u>Step One: Linearization</u>
    The phrase structural representation is converted into a linear string of heads/nodes

    [$_{TP}$ [$_N$ DAVE] [$_{T'}$[$_T$ FUT] [$_{VP}$ [$_V$ TRIM] [$_{NP}$ [$_N$ HEDGE] [$_{NUM}$ PL]]]]] →

    < [$_N$ DAVE] * [$_T$ FUT] * [$_V$ TRIM] * [$_N$ HEDGE] * [$_{NUM}$ PL] >

SIDE-NOTES

First, linearization isn't always taken to be the 'first step'. In the full DM-model, 'morphological' operations can take place in PF prior to linearization.

Second, *how* linearization is accomplished (the exact details of the mapping function) is a significant area of research and contention in the literature.

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b.   Step Two: Vocabulary Insertion

Rather than consult a 'lexical entry' for the abstract syntactic nodes, their basic phonological content is specified via 'Vocabulary Insertion Rules', like the following.

(i)   *Sample Vocabulary Rules*

i.   [$_T$ FUT]   →   /wIl/
ii.   [$_T$ PAST]   →   /d/
iii.   [$_{NUM}$ PL]   →   /z/
iv.   [$_N$ DAVE]   →   /dev/
v.   [$_N$ HEDGE]   →   /hEdz/
vi.   [$_V$ TRIM]   →   /trIm/

(ii)   *Sample Mapping*

< [$_N$ DAVE] * [$_T$ FUT] * [$_V$ TRIM] * [$_N$ HEDGE] * [$_{NUM}$ PL] > →

< /dev/ * /wIl/ * /trIm/ * /hEdz/ * /z/ >

c.   Step Three: 'Special Phonology' (Readjustment Rules)

Following the insertion of 'basic phonological content', certain 'special' phonological rules can take place.

These rules (sometimes called 'readjustment rules') can be completely idiosyncratic and unpredictable (*i.e.* these can be rules of 'lexical phonology')

(i)   *Sample Phonology*

< /dev/ * /wIl/ * /trIm/ * /hEdz/ * **/z/** >   →

< /dev/ * /wIl/ * /trIm/ * /hEdz/ * **/Iz/** >

SUMMARY: The Basic 'Gist' of Distributed Morphology

- There is no 'lexicon' (the functions of the 'lexicon' are *distributed* across the grammar)

- Syntax manipulates entirely abstract bundles of features, creating phrase structures

- The Syntax-to-PF mapping turns these phrase structures into (i) linear strings of nodes, and then into (ii) linear strings of phonological representation.

- The Syntax-to-PF mapping just *is* morphology.

4.1.2   PF Movement in a DM System

In the 'basic layout' presented above, the application of 'Vocabulary Insertion Rules' was presented as 'Step 2'.

However, in the full DM-model, certain 'morphological operations' can take place (i) after linearization of the syntactic structure, but (ii) prior to Vocabulary Insertion.

(15)   **Morphological Merger (Marantz 1998, Embick & Noyer 2001, Embick 2007)**

A relationship of <u>linear adjacency</u> < X * Y > can be converted into a relation of <u>affixation</u> < Y-X > (with possible <u>reversal of order</u>).

(16)   **Example of Morphological Merger: 'Affix Hopping' in English**

< [$_N$ DAVE] * **[$_T$ PAST] * [$_V$ TRIM]** * [$_N$ HEDGE] * [$_{NUM}$ PL] >   →

< [$_N$ DAVE] * **[$_V$ TRIM]-[$_T$ PAST]** * [$_N$ HEDGE] * [$_{NUM}$ PL] >   →

< /dev/ * **/trIm/-/-d/** * /hEdz/ * /z/ >

---

(17)   **Key Principle: Morphological Operations are 'Triggered' by Output Conditions**

In the DM model, morphological operations don't occur 'for free'.
They can only take place if they solve some 'problem'.

a.   <u>Example: Tense Morphology in English</u>

Requirement: [PAST] in English must be suffixed to a V-head.

(i)   This forces 'morphological merger' in cases like (16)
If morphological merger did not take place in (16), [PAST] wouldn't be suffixed to anything, and the requirement above would be violated.

(ii)   In cases where *absence* of merger would *not* violate the requirement above, morphological merger cannot take place.

Impossible Derivation:

< [$_N$ DAVE] * **[$_T$ FUT] * [$_V$ TRIM]** * [$_N$ HEDGE] * [$_{NUM}$ PL] >   →

< [$_N$ DAVE] * **[$_V$ TRIM]-[$_T$ FUT]** * [$_N$ HEDGE] * [$_{NUM}$ PL] >   →

< /dev/ * /trIm/-/-wIl/ * /hEdz/ * **/z/** >

Besides 'morphological merger', it is also possible (in some limited cases) to *insert* structure into the linearized string prior to Vocabulary Insertion.

(18)   **Insertion of Structure**

Prior to Vocabulary Insertion, structure can be added to the linearized string of syntactic nodes. *This structure may, upon insertion, be in an 'affixal relation' with some head.*

< [X] * [Y] > → < [Z]-[X] * [Y] >

(19)   **Example of 'Insertion': 'Do-Support' in English**

a.   The Classic Paradigm
When the verb is negated in English, past-tense cannot appear suffixed to the verb, but instead must appear on a 'dummy auxiliary'.

(i)   Dave trimmed hedges.
(ii)   * Dave not trimmed hedges.
(iii)   Dave **did** not trim hedges.

b.   The Derivation

Output of Linearization:
< [$_N$ DAVE] * **[$_T$ PAST] * [NOT] * [$_V$ TRIM]** * [$_N$ HEDGE] * [$_{NUM}$ PL] >

Problem:
Morphological merger (which is limited to nodes that are adjacent) cannot serve to affix the V to the T!

Solution:
Insert a 'dummy V' as the 'host' for the T!

<[$_N$DAVE]* **[$_V$ DO]-[$_T$ PAST]** * [NOT] * [$_V$ TRIM] * [$_N$HEDGE]*[$_{NUM}$PL]> →
< /dev/ * **/do/-/d/** * /nat/ * /trIm/ * /hEdz/ * /z/ >

SIDE-NOTE:
Structure which is 'inserted' at PF is by definition not present in the 'narrow syntax'
Thus, it is not present at LF, and so is 'semantically vacuous' (uninterpreted).

---

(20)   **Key Principle: Morphological Operations are 'Triggered' by Output Conditions**

As we observed above for morphological merger, 'insertion' also cannot take place if there is not an 'output problem' that it potentially solves.

a.   Dave will trim the hedges.
b.   * Dave do-will trim the hedges.

4.2   The 'PF-Movement' Analysis of Nuu-chah-nulth Bound Roots

With the 'DM basics' above as background, it is now possible to present Wojdak's (2003a,b) 'PF-movement' analysis of NCN polysynthesis.

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(21)   **Central Proposal**

Bound transitive roots in NCN are like '$[_T$ PAST $]$' in English.
- In the 'narrow syntax', they are distinct V-heads (just like 'free transitive roots')
- There is a 'PF-requirement' that they be suffixed to some other head.

---

(22)   **The System of Bound and Free Transitive Roots in NCN**

   a.   Some Roots of NCN

     (i) $[_N$ HOUSE $]$
     (ii) $[_V$ BUY$_{FREE}$ $]$
     (iii) $[_V$ BUY$_{BOUND}$ $]$
     (iv)   [DUMMY]

   b.   Semantics of Roots in NCN

     (i) $[[\ [_N$ HOUSE $] \ ]]$ = $\lambda x.$ house(x)
     (ii) $[[\ [_V$ BUY$_{FREE}$ $] \ ]]$ = $\lambda y \ \lambda x.$ buy(x,y)
     (iii) $[[\ [_V$ BUY$_{BOUND}$ $] \ ]]$ = $\lambda y \ \lambda x.$ buy(x,y)

   c.   Some Vocabulary Insertion Rules of NCN

     (i) $[_N$ HOUSE $]$ →   /maht'ii/
     (ii) $[_V$ BUY$_{FREE}$ $]$ →   /maakuk/
     (iii) $[_V$ BUY$_{BOUND}$ $]$ →   /7aap/
     (iv)   [DUMMY]   →   /7u/

   d.   A PF-Condition of NCN

     Requirement: $[_V$ BUY$_{BOUND}$ $]$ must be suffixed to some head.

SIDE-NOTE:
By not giving '[DUMMY]' a semantic entry, we guarantee that it cannot appear at LF. Thus, it can only function in the language as an 'expletive' inserted at PF.

... so let's see how this set up can function to derive the basic phenomenon of bound transitive roots in Nuu-chah-nulth!...

… We'll begin by considering how a VP consisting of '[$_V$ BUY$_{BOUND}$]' *and* '[$_N$ HOUSE]' *can produce both the 'incorporated form' "maht'ii-7aap" and the 'expletive form' "7u-7aap"…*

(23)   **Sample Derivation**

    a.   <u>Output of Narrow Syntax</u>:   [$_{VP}$ [$_V$ BUY$_{BOUND}$] [$_{NP}$ [$_N$ HOUSE]]]

    b.   <u>Result of Linearization:</u>   < [$_V$ BUY$_{BOUND}$] * [$_N$ HOUSE] >

    c.   <u>Output Problem:</u>   *If left alone, the string in (b) will violate (22d)!!*

    d.   <u>Solution 1: Morphological Merger:</u> < [$_N$ HOUSE]-[$_V$ BUY$_{BOUND}$] >   →
                                            < /maaht'ii/-/7aap/ >

    e.   <u>Solution 2: Insertion:</u>   < [DUMMY]-[$_V$ BUY$_{BOUND}$] * [$_N$ HOUSE] > →
                                              < /7u/-/7aap/ * /maht'ii/ >

SIDE-ISSUE:
In the English tense system (at least), one is not free to choose between either 'morphological merger' *or* 'insertion'. Rather, insertion *only* takes places when morphological merger cannot.

(24)   **Insertion as a 'Last Resort'**

    a.   Dave trimmed hedges.   c.   * Dave not trimmed hedges.
    b.   * Dave did trim hedges.   d.   Dave did not trim hedges.

In the NCN system of bound roots, however, one is always free to employ either insertion (host = expletive *7u*) or morphological merger (host = substantive head)…

With the basic logic of the account in place, we can now begin to see how it can derive various key facts regarding 'polysynthesis' in NCN!

4.3   Facts Predicted by the 'PF-Movement' Analysis

4.3.1   Basic Facts of NCN Polysynthesis (*cf.* Sections 1 and 2)

(25)   **Core, Basic Properties of Bound Roots**

a.   <u>Bound roots in NCN *must* appear suffixed to some other root.</u>

* **7aap**-mit-7is	cakup	maht'ii
buy-PST-3.IND	man	house (Wojdak 2003b; p.1)

<u>Explanation:</u>
The sequence above violates the 'PF Output Condition' in (22d)!

b.   <u>Bound roots can (optionally) be suffixed to the 'expletive morpheme' *7u*</u>

7u7aamit7is	cakup	maht'ii
7u-**7aap**-mit-7is	cakup	maht'ii
∅-**buy**-PST-3.IND	man	house

A man bought a house.   (Wojdak 2003b; p. 1)

<u>Explanation:</u>
As illustrated above (23e), the possibility of these sequences follows from:

    (i)   the inclusion of '[DUMMY]' in the inventory of NCN (22a,iv)

    (ii)   the theory of 'insertion' operations in DM (18)

c.   <u>When suffixed to 'expletive morpheme' *7u*, bound root must still take an object</u>

* 7u7aamit7is	cakup
7u-**7aap**-mit-7is	cakup
∅-**buy**-PST-3.IND	man

<u>Explanation:</u>
Since dummy '7u' is inserted only at PF, it isn't present in the narrow syntax (LF)
Thus, it cannot itself satisfy the theta-requirements of the 'bound transitive V'.

(26)   **Facts that Support the Lexical Analysis (Over the H-Movement One)**

      a.   <u>Restriction of 'Incorporation' to the Bound Roots (*cf.* Bach 1995 on Haisla)</u>

            (i)   *   maht'ii-**maakuk**-mit-7is   cakup
                             house-**buy**-PST-3.IND   man

            (ii)   *   7u-**maakuk**-mit-7is   cakup   maht'ii
                             ∅-**buy**-PST-3.IND   man   house

> <u>Explanation:</u>
>
> *By definition, there is no 'PF-Output Condition' requiring that free roots like 'maakuk' be suffixed to another head.*
>
> ***Thus, the general 'economy principles' in (17) and (20) would entail that the operations of 'morphological merger' and 'insertion' cannot take place in these circumstances!***
>
> (iii)   *Putative Parallels in English*
>
>   * Dave trim-will hedges.
>   * Dave do-will trim hedges.

      b.   <u>Idiosyncratic Phonological Effects of 'Incorporation'</u>

            (i)   Particular bound roots can induce unpredictable changes on their 'host':

            (ii)   When some roots combine with 'bound roots', they take an unpredictable 'combining form.

> <u>Explanation:</u>
> *In the DM model, even 'idiosynractic', 'lexical phonology' can occur on syntactically derived heads. (cf. the 'readjustment rules' in (14c)).*

(27)   **Facts that Support the H-Movement Analysis (Over the Lexical One)**

   a.   Subject / Object Asymmetries
   The understood subject of the bound root can never function as its 'host'.

         (i)   * cakup-**7aap**-mit-7is   maht'ii
                  man-**buy**-PST-3.IND   house   (Wojdak 2003b; p.2)
                  A man bought a house.

         (ii)   * n'uw'iiq-**7itl'as**-7is   ha7um
                  father-**go.get**-3.IND   food
                  Father went to get food.   (Wojdak 2003a; p. 278)

Explanation:

If we adopt standard phase theory, then the *first* Spell-Out cycle containing the bound root will be the *v*-phase.

By definition, this Spell-Out cycle contains *only* the V (bound root) and its internal arguments.
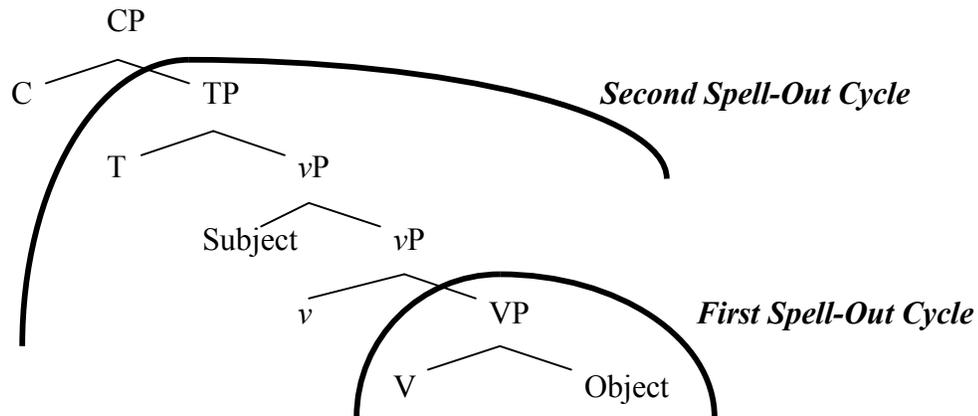
Consequently, the subject will not be a component of this First Spell-Out Cycle!

Finally, if we assume that the 'PF Output Condition' in (22d) must be satisfied in *every* Spell-Out cycle, it follows that the 'host' of the bound root must be selected within the *first* Spell-Out cycle, *and thus could never be the subject!*

SIDE-NOTE:
This also explains why the postulated 'morphological merger' of the 'bound V' and the direct object can 'ignore' the inflectional morphology following the V (because it isn't there yet!)

b.   No 'Doubling' of the Object
        A bound root suffixed to a semantically contentful host (interpreted as the 'direct
        object') *cannot* still take a separate direct object DP

        (i)   Maht'ii7amit7is   cakup   (*maht'ii)
                maht'ii-**7aap**-mit-7is   cakup   maht'ii
                house-**buy**-PST-3.IND   man   house
                A man bought a house.

> Explanation
> *As in the H-movement account, non-expletive 'hosts' of the bound V-roots are*
> *assumed to occupy the argument positions of the V in the narrow syntax.*

c.   Discourse Transparency of the 'Incorporated' NP
        The host of a bound root can introduce a 'discourse referent', and can serve as the
        antecedent for subsequent, cross-sentential anaphora.

        (i)   **7innitl**-nak-sis.   7uklhaa-7is   Fido.
                dog-have-1.IND   name-3.IND   Fido
                I have a dog.   *His name is Fido.*   (Sawai 2002; p. 10)

> Explanation
> *Whether or not the direct-object is 'host' to the bound verb has no effect upon its*
> *narrow syntax (LF) representation (since such 'incorporation' all happens in PF)*
>
> *Thus, we predict that 'incorporated' NPs should have all the same discourse-*
> *structural properties as 'free-standing' NPs.*

4.3.2   More 'Puzzling' Facts of NCN Polysynthesis (*cf.* Sections 3)

Thus far, we've seen that the 'PF-Movement' analysis of Wojdak (2003a,b) can capture all of the
most 'basic' features of NCN polysynthesis.

Now we will see how this account can also capture the more 'problematic' and 'puzzling' facts
enumerated in Section 3….

---

(28)   **General Advantage of the 'PF-Movement' Analysis**

        Since the 'fusion' of the bound root with its host takes place in PF *after linearization,* it
        follows that this process:
        (a)   *will <u>not</u> be sensitive to syntactic constituency*
        (b)   *will <u>only</u> be sensitive to linear order/adjacency*

(29)   **Apparent Violations of the Co-Ordinate Structure Constraint**

The 'fusion' of the bound root to its host can appear to violate the CSC!

a.   tl'itl'ick'ukhaay'asci   7uh7iis   suukwaa
       tl'itl'ick'uk-**haay'as**-ci   and   sugar
       flour-**go.buy**-IMP   and   sugar
       Go buy flour and sugar!

Explanation:
As mentioned above in (28), the analysis assumes that 'morphological merger' is not sensitive to (does not 'see') the syntactic constituency, only the *linearized* structure.

Thus, our analysis permits the following derivation of example (29a) above, *one where there is no violation of the CSC (in the narrow syntax).*

(30)   **Derivation of the Apparent 'CSC-Violationg' Structures Like (29a)**

a.   Output of Syntax:

[$_{VP}$ [$_V$ GO.BUY$_{BOUND}$] [$_{NP}$ [$_N$ FLOUR] [$_{CONJ}$ AND] [$_N$ SUGAR]]]

b.   Result of Linearization:

< [$_V$ GO.BUY$_{BOUND}$] * [$_N$ FLOUR] * [$_{CONJ}$ AND] * [$_N$ SUGAR] >

c.   Application of Morphological Merger:

< **[$_V$ GO.BUY$_{BOUND}$] * [$_N$ FLOUR]** * [$_{CONJ}$ AND] * [$_N$ SUGAR] >   →

< **[$_N$ FLOUR]-[$_V$ GO.BUY$_{BOUND}$]** * [$_{CONJ}$ AND] * [$_N$ SUGAR] >

d.   Application of Vocabulary Insertion:

< [$_N$ FLOUR]-[$_V$ GO.BUY$_{BOUND}$] * [$_{CONJ}$ AND] * [$_N$ SUGAR] >   →

< /tl'it'ik'uk/-/haay'as/ * /7uh7iis/ * /suukwaa/ >

---

(30)   **Insensitivity of Bound Root to Lexical Category of the 'Host'**

A bound root can take as 'host' a variety of syntactic elements (not just 'nouns').

Explanation:
The 'PF-condition' in (22d) does not specify a particular category that the bound transitive root *must* be suffix to (only that it be suffix to *something*)

---

(31) **The 'Leftmost Root' Generalization**

If a bound transitive root R is suffixed to a substantive (non-expletive root) S, then *were S to surface instead in the direct object D of R, then S would be leftmost in D.*

> Explanation:
> *This generalization follows directly from the logic of the PF-Movement account!*
>
> If the 'host' of the bound root is not an expletive, then it could only have become the 'host' via application of 'morphological merger' (23)
>
> However, if the 'substantive host' were affixed to the bound root via 'morphological merger', then (by definition) that root must been **linearly adjacent** to the bound root at the preceding step of the derivation (15)
>
> Thus, such a root had to have been *left-most* in the direct object. *If there were any other element preceding it, then the root would not have been adjacent to the V!*

(32) **No Semantic Effects of 'Incorporation'**

The 'incorporation' of a direct object into a transitive bound root has no effect upon the relative scope of the direct object.

> Explanation:
> As noted earlier, whether or not the direct-object is 'host' to the bound verb has no effect upon its narrow syntax (LF) representation (since such 'incorporation' all happens in PF)
>
> Thus, we predict that 'incorporated' NPs should have all the same semantic properties as 'free-standing' NPs.

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5. Conclusions

(33) **Certain Approaches to Polysynthesis *Can't* Work for Nuu-chah-Nulth**

     a.   Polysynthesis (Incorporation) as Syntactic H-Movement

           PROBLEM: Leftmost Generalization entails massive violations of the HMC!

     b.   Polysynthesis (Incorporation) as 'Lexical' Process

           PROBLEM: Leftmost Generalization cannot in any way be capture/enforced.

(33)   **Further Support for Distributed Morphology Framework**

At the very least, this gives us another case where 'DM does good work'.

More interestingly, though, there's a sense in which the DM approach is the *only* viable option (out of the *prima facie* imaginable ones):

In particular, the facts comprising the 'leftmost generalization' pose <u>insuperable</u> problems for both the 'lexical' and the 'H-movement' analyses, but are <u>exactly</u> what you expect under the DM-approach!
(No special assumptions are added to the general DM theory to derive the targeted facts!)

SIDE-NOTE:
Waldie (2004) captures the core insights of the DM approach in an HPSG system.
<u>The analysis</u>: 'bound transitive verbs' are *phrasal* affixes (affix onto XPs) and are also 2nd position clitics (encliticize onto the left-most member of the XP they syntactically attach to)

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(34)   **Heterogeneity of 'Polysynthesis' and 'Incorporation'**

      a.   <u>A Common Notion in the Literature on Incorporation:</u>
            In some languages, incorporation is 'syntactic' (Mohawk)
            In other languages, incorporation is 'lexical' (Na-Dene Languages)

      b.   <u>Nuu-chah-nulth Provides a Third Type</u>
            In some languages, incorporation is a purely 'surfacy' 'PF'-process
            (*i.e.*, it involves the *purely linear* rearrangement of the output of syntax)

(35)   **Heterogenity of Polysynthesis in Wakashan**

      FACT: In Northern Wakashan languages (*e.g.* Kwakwala), it *is* possible for an incorporated object to be 'doubled' by a free-standing object.

      a.   <u>'Doubling' of the Object in Kwakwala (Anderson 1992; p. 30)</u>

            q'amdzakw-**ila**-ixsd-ida   begwanama-xa   q'amddzakw-i7
            salmonberry-give.feast-want-DET   man-DET   salmonberry-PL
            The man wants to give a salmonberry feast of salmonberries.

      SPECULATION: Perhaps 'polysynthesis' in the Northern Wakashan languages *is* quite different from that in Nuu-chah-nulth (a Southern Wakasahn language).

      QUESTIONS: Do N. Wakashan languages fail to exhibit the 'leftmost generalization'?
                       Is this predictable from any other features of N. Wakashan incorporation? (absence of an expletive 'host'?)