The semantics of morphology:

A frame-based approach

Lea Kawaletz, M.A.

Agenda

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.

    - e.g. Plag 1998, 1999, Lieber 2004, Bauer, Lieber, Plag 2013

- 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?
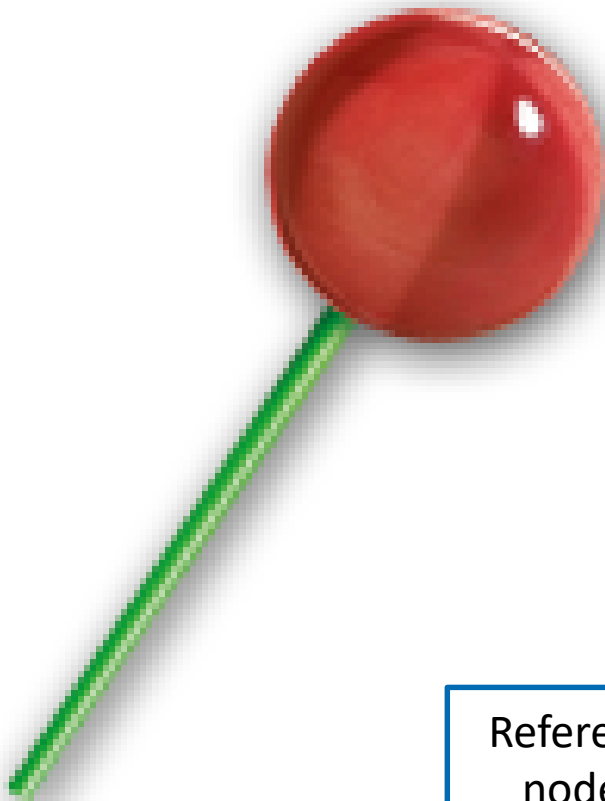
State of the art

- **Lieber's theory of word-formation semantics (2004)**
  - 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**
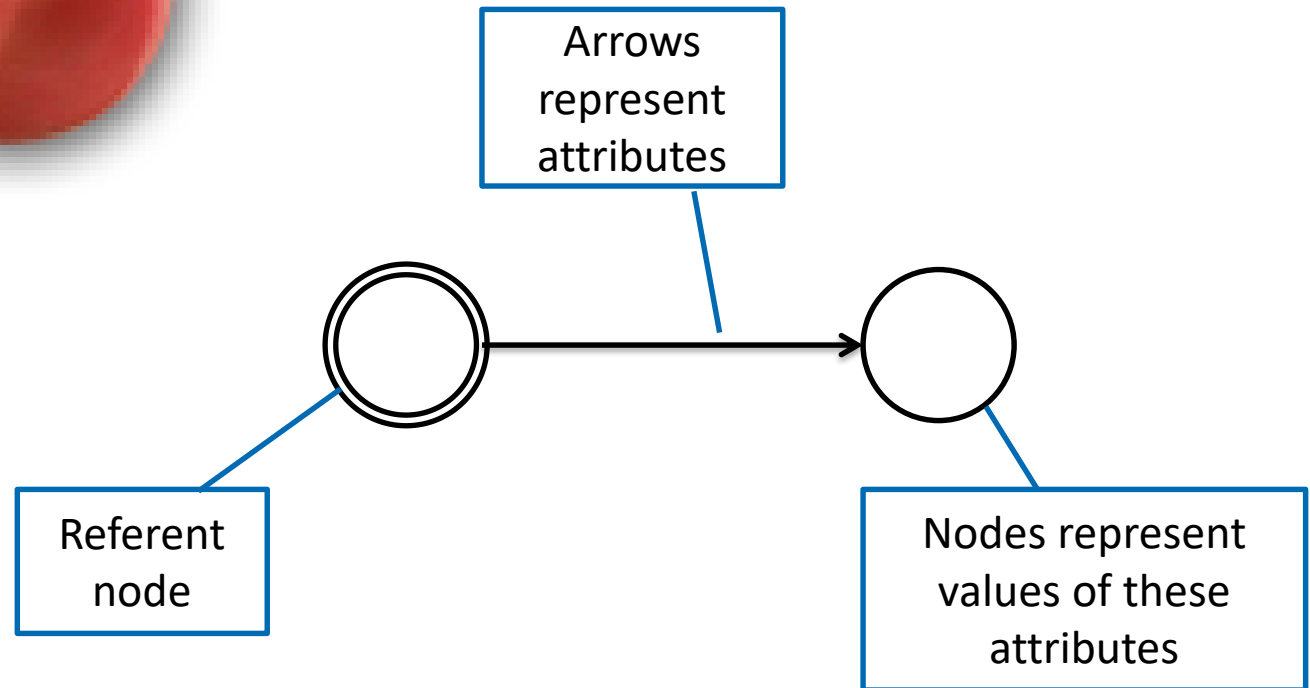 - Tackle the issue of affix polysemy by means of *frames*

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)

- Formal theory (CRC 991): Petersen (2007), Petersen (forthcoming), Kallmeyer and Osswald (in press)

- CRC hypothesis: In our brain, there is a uniform structure of representations

- In plain English:
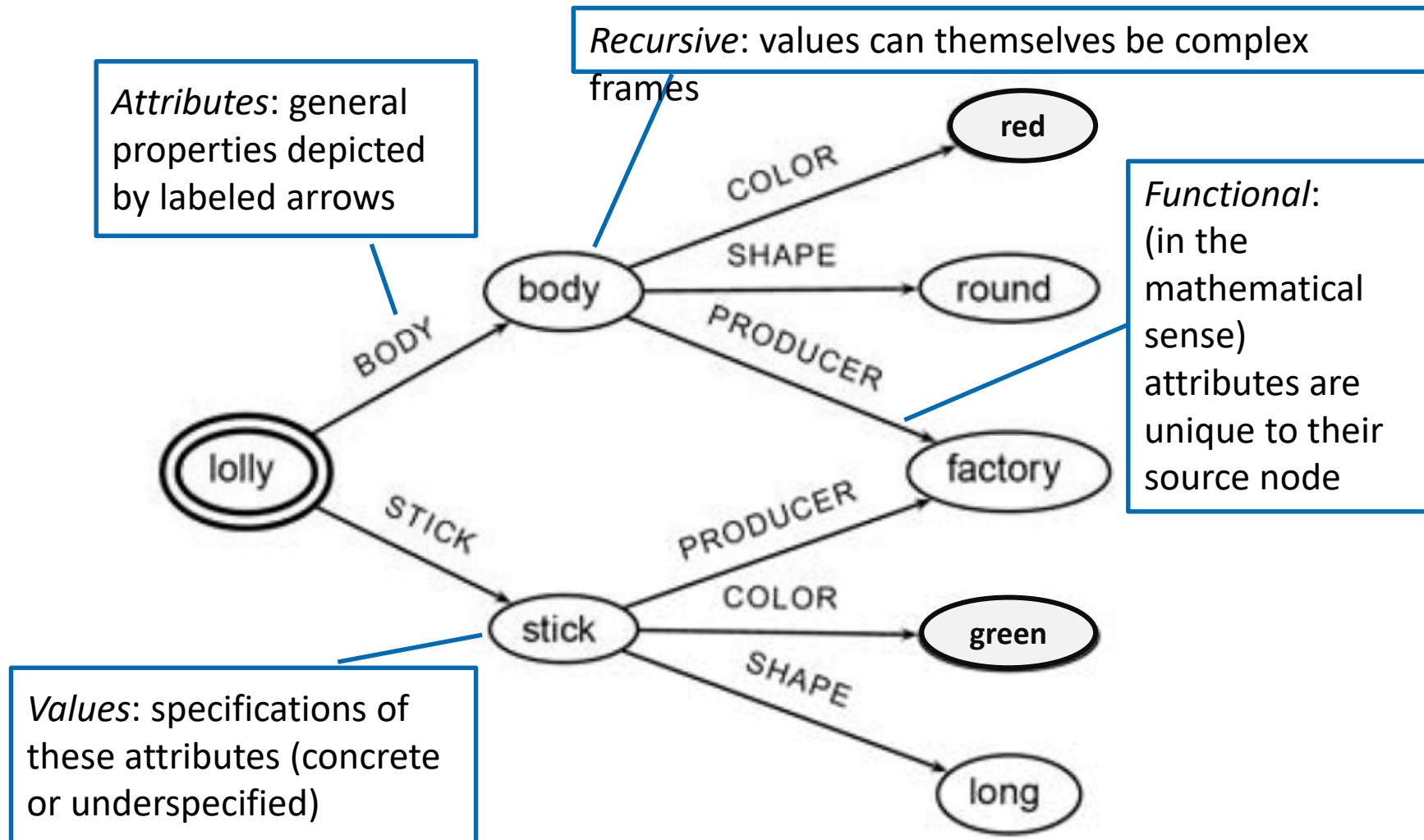 - Frames are recursive functional attribute-value structures

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How to represent such a concept?

1. Frame graph of nodes and arrows
2. Matrix

Arrows represent attributes

Referent node

Nodes represent values of these attributes

But that doesn't tell us a lot does it…

Labels help!

Attributes: general properties depicted by labeled arrows

Recursive: values can themselves be complex frames

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

Values: specifications of these attributes (concrete or underspecified)

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

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

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.
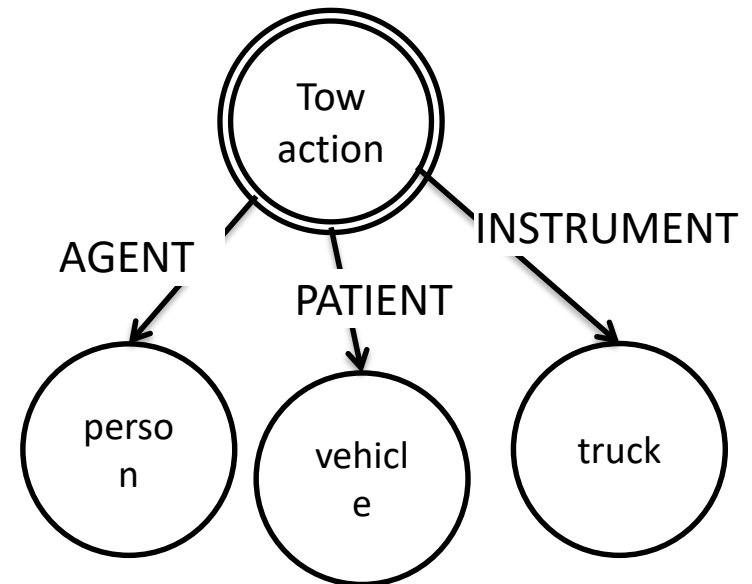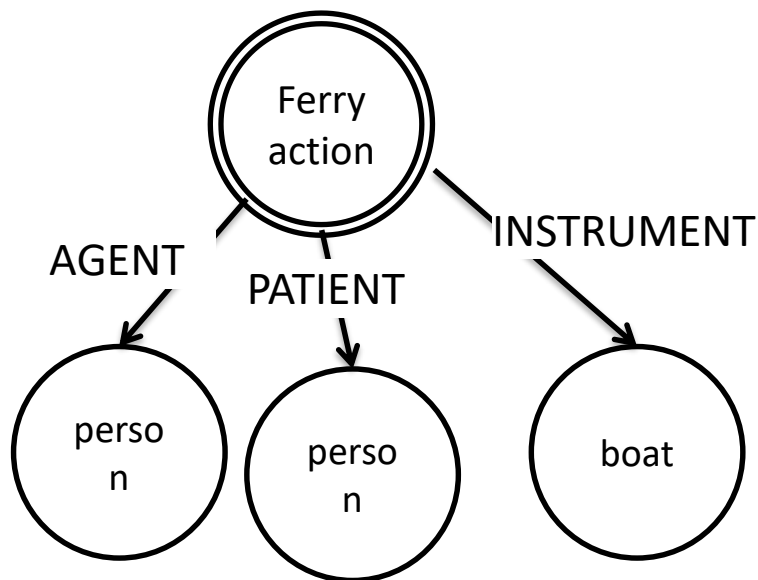
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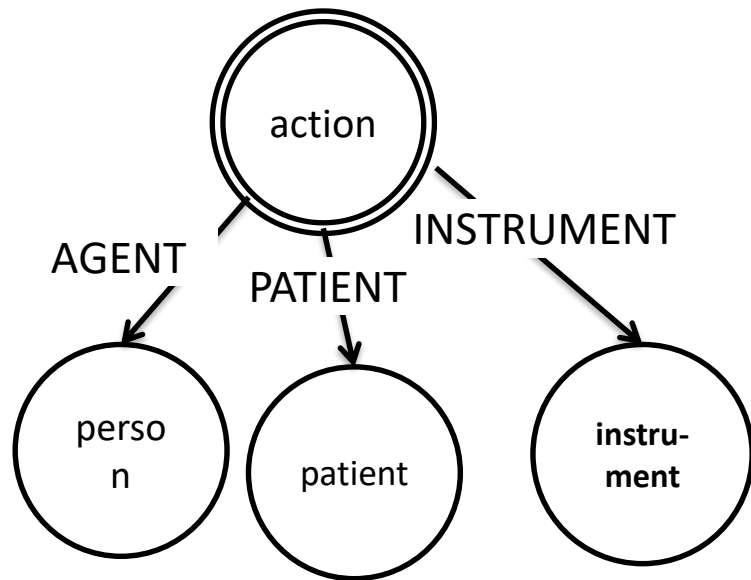 **2.** **The action** or process of towing or being towed.

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

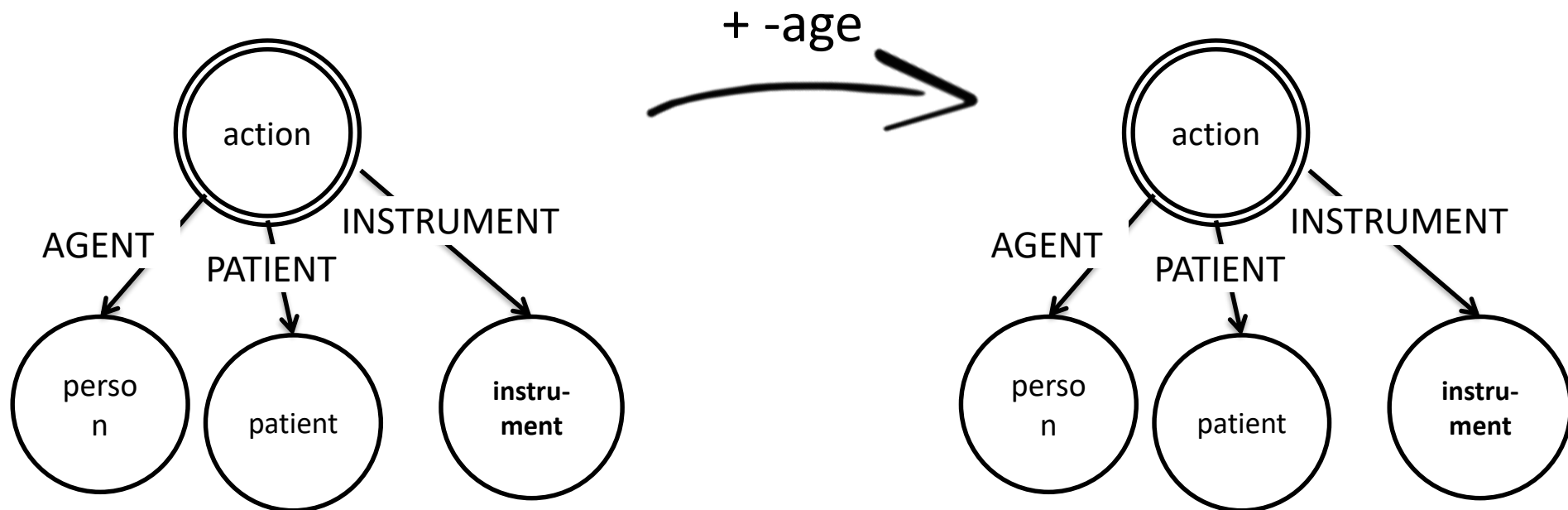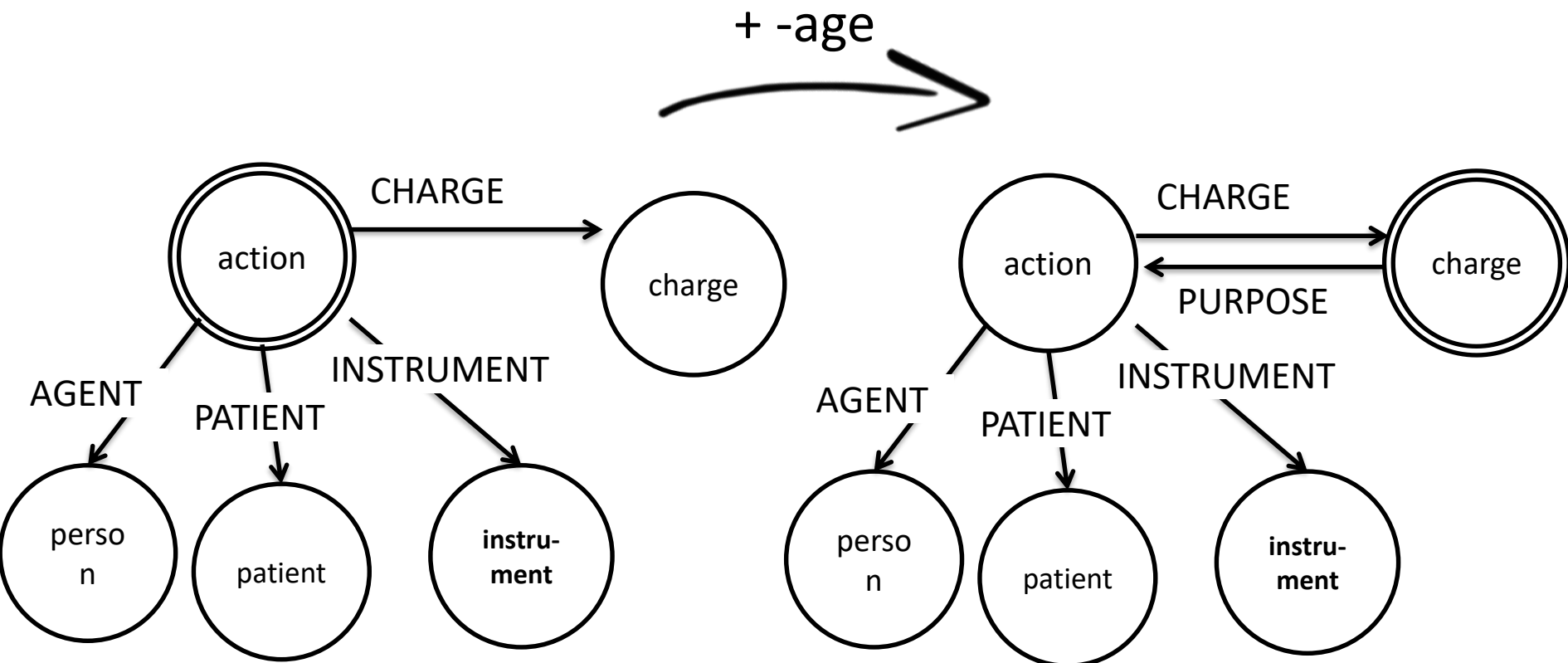➢ The primary readings are assumed on the basis of corpus data

Generalized frame

The derivation process

+ -age

How about the 'charge' reading?

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

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

- barrelage
- bloatage
- brickage
- bummage
- copiage
- cousinage
- crackage
- cuttage
- dilatage
- domage

- dumpage
- eatage
- ferriage
- fillage
- finnage
- grimage
- 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
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Frames and affix polysemy

Contexts for *ferriage* and *towage* in COCA

- 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)

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 / … ?

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  - Verb: motion / vehicle motion / cause motion / …

  - Derivative: abstract / process / …?

Benefits of the CRC 991 frame approach

- Applicable to different kinds of concept
  - ➤ Sortal/relational/individual/functional concepts (cp. Löbner 1985, 2011)
- 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."

me

ACTOR

THANK-
event

EXPERIENCER

you