

## MORPHOLOGY I

104-440A - FALL 2002

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### UNIT 2 DERIVATION

#### 2.1 Order and Structure

- In the following examples, the (a) forms are complex, they are made up of the morphemes as shown following. The (b) examples are made up of the same morphemes, but they are gibberish. Why?

- |     |    |                                                                          |                                       |
|-----|----|--------------------------------------------------------------------------|---------------------------------------|
| (1) | a. | undoable                                                                 | un-do-able                            |
|     | b. | *do-able-un, *do-un-able, *able-do-un, etc...                            |                                       |
| (2) | a. | antidistestablishmentarianism                                            | anti-dis-establish-ment-ar(y)-ian-ism |
|     | b. | *ism-anti-dis-ment-establish-ar-ian, *dis-anti-establish-ar-ian-ism-ment |                                       |
| (3) | a. | hopefulness, hopefully                                                   | carelessness, carelessly              |
|     | b. | *hopenessful, *hopelyful                                                 | *carelessness, *carelyless            |

Observation: The **order** of morphemes in complex words is important. Our notions 'prefix' and 'suffix' (Unit 1) get us part way to explaining the ungrammaticality of the (b) examples, but they do not, for example, explain (3b). Why not?

Intuition: Morphemes (affixes) care about what they attach to / combine with. (cf. our *lexical entries*, from Unit 1, p.6)

| Label                    | -er                       | -less             | un-                    | -rjuaq<br>INUKTITUT |
|--------------------------|---------------------------|-------------------|------------------------|---------------------|
| phonology:               | /ɛr/                      | /lɛs/             | /ʌn/                   | /rʃjuaq/            |
| meaning:                 | one who "V <sub>s</sub> " | without N         | not Adj                | big N               |
| position                 | Suffix                    | Suffix            | Prefix                 | Suffix              |
| selectional restrictions | attaches to verbs         | attaches to nouns | attaches to adjectives | attaches to nouns   |
| category                 | Noun                      | Adjective         | Adjective              | Noun                |

- |     |                                                                                       |                                                                          |
|-----|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| (4) | [ [ care ] <sub>Noun</sub> -ful ] <sub>Adj</sub>                                      | [ [ hope ] <sub>Noun</sub> -ful ] <sub>Adj</sub>                         |
|     | -ful attaches to nouns and makes adjectives, meaning (roughly) 'full of N'            |                                                                          |
| (5) | [ [ care ] <sub>Noun</sub> -less ] <sub>Adj</sub>                                     | [ [ hope ] <sub>Noun</sub> -less ] <sub>Adj</sub>                        |
|     | -less attaches to nouns and makes adjectives, meaning roughly 'lacking N'             |                                                                          |
| (6) | [ [ soft ] <sub>Adj</sub> -ness ] <sub>Noun</sub>                                     | [ [ soft ] <sub>Adj</sub> -ly ] <sub>Adv</sub>                           |
|     | -ness attaches to adjectives and makes nouns                                          |                                                                          |
|     | -ly attaches to adjectives and makes adverbs                                          |                                                                          |
| (7) | [ [ care ] <sub>Noun</sub> -less ] <sub>Adj</sub> -ness ] <sub>Noun</sub>             | [ [ [ hope ] <sub>Noun</sub> -less ] <sub>Adj</sub> -ly ] <sub>Adv</sub> |
|     | -ness attaches to the adjective <i>careless</i> , making the noun <i>carelessness</i> |                                                                          |
|     | -ly attaches to the adjective <i>hopeless</i> , making the noun <i>hopelessly</i>     |                                                                          |
| (8) | * [ [ [ care ] <sub>Noun</sub> -ness ] <sub>Noun</sub> -less ] <sub>Adj</sub>         |                                                                          |
|     | -ness has attached to the noun <i>care</i>                                            |                                                                          |
|     | but this violates its attachment properties: -ness doesn't attach to nouns:           |                                                                          |
|     | *care-ness                                                                            |                                                                          |
| (9) | * [ [ [ hope ] <sub>Noun</sub> -ly ] <sub>Adv</sub> -less ] <sub>Adj</sub>            |                                                                          |
|     | -ly has attached to the noun <i>hope</i>                                              |                                                                          |
|     | but this violates its attachment properties: -ly doesn't attach to nouns:             |                                                                          |
|     | *hope-ly                                                                              |                                                                          |

#### 2.1.1 Some Formalism:

We will collapse "position" and "attaches to X..." into the following notation:

| Label                    | -er     | -less   | un-     | -rjuaq<br>INUKTITUT |
|--------------------------|---------|---------|---------|---------------------|
| selectional restrictions | [ V _ ] | [ N _ ] | [ _ A ] | [ N _ ]             |

- these are called **subcategorization frames**.
- The underline shows the position of the morpheme in its immediate constituent (prefix or suffix), the category of the sister is also indicated.
- A root has a subcategorization frame: [ \_ ] i.e., it is alone in its constituent

- What problem might the following examples pose for the idea that morphemes care about what they are next to?

- (10) a. enjoyment      en-joy-ment  
b. indecipherable      in-decipher-able

- (11) *-ment* does not typically attach to nouns:      joy - \*joyment  
face - \*facement (cf. defacement)

but in (10a), *-ment* immediately follows *joy* (a noun)

- (12) *in-* does not attach to verbs:      \*in-decipher  
\*in-cure (cf. incurable)

but in (10b), *in-* immediately precedes *decipher* (a verb)

- (13) Linear order is not sufficient:  
There is a hierarchical or *derivational* order:

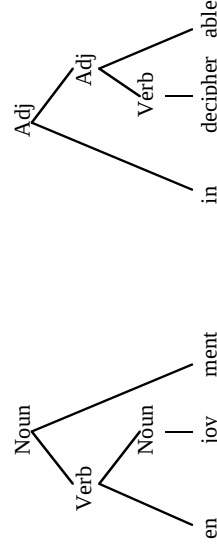
- ① joy      noun      ① joy      noun  
② en-joy      verb      ② \*joy-ment      !!!  
③ en-joy-ment      noun      ③ en-joy-ment      noun

*joy* is a noun  
*en-joy* is a verb  
*en-joy-ment* is formed by adding *-ment* to *enjoy*, not to *joy*.

- (14) Selectional Restrictions met by outermost constituent:

[ [ en<sub>Noun</sub> [ joy ]<sub>Noun</sub> ]<sub>Verb</sub> -ment ]<sub>Noun</sub>  
en [ \_\_ N ]      ment [ V \_\_ ]

- (15) Word Structure Trees (cf. syntactic trees)

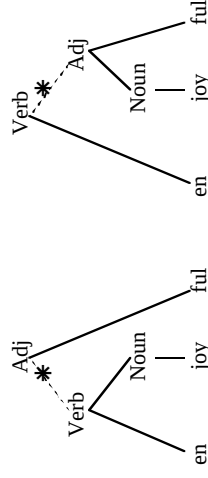


- (16) Like labelled brackets, Word Structure Trees express more information about a word than just the linear order of the morphemes. They express *constituent structure* i.e., the intermediate units within larger units. This is also *hierarchical structure*, in essence: the degree of closeness to the root.

Important: the terminal elements in the trees are the morphemes  
recall that a morpheme is a lexical entry, not just the phonology

- (17) we can use the phonology/orthography/label as a shorthand, for now.  
Word Structure Trees allow us to express why the following are not legitimate English words:

\*enjoyful cf. enjoy, joyful  
\*dethroneless cf. dethrone, throneless

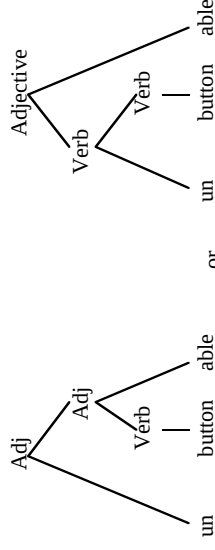


en-joy is a Verb,  
-ful attaches to Nouns  
joy-ful is an Adjective  
en- attaches to Nouns

- (18) What information can Word-Structure Trees express about the following words ?

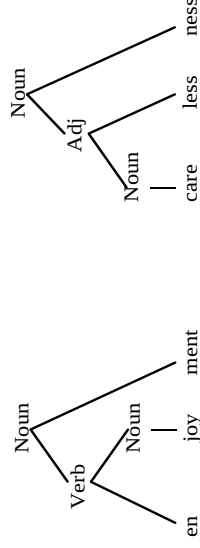
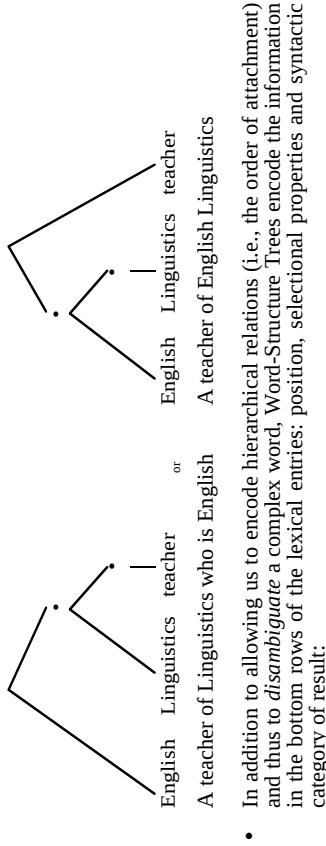
undoable      un-do-able  
unbuttonable      un-button-able  
untieable      un-tie-able

- (19)



- (20) a. This straightjacket is no good, it's too easily unbuttonable.  
b. I can't close my coat, since it's so ripped up that it's unbuttonable.  
c. This problem set is so hard it's practically undoable.  
d. This mistake is easily undoable, hit ~~⌘~~+Z.

(21) Structural Ambiguity (Syntax)



joy is a Noun, it is also the Root  
 en is a Prefix, it has attached to a Noun and made a Verb  
 ment is a Suffix, it has attached to a Verb and made a Noun  
 care is a Noun, it is also the Root  
 less is a Suffix, it has attached to a Noun and made an Adjective  
 ness is a Suffix, it has attached to an Adjective and made a Noun

## 2.2 Nodes and Percolation

- How do we know what labels to give to the nodes in a Word Structure Tree?

(22) NODE LABELLING CONVENTION (NLC)

The features of a node are provided by the lexical category it immediately dominates.

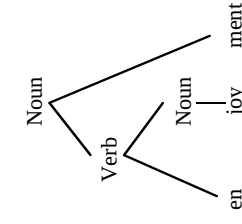
lexical category: something with a lexical entry: a morpheme

Intuitive content: The affix derives the features of the whole word = derivation.

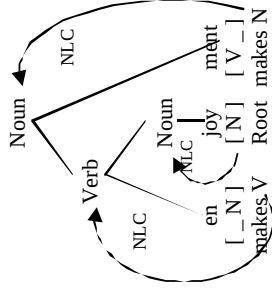
Note: To make this work, we need to label the Root first. Do you see how this is done in each of the examples above?

(23) cf. (10) above

Word Structure Tree



Labelled Word Structure Tree



aside: Why do we label the Root first?

Related question: How do we identify the Root?

Typically (though not always) the meaning of an affix is a function of the meaning of the root, but the meaning of the root is complete, it stands on its own.

work+er work: to labour/toil -er: someone who does \_\_\_\_.

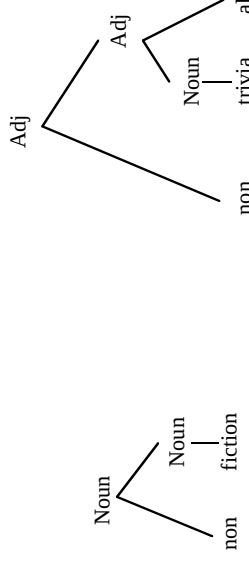
enjoy joy: ☺!! en-: to have N, to cause to be in/on N (cf. enthroned, ensnare, entrap ...)

note that this same convention as headedness or percolation in syntax:

the head of the VP is the V — the head determines the features of the constituent it heads

(24) Consider now the following words:

- a. non-invasive non-trivial non-essential
- b. non-smoker non-fiction non-proliferation



- Remember, we can read the lexical entry off the word structure tree. What is the lexical entry for non-?

(25) *non-*:

|                              |                   |
|------------------------------|-------------------|
| phonological shape:          | /nan/             |
| meaning:                     | not X             |
| selection                    | [__ N ]           |
| syntactic category of result | Noun<br>Adjective |

We seem to be missing a generalization:

**OBSERVATION:** Like constituent negation in syntax, *Non-* adds meaning, but does not change category.  
**INTUITION:** Unlike the affixes above, *non-* allows the node dominating it to inherit the feature/category of the lower node (in apparent violation of the NLC)

*Non-* is a **modifier**. It belongs to the class of element that preserve the category (type) of the constituent to which they attach.

(This is like **adjunction** in syntax, including adverbial modification)

**IMPLEMENTATION:**

*non* is ‘unmarked’ [we write “Ø”] for “syntactic category”

Ø is not a category or feature. It is a sign we use to indicate the absence of a feature

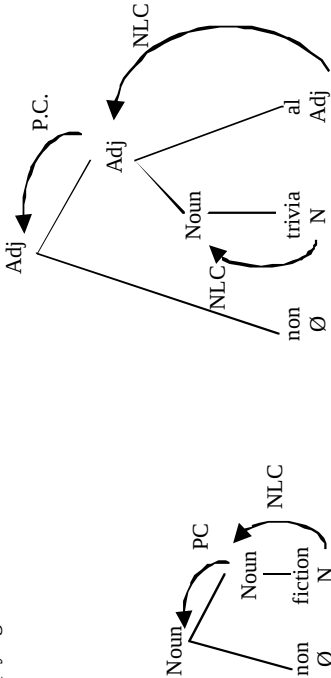
(26) *non*:

|                     |                         |
|---------------------|-------------------------|
| phonological shape: | / nan /                 |
| meaning:            | not X                   |
| selection           | [ { N }<br>{ Adj } __ ] |
| category            | Ø                       |

(27) **BACKUP PERCOLATION CONVENTION (BPC)**, or just **PC** for short

If the *lexical category* immediately dominated by a node has no features, (i.e. – if the NLC does not apply) then the node may acquire the features of a lower node.

(28) Applying the Conventions:



### 2.3 Lexical Entries Revisited: Syntactic Category of Result

Consider some lexical entries:

| “label”                        | -ful                                          | -able           | en-                            | joy    |
|--------------------------------|-----------------------------------------------|-----------------|--------------------------------|--------|
| phon. / allom.                 | [fʊl]                                         | [əbəl]          | [en]                           | [dʒɔɪ] |
| meaning                        | The degree to which s.th. is X <sub>ADJ</sub> | able to be X-ed | ~Cause s.th. to have/be (in) X | ☺      |
| selection                      | [ Adj __ ]                                    | [ Verb __ ]     | [ __ N ]                       | [ __ ] |
| syntactic category (of result) | Adjective                                     | Adjective       | Verb                           | Noun   |

We haven’t talked much about the bottom part of the lexical entries. We see now, though, why we have called the last row “syntactic category of result” for affixes. It is a property of the suffix *-ness* that the result of attaching this suffix to an adjective will be a noun. For roots, though, the term “of result” is somewhat awkward. Really, we mean syntactic category of the morpheme itself. Can we unite roots and affixes?

**Hypothesis:** Affixes have the same kinds of lexical entries *including category features* as roots do.

It is sufficient to speak of “syntactic category” for both roots and affixes. The NLC will take care of the rest. What happens when we delete the word *makes* from (23) ?

## 2.4 Gender and the Feature conventions

Singular nouns (including place names) in Russian come in three genders: masculine, feminine and neuter. Consider the following data:

c = /ts/; transcription broadly phonemic  
stress-related vowel alternations NOT indicated  
palatalization not consistently indicated

- (29) a.      leningrad      'Leningrad' [Masc]  
              vjetnam      'Vietnam' [Masc]  
              amerika      'America' [Fem]  
              italija      'Italy' [Fem]  
              marokko      'Morocco' [Neut]  
              meksiko      'Mexico' [Neut]
- b.      leningrad'ec      'Leningrader' [Masc]      leningradka      'Leningrader' [Fem]  
              vjetnam'ec      'Vietnamese' [Masc]      vjetnamka      'Vietnamese' [Fem]  
              amerikan'ec      'American' [Masc]      amerikanka      'American' [Fem]  
              italian'ec      'Italian' [Masc]      italijanka      'Italian' [Fem]  
              meksikan'ec      'Mexican' [Masc]      meksikanka      'Mexican' [Fem]  
              marokkan'ec      'Moroccan' [Masc]      marokkanka      'Moroccan' [Fem]

(30) Lexical Entries:

| "label"             | -(n)'ec         | -(n)ka         |
|---------------------|-----------------|----------------|
| phon. /             | [n'ec] / V ____ | [nka] / V ____ |
| allom.              | [ʲec] / C ____  | [ka] / C ____  |
| meaning             | someone from N  | s.o. from N    |
| selection           | [N ____]        | [N ____]       |
| category            | Noun [Masc]     | Noun [Fem]     |
| <b>&amp; gender</b> |                 |                |

- There are two ways of writing lexical entries. The columns on the right are abbreviations for the corresponding tables. They express the same information, but use less space. Either way of writing lexical entries is henceforth acceptable.

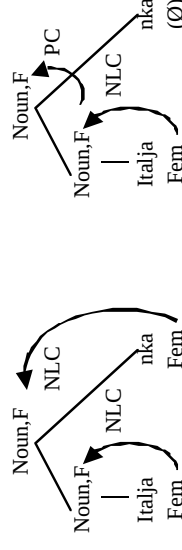
(31) Aside: Stem Change (we'll learn more about this later):

/o/ -> /a/ in the stem, before these suffixes  
cf. English: Mexico -> Mexican; Morocco -> Moroccan  
Allomorphy:      -nec, -nka / V \_\_\_\_  
                      -ec, -ka / C \_\_\_\_

(32) Gender and the NLC



(33) For the word *italijanka* 'Italian person (Fem)' can we tell which tree is correct?



- It must be the tree on the left. Why?

- (34) a.      prepodavat'      'to instruct' (verb)  
              prepodavat'el'      'instructor' [Masc]  
              prepodavat'el'nica      'instructor' [Fem]  
              prepodavat'el'stvo      'pedagogy' [Neut]
- b.      učit'      'to teach' (verb)  
              učit'el'      'teacher' [Masc]  
              učit'el'nica      'teacher' [Fem]  
              učit'el'stvo      'the profession of teaching' [Neut]  
              učit'el'stvovat'      'to be a teacher'
- c.      rukovodit'      'to lead' (verb)  
              rukovodit'el'      'leader' [Masc]  
              rukovodit'el'nica      'leader' [Fem]  
              rukovodit'el'stvo      'leadership' [Neut] sense: "art/craft of leading"
- el'      / - el' /  
              "one who Xs"  
              suffix  
              attaches to verbs  
              N [Masc]
- nica      / - nica /  
              "female"  
              suffix  
              attaches to nouns  
              N [Fem]
- stvo      / - stvo /  
              "the profession or  
              art of being an X"  
              suffix  
              attaches to nouns  
              N [Neut]

|      |                                         |                                                                                 |                                                                                     |                                                                                                                               |
|------|-----------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| (35) | šofior<br>fermer<br>brat<br>deti<br>rab | 'driver' [M]<br>'farmer' [M]<br>'brother' [M]<br>'children' [PL]<br>'slave' [M] | šo'orstvo<br>fermerstvo<br>bratstvo<br>detstvo<br>rabstvo                           | 'the profession of driving' [M]<br>'farm management' [Neut]<br>'brotherhood' [Neut]<br>'childhood' [Neut]<br>'slavery' [Neut] |
|      | bogat-vj<br>znakom-ij                   | 'rich' <Adj><br>'familiar' <Adj>                                                | bogatstvo<br>znakomstvo                                                             | 'richness' [Noun, Neut]<br>'familiarity' [Noun, Neut]                                                                         |
|      | ubi-č'i<br>rkovod-ič'i                  | 'to kill' <Verb><br>'to lead' <Verb>                                            | ubijstvo<br>rukovodstvo                                                             | 'killing, murder' [Noun, Neut]<br>'leadership' [Noun, Neut]                                                                   |
|      |                                         |                                                                                 | / - stvo/<br>"abstract noun<br>corresponding to X"<br>[ {N,V,Adj} ___ ]<br>N [Neut] |                                                                                                                               |

Vagueness in Meaning:

## 2.5 More Terminology

There are two kinds of affixation:

### Head-Complement Structures

The affix is a head. It contributes its features to the whole constituent, via the NLC.

### Modification Structures

The affix is a modifier. It has no features to contribute, and the features of the stem percolate through (by the BPC).

Some hints:

Anything that "changes" a feature (category, gender) is a head-complement structure.

Anything that has variable selection of the form: [ X,Y,Z \_\_\_ ]. Result = X,Y,Z is a modification structure.

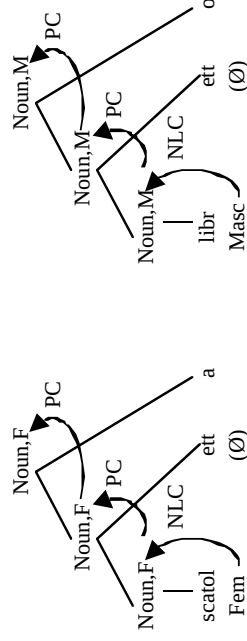
|      |                    |                                            |                                                                                                                                |                                                      |                        |
|------|--------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------------------|
| (36) | Italian            | (for Practise)                             | Italian adjectives and nouns end in a vowel which marks their number (singular vs. plural) and gender (masculine vs feminine). |                                                      |                        |
|      | bella<br>bello     | 'beautiful' (fem)<br>'good-looking' (masc) | bellissima<br>bellissimo                                                                                                       | 'very beautiful' (fem)<br>'very good-looking' (masc) |                        |
|      | stupida<br>stupido | 'stupid' (fem)<br>'stupid' (masc)          | stupidissima<br>stupidissimo                                                                                                   | 'very stupid' (fem)<br>'very stupid' (masc)          |                        |
|      | bell-<br>stupid-   | good-looking (beautiful)<br>stupid         | -a<br>-o<br>-issim-                                                                                                            | feminine;<br>masculine<br>very                       | attaches to adjectives |
|      | ORDER:             | root-gender<br>root-very-gender            | *bellaissim, *stupid-o-issim                                                                                                   |                                                      |                        |

(37) Italian nouns and diminutives:

|                                                      |                                                                                                    |                                                                        |                                                                                                                                              |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| scatola<br>camicia<br>libro<br>libri<br>vaso<br>vasi | 'box' (fem)<br>'shirt' (fem)<br>'book' (masc)<br>'books' (masc)<br>'vase' (masc)<br>'vases' (masc) | scatoletta<br>camicietta<br>libretto<br>libretti<br>vasetto<br>vasetti | 'little box' (fem)<br>'little shirt' (fem)<br>'little book' (masc)<br>'little books' (masc)<br>'little vase' (masc)<br>'little vases' (masc) |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|

|             |
|-------------|
| / - ett - / |
| diminutive  |
| [ N ___ ]   |
| [ Ø ]       |

(38) Ignore the exact nature of the final vowels here. The gender of the noun is inherent and every noun has a specific gender – the vowel merely shows what gender the noun has.



## 2.6 Taking Stock

### 2.6.1 Order Matters:

(39) hope-ful-ness, hope-ful-ly      vs.      \*hope-ness-ful, \*hope-ly-ful

In order to explain this, we need to be able to express formally the fact that affixes care about what they attach to. The suffix *-ful* attaches to nouns, and the suffix *-ness* attaches to adjectives.

A part of an affix's lexical entry is that affix's **SELECTIONAL RESTRICTIONS**.

- Linear order alone is insufficient:

(40) a. en-joy-ment      but \*joy-ment  
b. indecipherable      but \*in-decipher  
c. \*en-joy-ful      but OK: en-joy / joy-ful

To account for these, any theory needs **TWO** components:

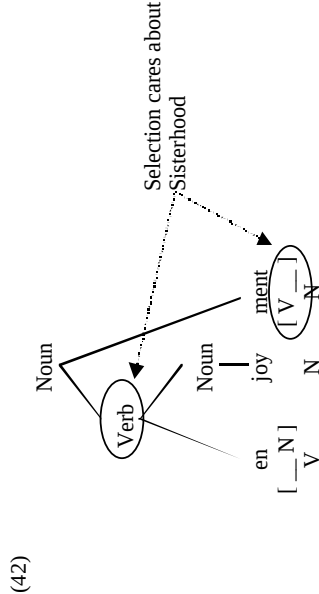
### I. Hierarchical Structures (representations of the order of affixation)

- Having hierarchical structure predicts, in principle, the possibility of structural ambiguity in morphology, just like in syntax. This prediction appears to be correct, if subtle.

(41) a. un-button-able      [caveat: this might be lexical ambiguity, un- 1/2]  
b. non-permeability:      • the degree to which s.th. is non-permeable  
                                         • lacking in permeability  
non-professional:      • the non-professionality of the Olympics.  
                                         • the non-professionality of the athlete.

### II. A sisterhood condition:

Attachment properties must be satisfied at the sister node, in other words: an affix cannot look down into the word it is attaching to.



Note: crucial example is \*enjoyful

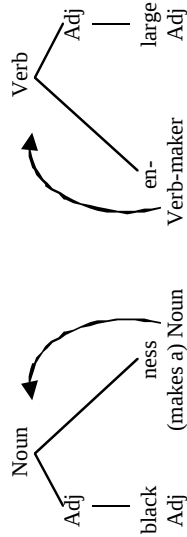
### 2.6.2 Node Labels

- Node Labels must come from somewhere. Since we don't store little trees in our heads, the node labels must be **predictable** from the information in the lexical entries.
- Observation: the affix generally determines the properties of the word / node immediately above it:

(43) [ V \_\_ ]<sub>A</sub>      [read]<sub>V</sub>      [readable]<sub>ADJ</sub>  
                                 [break]<sub>V</sub>      [breakable]<sub>ADJ</sub>  
                                 [solve]<sub>V</sub>      [solvable]<sub>ADJ</sub>  
                                 [care]<sub>N</sub>      [careless]<sub>ADJ</sub>  
                                 [hope]<sub>N</sub>      [hopeless]<sub>ADJ</sub>  
                                 [quick]<sub>ADV</sub>      [quickly]<sub>ADV</sub>  
                                 [hopeless]<sub>ADJ</sub>      [hopelessly]<sub>ADV</sub>

(44) [ N \_\_ ]<sub>V</sub>      [en-joy]<sub>V</sub>  
                                 [rage]<sub>N</sub>      [en-rage]<sub>V</sub>  
                                 [large]<sub>ADJ</sub>      [en-large]<sub>V</sub>

(45) Affixes and Category



- Formalization: the *Node Labelling Convention* (22)

2.6.3 *Modifiers: Morphemes without feature specifications*

- The NLC formalizes the observation that the affix determines the properties of the word. Sometimes, though, the affix fails to do this:

- (46)
- |    |              |             |                   |
|----|--------------|-------------|-------------------|
| a. | non-invasive | non-trivial | non-essential     |
| b. | non-smoker   | non-fiction | non-proliferation |

*non-* does not change the category of the item to which it attaches

Contrast: *en-* which makes verbs from nouns (and sometimes adjectives)

en + N = V    enjoy, encourage, enamour ...

enthrone, ensnare, entrap, enrol, encamp, enchain ...

en + Adj = V    enlarge, enable, ensure [not productive]

(47) Italian nouns and diminutives:

|          |               |              |                      |
|----------|---------------|--------------|----------------------|
| scatol-a | 'box' (fem)   | scatol-ett-a | 'little box' (fem)   |
| camici-a | 'shirt' (fem) | camici-ett-a | 'little shirt' (fem) |
| libr-o   | 'book' (masc) | libr-ett-o   | 'little book' (masc) |
| vas-o    | 'vase' (masc) | vas-ett-o    | 'little vase' (masc) |

$$\left[ \begin{array}{c} / - \text{ett} - / \\ \text{diminutive} \\ [ N \text{ --- } ] \\ [ \emptyset ] \end{array} \right]$$

Remember: at this stage, we are using the final vowel only as an indicator of the gender of the word, we will take this up again later.

- When an affix has not category features of its own then the properties of the next node down *percolate* through.

⇒ The (backup) Percolation Convention (27)