Morphological patterns: concatenative vs. non-concatenative morphology

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Morphology
2016
30.05.2016

Announcement: schedule change

Wednesday 1st June 10-12:

- No exercise
- Lecture: Inflection and Derivation **in L155**

Outline

Slides adapted from Weller and Haselbach (IMS Stuttgart)

Originally based on: Haspelmath, M. & Sims, A. D. (2010): *Understanding Morphology* [2nd ed.], chapter 3 'Rules', London: Hodder Education.

Outline

Introduction

Morphological patterns

- Morphological structure can be more various than simply combining affixes with bases
- German plural formation: add an umlaut to the vowel (the stem vowel changes, no morpheme is added)

singular	plural	
Mutter	*Mütter*	'mother(s)'
Vater	*Väter*	'father(s)'
Tochter	*Töchter*	'daughter(s)'
Garten	*Gärten*	'garden(s)'
Nagel	*Nägel*	'nail(s)'

- **Morphological pattern**: Cover term for processes in which morphological meaning can be associated with a segmentable part of the word and examples where this is not possible
- In this sense, a morpheme is a subtype of morphological pattern

Outline

Affixation and compounding: Concatenative morphology

Introduction

- Basic types of morphological patterns:
  - **concatenative morphology**: two morphemes are ordered one after another i.e. affixation and compounding (segmentation)
  - **non-concatenative morphology**: everything else
- An affixation rule also states which *types* of morphemes may combine: this is the **combinatory potential** of the affix

Affixation and compounding: Concatenative morphology

Combinatory potential

- An affixation rule also states which *types* of morphemes may combine: this is the **combinatory potential** of the affix
- We can't just combine any base and any affix. The **word-class** of the base in an important factor:
  - combinatory potential of *un-* [_Adjective]
  - combinatory potential of *-able* [Verb_]
  - combinatory potential of comparative *-er* [Adjective_]
  - combinatory potential of *-ful* [Noun_]
- Adjective examples: *un-intelligent*, **intelligent-able*, **intelligent-ful*, however **intelligent-er* (*more intelligent*)
- **Test**: check the combinatory potential of some other words

Outline

Base modifications: Non-concatenative morphology

Introduction

- **Old definition of base**: The base is the part of a word that an affix is attached to
- **New definition**: The base of a morphologically complex word is the element to which a morphological operation applies
- **Base modification** (aka. stem modification/alternation): The shape of the base is changed without adding segmentable material

Base modifications: Non-concatenative morphology

Fronting and palatalization

- **Fronting** of the stem vowel, so that it is produced near the front of the mouth e.g. German plural formation with umlaut (cf. slide 5)
- **Palatalization** of the last consonant,
  e.g. plural formation in Albanian:

armik [...k]	'enemy'	*armiq* [...c]	'enemies'
fik [...k]	'fig'	*fiq* [...c]	'figs'
frëng [...g]	'Frenchman'	*frëngj* [...ɟ]	'Frenchmen'
murg[...g]	'monk'	*murgj* [...ɟ]	'monks'
papagall [...ɬ]	'parrot'	*papagaj* [...j]	'parrots'
portokall [...ɬ]	'orange'	*portokaj* [...j]	'oranges'

Base modifications: Non-concatenative morphology

Weakening

- Morphological patterns may involve a changed manner of articulation
- **Weakening** of word-initial obstruent consonants,
  e.g. Scottish Gaelic indefinite nouns, genitive plural

nom sg indef	gen pl indef	
[b...] *bard*	[v...] *bhàrd*	'bard'
[kʲ...] *ceann*	[ç...] *cheann*	'head'
[g...] *guth*	[ɣ...] *ghuth*	'voice'
[tʰ...] *tuagh*	[h...] *thuagh*	'axe'
[b...] *balach*	[v...] *bhalach*	'boy'

Base modifications: Non-concatenative morphology

Gemination

- Morphological patterns may involve a changed manner of articulation
- **Gemination** (consonant lengthening/doubling),
  e.g. causitive verb formation in Standard Arabic

darasa	'learn'	*darrasa*	'teach'
waqafa	'stop (intransitive)'	*waqqafa*	'stop (transitive)'
damara	'perish'	*dammara*	'annihilate'

Base modifications: Non-concatenative morphology

Lengthening

- **Lengthening** of the final stem vowel,
  e.g. first person singular inflection of verbs in Huallaga Quechua:

aywa-nki	'you (SG) go'	*aywa:*	'I go'
aywa-pti-ki	'when you (SG) went'	*aywa-pti:*	'when I went'
aywa-shka-nki	'you (SG) have gone'	*aywa-shka:*	'I have gone'

(Long vowels are indicated by a colon)

Base modifications: Non-concatenative morphology

Shortening

- **Shortening** of the stem vowel,
  e.g. intransitive verb formation in Hindi/Urdu:

ma:r-	'kill'	*mar-*	'die'
kho:l-	'open (tr.)'	*khul-*	'open (intr.)'
phe:r-	'turn (tr.)'	*phir-*	'turn (intr.)'

Base modifications: Non-concatenative morphology

Tonal change

- **Tonal change** (stress shift),
  e.g. adjective formation in Chalcatongo Mixtec:

ká?ba	'filth'	*ká?bá*	'dirty'
žuù	'rock'	*žúú*	'solid, hard'
xa?à	'foot'	*xá?á*	'standing'

  (High tone indicated by ' tone diacritic)

- **Stress shift in English**: *díscount* (noun); *discóunt* (verb)
  - **Test**: have a go at saying the above words

Base modifications: Non-concatenative morphology

Voicing

- **Voicing** of the last consonant,
  e.g. a few verbs in English are derived from nouns by voicing:

house	[haʊs]	*to house*	[haʊz]
thief	[θiːf]	*to thieve*	[θiːv]
wreath	[riːθ]	*to wreathe*	[riːð]

  - **Test**: have a go at saying the above words

Base modifications: Non-concatenative morphology

Subtraction

- Interesting but less common morphological patterns arise from:
- **Subtraction** (deletion of one or more segments from the base), e.g. plural formation in Murle:

nyoon	'lamb'	*nyoo*	'lambs'
wawoc	'white heron'	*wawo*	'white herons'
onyiit	'rib'	*onyii*	'ribs'
rottin	'warrior'	*rotti*	'warriors'

Base modifications: Non-concatenative morphology

Metathesis

- **Metathesis** (switching of two of more segments within the base), e.g. actual vs. non-actual (i.e. hypothetical) events in Clallam

non-actual	actual	
qq'í-	*qíq'-*	'restrain'
pk^{w}'é-	*pék^{w}'-*	'smoke'
t'cé-	*t'éc-*	'shatter'
k^{w}'sé-	*k^{w}'és-*	'count'

Outline

Reduplication

Introduction

- **Reduplication**: A part of the base or the complete base is copied and attached to the base
- Position of reduplicant:
  - initial reduplication:
    [ŋaŋaj] 'a long time' → [ŋa-ŋaŋaj] 'a long time (in years)' (Agta)
  - final reduplication:
    [waʃte] 'good (SG)' → [waʃte-ʃte] 'good (PL)' (Dakota)
  - internal reduplication:
    alofa 'he/she loves (SG)' → *a-lo-lofa* 'they love (PL)' (Samoan)

Reduplication

Introduction

- Reduplication of the entire stem,
  e.g. weakening the meaning of an adjective in Malagasy

be	'big, numerous'	*be-be*	'fairly big, numerous'
fotsy	'white'	*fotsi-fotsy*	'whitish'
maimbo	'stinky'	*maimbo-maimbo*	'somewhat stinky'
hafa	'different'	*hafa-hafa*	'somewhat different'

Reduplication

Consonant-vowel and vowel-consonant sequences

- Alternatively only part of the base may be copied:
- Reduplication of a consonant-vowel sequence before the base, e.g. participle formation in Ponapean

duhp	'dive'	*du-duhp*	'be diving'
mihk	'suck'	*mi-mihk*	'be sucking'
wehk	'confess'	*we-wehk*	'be confessing'

- Reduplication of a vowel-consonant sequence after the base, e.g. participle formation in Mangap-Mbula

kuk	'bark'	*kuk-uk*	'be barking'
kel	'dig'	*kel-el*	'be digging'
kan	'eat'	*kan-an*	'be eating'

Reduplication

Examples

- Mixture between affix and reduplicant: **duplifix**
- Plurals in Somali: duplifix *-aC* (C is the last consonant of the base)

buug	'book'	*buug-ag*	'books'
fool	'face'	*fool-al*	'faces'
koob	'cup'	*koob-ab*	'cups'
jid	'street'	*jid-ad*	'streets'

Reduplication

Examples

- Mixture between affix and reduplicant: **duplifix**
- 'Sort of' adjectives in Tzutujil: duplifix *-Coj* (C is the first consonant of the base)

saq	'white'	*saq-soj*	'whitish'
rax	'green'	*rax-roj*	'greenish'
q'eq	'black'	*q'eq-q'oj*	'blackish'
tz'iil	'dirty'	*tz'il-tz'oj*	'dirtyish'

Outline

Conversion

Introduction

- **Conversion**: A morphological pattern in which the form of the base remains unaltered
- Examples from English verbs and nouns:

noun	verb
hammer	*hammer*
plant	*plant*
ship	*ship*
walk	*walk*
drink	*drink*

- Conversion is invoked only for derivational morphology, and primarily for relating two lexemes that differ only in lexical class (i.e. noun vs. verb)

Outline

Outside the realm of morphology

Abbreviations and blends

- Other operations that can be used to create new words:
- Abbreviations:
  - acronyms: *NATO* [ˈneɪtoʊ] (*North Atlantic Treaty Organization*)
  - alphabetisms: *CD* [siːˈdiː] (*Compact Disc*)
- Blends:

  smog (from *smoke* and *fog*),
  infotainment (from *information* and *entertainment*)
- **Test**: think of some German examples of abbreviations and blends

Outside the realm of morphology

Clippings

- Other operations that can be used to create new words:
- Clippings:
  - final clipping (apocope): *gas* (*gasoline*), DE *Auto* (*Automobil* 'car')
  - initial clipping (apheresis): *chute* (*parachute*), NO *bil* (*automobil* 'car')
  - medial clipping (syncope): *ma'am* (*madam*)
- **Test**: think of some German examples of clippings

→ None of these operations are **not** subject to morphology because the new words do not have different meanings to the longer words

Summary: Morphological Patterns

- **Concatenative morphology**: two morphemes are order one after another
  - **Affixation**: e.g. *cat-s*, *un-happy*, *wash-ed*
  - **Compounding**: e.g. FIRE + WOOD = FIREWOOD

- **Non-concatenative morphology**: everything else
  - **Base modifications**: the shape of the base is changed without adding segmentable material,
    e.g. **stress shift in English**: *díscount* (noun); *discóunt* (verb)
  - **Reduplication**: a part of the base or the complete base is copied and attached to the base, e.g. weakening the meaning of an adjective in Malagasy
    be ('big') ; *be-be* ('fairly big')
  - **Conversion**: a morphological pattern in which the form of the base remains unaltered,
    e.g. hammer (noun and verb)

Outline

Morphological rules

Systems

- **Goal**: create a system of **morphological rules** that mimics speakers' linguistic knowledge
  - System should accurately represent morphological generalisations
  - Rules should be elegant and cognitively realistic
- Note: **concatenative patterns** are more common in the world's languages than **non-concatenative patterns**
  - Because morphological structure is similiar to syntactic structure?
  - Or because of the way language changed through history?
- Two possible systems:
  - Morpheme-based model
  - Word-based model

Morphological rules

Morpheme-based model

- **Morpheme-based model**: morphological rules combine morphemes like syntactic rules combine words
- E.g. we can use syntactic **phrase structure rules** to create a sentence:

a.	sentence	=	noun phrase + verb phrase
b.	noun phrase	=	(i) determiner (+ adjective) + noun (ii) sentence
c.	verb phrase	=	verb (+ noun phrase)
d.	determiner	=	*the*, *a*, *some*, ...
e.	noun	=	*cat*, *rat*, *bat*, ...
f.	verb	=	*chased*, *thought*, *slept*, ...
g.	adjective	=	*big*, *grey*, ...

- Replace elements on the left of "=" by elements on the right

Morphological rules

Applying phrase structure rules

- Produce the sentence: *A big cat chased the bat*

sentence → noun phrase + verb phrase	(a)
noun phrase → determiner + adjective + noun	(b)
verb phrase → verb + noun phrase	(c)
noun phrase → determiner + noun	(b)
determiner + adjective + noun → *a big cat*	(d,g,e)
verb → *chased*	(f)
determiner + noun → *the bat*	(d,e)

sentence: *A big cat chased the bat*

- X → Y means "insert Y for X"

Morphological rules

Word-structure rules

- **Word-structure rules** are analogous to syntactic phrase structure rules
- Can be used to describe the structure of complex English words like: *cheeseboard*, *bags*, *unhappier*, *eventfullness*

a.	word-form	=	stem (+ inflectional suffix)
b.	stem	=	(i) (deriv. prefix +) root (+ deriv. suffix) (ii) stem + stem
c.	inflectional suffix	=	*-s*, *-er*, ...
d.	derivational prefix	=	*un-*, ...
e.	root	=	*bag*, *event*, *cheese*, *board*, *happy*, ...
f.	derivational suffix	=	*-ful*, *-ness*, ...

Morphological rules

Word-structure rules: test

- **Test**: produce the word *bags*

a.	word-form	=	stem (+ inflectional suffix)
b.	stem	=	(i) (deriv. prefix +) root (+ deriv. suffix) (ii) stem + stem
c.	inflectional suffix	=	*-s*, *-er*, ...
d.	derivational prefix	=	*un-*, ...
e.	root	=	*bag*, *event*, *cheese*, *board*, *happy*, ...
f.	derivational suffix	=	*-ful*, *-ness*, ...

Morphological rules

Word-structure rules: solution

- **Test**: produce the word *bags*

word-form $\rightarrow$ stem $+$ inflectional suffix	(a)
stem $\rightarrow$ root $\rightarrow$ *bag*	(b(i),e)
inflectional suffix $\rightarrow$ *-s*	(c)

word-form: *bag-s*

Morphological rules

Pros and cons of the morpheme-based model

Pro:

- **Concatenative patterns**: natural explanation of the fact that morpheme concatenation is the most common kind of morphological pattern in the worlds' languages

Con:

- **Non-concatenative patterns**: base modification (Mutter $\rightarrow$ Mütter) and conversion (hammer (N) $\rightarrow$ hammer (V))
  are difficult to accommodate

Morphological rules

Word-based model

- **Word-based model**: word-schemas represent features common to morphologically related words
- E.g. the similarities among the English words *bags*, *keys*, *gods*, *ribs*, *bones*, *gems* (etc.) can be expressed by the word schema:

Words: *bags*, *keys*, *gods*, *ribs*, *bones*, *gems*

Lexical entries for words:

/bægz/N 'bags'		/k^hij z/ 'keys'		/gɑdz/N 'gods'		/rɪbz/N 'ribs'

Word schema:

/Xz/N 'plurality of *xs*'

Morphological rules

Word-based model: word-schemas

- A word schema contains information on:
  - Pronunciation (phonological representation e.g. /z/)
  - Syntactic properties (e.g. N)
  - Meaning (e.g. 'plurality of...')
- Additionally a word-schema may contain: variables (/X/

/Xz/N 'plurality of *xs*'

- A word-schema stands for complete words, not individual morphemes (in the sense of the morpheme-based model)
  - It is a generalisation based on lexical entries (e.g. bags, keys, gems), which are themselves word-forms, not morphemes

Morphological rules

Pros and cons of the word-based model

Pro:

- **Non-concatenative patterns**: such as hammer(N) / hammer(V) can be described quite naturally
  (this is difficult for the morpheme-based model)

/X/N 'x (= an instrument)'	$\leftrightarrow$	/X/V '*use* x (= an instrument)'

- **Back-formations**: words like *babysit* which is historically derived from *babysitter* are possible (but not easy to explain in the morpheme-based model)

Con:

- The model is not **restrictive** (unlike the morpheme-based model)
  - It allows morphological rules of virtually any type – even those that do not exist in any language

Morphological rules

Summary: morpheme-based vs. word-based models

	Morpheme-based	**Word-based**
Concatenative patterns easy to capture?	Yes	No
Non-concatenative patterns easy to capture?	No	Yes
Back-formations are easy to describe?	No	Yes
Restrictive?	Yes	No

Questions?

Reminder: schedule change

Wednesday 1st June 10-12:

- No exercise
- Lecture: Inflection and Derivation **in L155**

Thank you for your attention