The semantics of morphology: A frame-based approach

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Affix polysemy

The situation

- Most English affixes are semantically divers, e.g.
  - -er: agents (*writer*), instruments (*opener*), inhabitants (*Londoner*) and many more
  - -ize: ornative (*patinize*), causative (*randomize*), resultative (*peasantize*) etc.

- Likewise, many meanings overlap, e.g.
  - Results: -ance (*acceptance*), -al (*arrival*), -ation (*inflation*), -ment (*assessment*), -ing (*understanding*), conversion (*surrender*)
  - Instruments: -ance (*conveyance*), -ation (*decoration*), -ment (*adornment*), -ing (*kindling*), conversion (*wrap*)

- However, not everything is possible!
Questions

- How to cope with the apparent flexibility of word-formation processes while taking restrictions into account?
- Which interpretations are principally possible in any given derivative, and why aren’t others?
- Is there a restricted set of semantic mechanisms at work?
- Which role does world knowledge play and how can it be integrated into a theory of derivational semantics?
Affix polysemy

State of the art

  - Highly restricted set of semantic features (*skeleton*)
  - Conceptual knowledge representations (*body*)

- Problems
  - Not clear how meaning extensions of affixes/derivatives come about
  - How to formalize them?
  - Not per se a semantic approach

- Goal
  - Tackle the issue of affix polysemy by means of *frames*
Frames

What are they?

- Barsalou’s (1992a, 1992b) cognitive frame theory
  - Describe referents by means of attributes (e.g. COLOR) and corresponding values (e.g. red)
- CRC hypothesis: In our brain, there is a uniform structure of representations
- In plain English:
  - Frames are recursive functional attribute-value structures
How to represent such a concept?

1. Frame graph of nodes and arrows
2. Matrix

But that doesn’t tell us a lot does it…
Frames

Labels help!

Attributes: general properties depicted by labeled arrows

Values: specifications of these attributes (concrete or underspecified)

Recursive: values can themselves be complex frames

Functional: (in the mathematical sense) attributes are unique to their source node

cp. Petersen 2007: 151
So far...

- The issue: affix polysemy
- The tool: frames

Now to bring these two together!
The idea

- morphological processes manipulate frame elements of their bases in some way
  1. Model the frame of the base
  2. Model the frame of the derivative
  3. See what changes
  4. Do this often to find patterns
Frames and affix polysemy

An example: -age

- According to Bauer, Lieber, Plag 2013:
  - Reasonably productive
  - Bases: predominantly nouns and verbs, infrequently adjectives
  - Native and non-native bases
- Highly polysemous
Frames and affix polysemy

An example: -age

- Action (pillage)
- Collective (foliage)
- Object (carriage)
- Tax (average*)
- Charge (towage)
- Payment (avenage**)

- Right (affuage***)
- State (achage)
- Location (backage****)
- Abstract (authorage)
- ...

* tax charged upon goods
** payment in oats made to a landlord
*** the right to cut firewood in a forest
**** back part of a building
OED definitions for *ferriage* and *towage*

- **ferriage**
  1. The action or business of ferrying a person or thing over a stream or other water; conveyance over a ferry.
  2. The fare or price paid for the use of a ferry.

- **towage**
  1. The charge or payment for towing a vessel
  2. The action or process of towing or being towed.
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Frames and affix polysemy

Partial graphs for the primary readings of *ferry* (v) and *tow* (v)

➢ The primary readings are assumed on the basis of corpus data

![Diagram of partial graphs for ferry and tow actions with nodes labeled as agent, patient, and instrument, with example instances such as person, boat, truck, and vehicle.]
Frames and affix polysemy

Generalized frame

- Action
- Agent
- Patient
- Instrument

person

patient

instrument
Frames and affix polysemy

The derivation process

[Diagram showing the derivation process with frames and affixes, labeled as follows:

- **AGENT**: person
- **PATIENT**: patient
- **INSTRUMENT**: instrument
- **action**

The diagram illustrates the addition of the affix `-age` to a frame, transforming the roles and labels accordingly.]
Frames and affix polysemy

How about the ‘charge’ reading?

+ -age

AGENT

PATIENT

INSTRUMENT

PERSON

PATIENT

INSTRUMENT

PERSON

PATIENT

INSTRUMENT

PERSON

PATIENT

INSTRUMENT
An outlook

Current methodology

- Focus on (possibly) deverbal nominalizations
  - Easy to model, argument structure as a starting point
- Corpus work
  - COCA (Corpus of Contemporary American English)
  - Hapax legomena
    - neologisms, ad hoc formations
- Model a large number of frames for comparison
- Find conclusive and enlightening patterns
  - semantic category of the base verb
  - semantic category of the derivative
Frames and affix polysemy

(possibly) deverbal nominalization hapaxes in –age (COCA)

- barrelage
- bloatage
- brickage
- bummage
- copiage
- cousinage
- crackage
- cuttage
- dilatage
- domage
- dumpage
- eatage
- ferriage
- fillage
- finnage
- grippage
- hidage
- juggage
- knightage
- labourage
- leggage
- machineage
- mottage
- peakage
- pissage
- porkage
- punnage
- readage
- recordage
- scourage
- screwage
- shippage
- sillage
- siphonage
- sleepage
- smileage
- snackage
- sortage
- stemmage
- strappage
- symbolage
- throbbage
- toppage
- towage
- tuneage
- tutorage
- womanage
- wrappage
Frames and affix polysemy

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That the Federal power was exclusive seems to have had little relation to monopolies of transportation, and no relation whatever to land transportation and **ferriage**. (ACAD, 2002)

Sometimes, when practical, 'cordelling,' or hauling the luggers by horse or man power is resorted to, and at times steam **towage** is employed, all of which, of course, is an element of further expense. (ACAD, 1996)
Frames and affix polysemy

Preliminary semantic considerations

- That the Federal power was exclusive seems to have had little relation to monopolies of transportation, and no relation whatever to land transportation and **ferriage**. (ACAD, 2002)
  - Verb: motion / vehicle motion / cause motion / instrument / ... ?
  - Derivative: abstract / collective of possible events / ... ?
- Sometimes, when practical, 'cordelling,' or hauling the luggers by horse or man power is resorted to, and at times steam **towage** is employed, all of which, of course, is an element of further expense. (ACAD, 1996)
  - Verb: motion / vehicle motion / cause motion / ...
  - Derivative: abstract / process / ...?
Benefits of the CRC 991 frame approach

- Applicable to different kinds of concept
- Different parts of speech
- Semantic decomposition as well as (diachronic) shifts
- Formally precise: not everything is possible
- Based on experimental cognitive research
- Many things are already possible and many more are still being worked on (dynamic frames, weighted values... )
“The theory is still in its early stages, but it is very promising, both as a perspective for the classical problems of semantics – [...] – and as a perspective for cognitive linguistics in general.”
THANK YOU!

THANK- event

ACTOR

me

EXPERIENCER

you