

# Inheritance in Construction Morphology

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# Outline of the talk

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# Construction Morphology

- Hierarchical lexicon with both abstract schemas and complex words that instantiate these schemas (avoidance of the rule/list fallacy)
- Morphological patterns are accounted for by constructional schemas at the word level that specify the relation between form and meaning
- Tripartite parallel architecture

# Deverbal –able adjectives

$[[x]_{Vi} \text{ able}]_{Aj} \leftrightarrow [\text{can undergo action SEM}_i]_j$

Schema dominates: *do-able, drink-able, enjoy-able, etc.*

## 2. Impoverished entry theory

Words with shared properties are dominated by nodes in a hierarchical lexicon on which these common properties are specified, and these properties are then inherited from the dominating schema. Specification of these properties can therefore be omitted from the individual lexical entries (Flickinger 1987, Riehemann 1998)

# Entry for do-able

$[V_i\text{-able}]_{A_j} \leftrightarrow [\text{can undergo the action SEM}_i]_j$

. (= do-able)

$[\text{do}]_V \leftrightarrow [\text{ACT}]$

# Lexicon

Specifies the lexicon conventions of a language.  
Regular outputs of word formation processes  
need to be stored

saddle > to saddle, mustard > \*to mustard

This hotel sleeps / \*eats 100 guests

### 3. Arguments for full entry theory

- rules / schemas are acquired on the basis of sufficient exposure and storage of sets of similar complex words;
- positive correlation between size of individual lexicon and degree of knowledge of morphological processes;
- “once a generalization has been made on the basis of stored instances, those instances may be redundant but there is no mechanism for deleting them from memory” (Hudson 2007: 22)



# Graceful integration

A linguistic model must allow for “graceful integration” (Jackendoff 2011), that is, it must be in harmony with the findings of other linguistic subdisciplines such as psycholinguistics, language acquisition theory, and historical linguistics, and with those of cognitive science in general.

(similarly : Hudson 2007)



# Construction Morphology

- no minimal redundancy
- schemas have 2 functions:
  - (i) motivation of the existence of stored complex words;
  - (ii) prediction of how new complex words can be formed.

# Reduction of informational cost

“What seems to be lost in the full entry theory, though, is any notion that semiregularities “save” anything: *shelve* takes no fewer bits to list than an underived word of similar complexity. In order to make sense of the full entry theory, then, we need to develop an alternative notion of what constitutes “informational cost” in the lexicon”.

(Jackendoff 1997: 129)

# Indeterminacy argument

“[...] certain properties of the investigated pattern will have the character of statistical rather than strictly mandatory features. However, adopting the criterion of (non-)predictability forces the analyst to be fully explicit about precisely which features are required for inclusion and exactly where (i.e. on which level of schematicity) they are encoded, which [...] may be quite difficult to determine” (Zeschel 2009: 187-88).

## 4. Default inheritance

A complex word inherits its properties from a dominating node (morphological schema) unless specified otherwise.

“Default inheritance [...] is useful in the statement of subregularities and idiosyncratic exceptions, without sacrificing morphological generalizations” (Deo 2007).

# Default inheritance (in impoverished entry theory)

“If X and Y are nodes, X may inherit from Y if a fact identifying Y as an inheritance source is included at X. All attribute: value pairs at Y become available at X, except those having an attribute which is already present in an attribute: value pair at X.” (Corbett & Fraser 1993)

# Presuppositions

All information about the properties of a word is given in the form of attribute: value (also called feature: value) pairs.

If a property can be overridden by a contrary specification on the level of the individual word, this property (feature-value combination) is marked as defeasible by means of a slash (/) (Sag et al. 2003).

Properties may be absolute, hence indefeasible .

# Default unification, example

- Dutch compounds are right-headed, hence gender of NN compounds is determined by the gender of the N on the right;
- exception: spleet-oog 'split-eye, person with Chinese appearance' (non-neuter) < oog 'eye' (neuter)
- non-default feature value [-neuter] will override the inherited feature value [+neuter] which follows from the general word formation schema for Dutch nominal compounds.



# Problem for default inheritance

- “Information in non-monotonic hierarchies can be overwritten arbitrarily often, so there is an unlimited number of possibilities for representing data in such hierarchies”
- “If we define a penguin as a bird that does not fly, what is to prevent us from asserting that a block of wood is a bird that does not fly, does not have feathers, and does not lay eggs?”  
(Luger and Stubblefield 1993 quoted in Dickson 2007: 25)

# Argument from language acquisition

“if all information were defeasible it would be unclear how the schemata would be formed”  
(Riehemann 1998: 72).

# Absolute versus defeasible properties

“The most important decision in constructing a non-monotonic hierarchy is about what information should be regarded as regular.”  
(Kilbury et al. 2006)

# Example: Dutch [x-baar] adjectives

Subtypes of base words:

- a. V-transitive      eet-baar 'edible', drink-baar 'drinkable'
- b. V-ergative      vloeï-baar 'liquid', brand-baar 'inflammable'
- c. V-intransitive      leef-baar 'livable', werk-baar 'workable'
- d. N      vrucht-baar 'fruit-bearing, fruitful'
- e. ?      dier-baar 'dear'

# Defeasible vs absolute properties

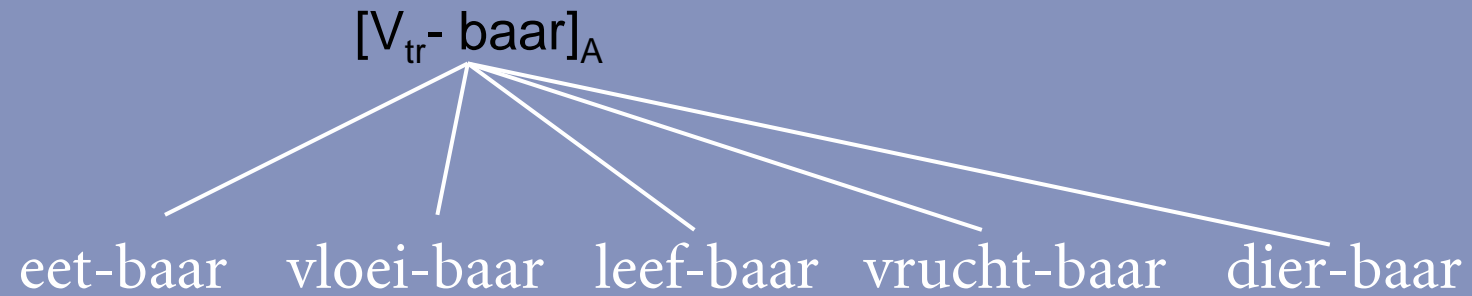
- defeasible: category of the base
- absolute: phonological specification of affix, output category (A)

Choice of absolute properties depends on the limits of motivation

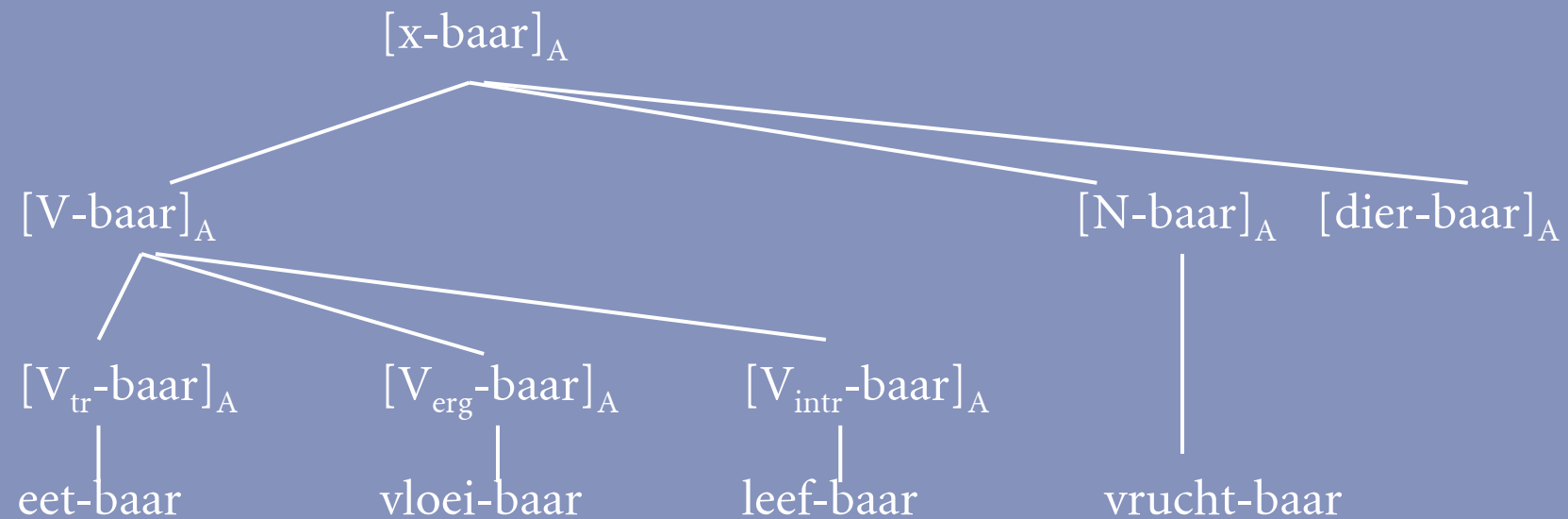
draag-baar 'portable' / drag-elijk 'bearable'



# Hierarchy with default override



# Hierarchy without default override (monotonic)



# Disadvantage of monotonic hierarchy

What this hierarchy does not express is that only one of the patterns is productive, namely the leftmost subschema on the bottom line.

Hence, in this approach we have to assign labels such as 'productive' or 'regular' to specific subschemas if we want to express this difference.





# Problem for impoverished entry theory

- Can idiosyncratic meaning properties of derived words always be specified in terms of attribute-value combinations?

on-drinkbaar 'lit. un-drinkable, not pleasant to drink'

betaal-baar 'lit. payable, affordable'

## 5. Inheritance as motivation

The relation between a schema and its dependents, the individual lexical items, is one of motivation.

Motivation means that there is a non-arbitrary relationship between the form and meaning of a linguistic construct.

Newly derived complex words do inherit their predictable properties through the unification of word formation schemas and base words, but these predictable properties are not omitted in their lexical representations.

# Constraints on default override

Absolute properties:  
output category, phonological form

Defeasible properties:  
input category, meaning



# Variation in input category

Dutch diminutives

*category* *base*

N vrouw 'woman'

*diminutive*

vrouw-tje

'little woman, sweetheart'

A lief 'sweet'

lief-je 'sweetheart'

V dut 'to nap'

dut-je 'nap'

Num tien 'ten'

tien-tje '10 guilder note'

Adv uit 'out'

uit-je 'outing'

NP twaalf uur '12 o'clock'

twaalfuur-tje 'packed lunch'

PP onder ons 'between us'

onderons-je 'private chat'

Pron dit en dat 'this and that'

dit-je-s en dat-je-s 'odds and ends'

# Diminutive schema

$$\langle [[x]_{N_i} (t)j e]_{N_j} \leftrightarrow [SMALL SEM_i]_j \rangle$$

# Dutch [X-achtig]<sub>A</sub>

*base stem*

N rots 'rock'

V weiger 'to refuse'

A groen 'green'

*derived adjective*

rots-achtig 'rocky'

weiger-achtig

'refusing persistently'

groen-achtig  
'greenish'

# Schema and subschemas

Subschemas express systematic, productive subpatterns



# Subpatterns for [N-achtig]<sub>A</sub>

soldaat-achtig 'soldier-like'

rots-achtig 'rock-y'

pasta-achtig 'liking pasta'



$[X_i \text{ achtig}]_{A_j} \leftrightarrow [\text{Property R SEM}_i]_j$

$\langle [[ ]_{N_i} \text{ achtig}]_{A_j} \leftrightarrow [\text{Property R SEM}_i]_j \rangle$

soldaat-achtig ‘soldier-like’

$\langle [[ ]_{A_i} \text{ achtig}]_{A_j} \leftrightarrow [\text{somewhat SEM}_i]_j \rangle$

groen-achtig ‘green-ish’

$\langle [[ ]_{V_i} \text{ achtig}]_{A_j} \leftrightarrow [\text{inclined to SEM}_i]_j \rangle$

weiger-achtig ‘refuse-inclined’



# Degrees of motivation

Relationship between base word and derived word exhibits various degrees of transparency

boer<sub>N</sub> 'farmer' / boer<sub>V</sub> 'to belch'  
wonder 'miracle' wonder-lijk 'strange'

“morphological structure is indeed inherently graded” (Hay & Baayen 2005: 346).



## 6. Types of motivation

- relation to schema
- relation to base word
- relation to other meaning of the same word  
(systematic polysemy)



# Rules of polysemy

- a. Harvard is an excellent university
- b. The university burned down last night
- c. The university will be on vacation next week

$\langle N_i \leftrightarrow \text{INSTITUTION}_i \rangle \approx \langle N_i \leftrightarrow$   
 $\text{BUILDING OF SEM}_i \rangle$

$\langle N_i \leftrightarrow \text{INSTITUTION}_i \rangle \approx \langle N \leftrightarrow \text{PEOPLE}$   
 $\text{RELATED TO SEM}_i \rangle$

# Semantic extension for complex words

Agent > Instrument

sender

wiper

heater

subschemas for English –er-nouns motivate the meaning(s) of individual deverbal –er-nouns

# 7. Affixoids and polysemy

- hoofd-bezwaar ‘main objection’
- hoofd-gedachte ‘main idea’
- hoofd-ingang ‘main entrance’

hoofd:

1. upper part of the body (as in *hoofd-pijn* ‘head-ache’)
2. entity at the top of a hierarchy (as in *het hoofd van de afdeling* ‘the head of the department’ and *hoofdkantoor* ‘head office’)
3. (as first part of a compound): main, most important, as in *hoofd-bezwaar* ‘main objection’)

# Affixoid *hoofd-*

$\langle [[\text{hoofd}]_{N_i} N_j]_{N_k} \leftrightarrow [\text{MAIN}_i \text{SEM}_j]_k \rangle$

## 8. Allomorphy

aanva[η] ‘begin’

toega[η] ‘access’

afha[η] ‘depend’

aanva[ηk]-elijk ‘initially’

toega[ηk]-elijk ‘accessible’

afha[ηk]-elijk ‘dependent’

Allomorphy rules makes relation between two words more transparent, hence increases motivation

$$[x \eta]_N \approx [[x \eta k]_N\text{-elijk}]_A$$



# Palatalization in Italian

ami[k]-o 'friend'

ami[tʃ]-i 'friends'

ami[tʃ]-izia 'friendship'

mendi[k]-o 'mendicant'

mendi[k]-i 'mendicants'

mendi[tʃ]-izia 'mendicity'

# Umlaut in German

Vater 'father' – Väter-chen 'father, diminutive'

Onkel 'uncle' – Onkel-chen 'uncle, diminutive'

# Morphological relatedness

‘the effect of Family Size is not mediated by the exact form of the base word, but by a more abstract central morphological representation’

Allomorphy does not impede the establishment of relations between words .

Finding a relation of motivation between a complex word and its base word(s) is always a matter of shared semantics, and if the relevant words share semantic properties, phonological variation is less of a problem. That is, the relationship between a complex word and its base word(s) is not necessarily obscured by phonological differences

# Conclusions

Basic question in CM:

when will the absence of properties in a complex word that are predicted by a word formation schema lead to complete blocking of the motivation relation between the complex word and the schema in question?

# When can predicted properties be overridden?

- the properties predicted by the relevant schema can be overridden by an individual complex word unless the property has to be considered absolute.
- if there is a systematic and extendable subpattern with an unpredicted, new meaning at stake (as in the case of compounds with the noun *hoofd-*), we can make use of subschemas which state the relevant generalizations, and which override properties specified at a higher level in the hierarchical lexicon.

# Absolute properties

- The only candidates for absolute, non-defeasible properties in word formation schemas are the output category of complex words and the phonological shape of their constituent morphemes.
- However, phonological shape can vary within the boundaries of allomorphy .

# Non-monotony problem

- Problem of non-monotony is avoided by full specification of individual items (compare Hudson's 2007 bottom up approach of inheritance).

# Full entry approach

- A lexicon with full entries avoids the problem of how to formalize default override, in particular in the domain of semantic properties which cannot obviously be specified in terms of feature: value combinations. Instead, complex words are supposed to differ in their degree of motivation. The degree of motivation is inversely proportional to the number of properties overridden at lower levels, with the exception that schemas for polysemy and constructional idioms serve to introduce motivation on lower levels, and hence increase the degree of motivation.



# Degrees of motivation

Being a motivated (non-arbitrary) linguistic sign is a gradient property of complex words which correlates with the degree to which the formal and semantic properties of the relevant word formation schema and of the base word(s) have been preserved.

