Modeling the interaction of affix semantics and base semantics

A frame-based approach

Marios Andreou, Lea Kawaletz, Ingo Plag
Heinrich-Heine-Universität Düsseldorf

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The problem: Polysemy

1. RESULTS (the outcome of VERB-ing): *acceptance, alteration*
2. PRODUCTS (the thing that is created by VERB-ing): *pavement, growth*
3. INSTRUMENTS (the thing that VERB-s): *seasoning, advertisement*
4. LOCATIONS (the place of VERB-ing): *dump, residence*
5. AGENTS (people or person who VERB-s): *administration, cook*
6. MEASURE TERMS (how much is VERB-ed): *pinch, deceleration*
7. PATHS (the direction of VERB-ing): *decline, direction*
8. PATIENTS (the thing affected or moved by VERB-ing): *catch, acquisition*
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- Certain base verbs evoke certain readings (BLP, 212)
  - Verb requires instrument – Instrument nominalization
  - *to wrap – wrap; to refresh – refreshment*
- Shift to a syntactic argument of the verb
  John purchased a car. His wife approves of this purchase.
- Shifts are not restricted to syntactic arguments
  My granny used to embroider pillowcases. I love the embroidery on this one.

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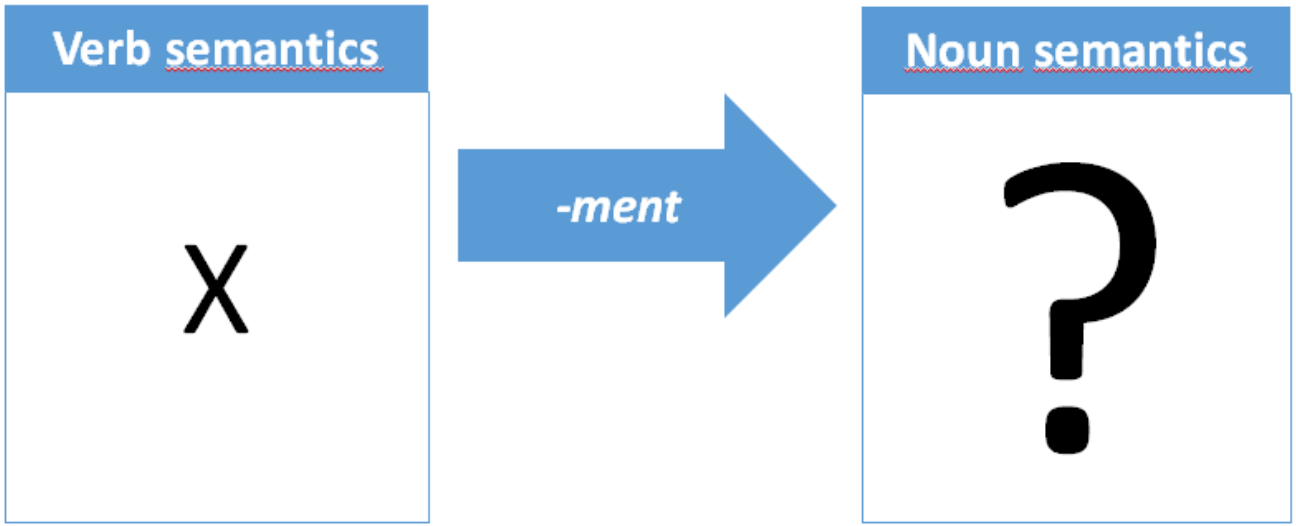
An interplay of verb and suffix



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- Frames are recursive attribute-value structures
- They serve to model mental representations of concepts
- They are applicable to linguistic phenomena
- They can be depicted as graphs or matrices

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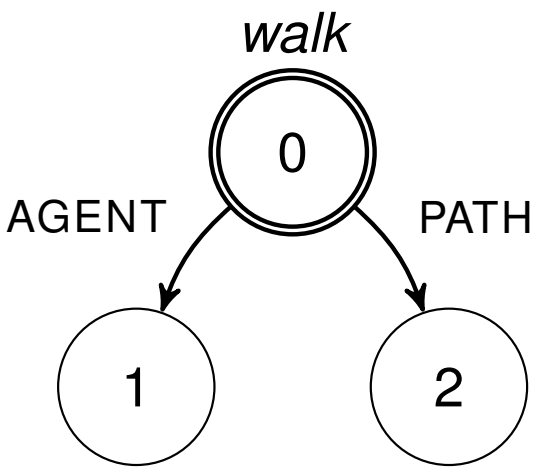

$$\boxed{0}\begin{bmatrix} \textit{walk} \\ \text{AGENT}\ \boxed{1} \\ \text{PATH}\ \boxed{2} \end{bmatrix}$$

Frame semantics

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\boxed{0}\begin{bmatrix}
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Methodology: *-ment*

- Many (often highly lexicalized) derivatives
  - government 1484
  - development 1756
  - department c. 1450
- Nowadays still somewhat productive (BLP, 199)
- Aim: synchronic analysis of the productive process
- Neologisms (1900-today)

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- 86 *-ment* derivatives from 24 verb classes (Levin 1993)
- Largest class: psych verbs (N=16)
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Semantic coding of derivatives

Traditional semantic categories, e.g.

- STATE
- EVENT
- EXPERIENCER
- STIMULUS
- RESULT STATE

Examples

- EVENT
  Medicine's and my great problem and great fault consist of what might be called the intellectualization – the enrapturement with science and technology – by which that legion of men and women who are today's doctors have allowed themselves to become besotted. (Webcorp_BLOG_1998)
- RESULT STATE
  I know a lot of our compatriots also feel the same angst, consternation and confoundment. (GloWbE_ART_2012)
- STIMULUS
  Here comes a confoundment(new word I just made up :)) for you. (Google COMM 2006)

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PSYCH verbs (AMUSE verbs): Types in our dataset (N=16)

affrightment	annoyment
bemusement	upliftment
bumfuzzlement	confoundment
dumbfoundment	endullment
enragement	enrapturement
nonplusment	perturbment
soothement	staggerment
upsetment	worriment

Results

- result state is dominant: not surprising
- stimulus or event nominalizations should be impossible (Pesetsky 1995, 71):
  "These nominalizations lack causative force"
  "*Amusement* does not refer to something amusing something, but to the state of being amused"
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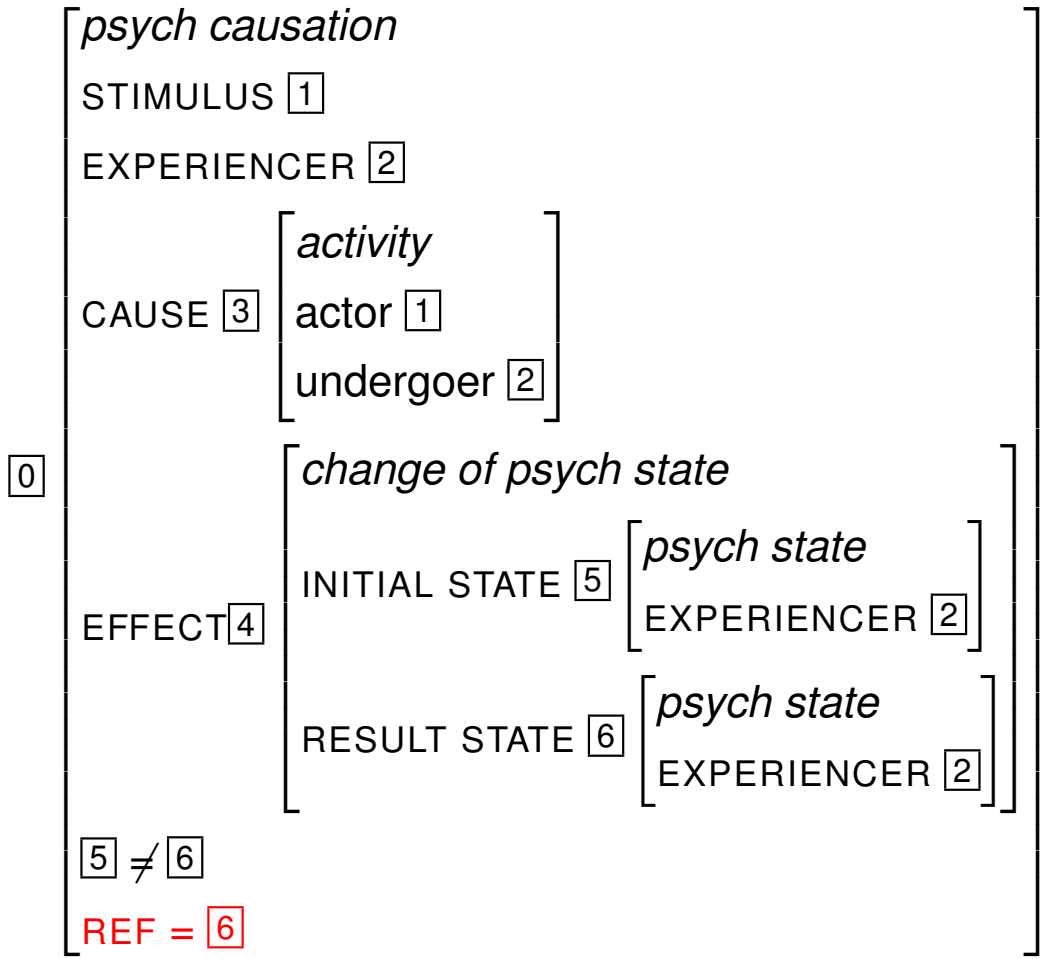
confoundment 'state of being confounded'



Formalization: *-ment* on PSYCH verbs

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Polysemy triggered by *-ment*

- Possible referential shifts with PSYCH verbs: EVENT, STIMULUS, RESULT STATE
- Impossible shift: EXPERIENCER
- General constraint: inanimate
- What about other verb classes as bases?

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CHANGE-OF-STATE base verbs: Examples

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2. INSTRUMENT
   Minimal bleeding and I didn't have to have any guaze/tissue in my mouth at all to try and stop it? I'm thinking that they must have used a **congealment** or something to make it clot while I was under or something? (GloWbE COMM 2010)
3. EVENT or CAUSE (*activity*)
   Click here to watch my **progressment** of the website (Google COMM 2013)
4. EFFECT (*change of state*)
   For one second she clung to her son, and then, disengaging herself, froze up like the sudden **congealment** of a spring.
5. RESULT STATE
   Sarcasm, Deb ... trying to excuse the **bedragglement** of the hair, etc?. (Google COMM 2013)
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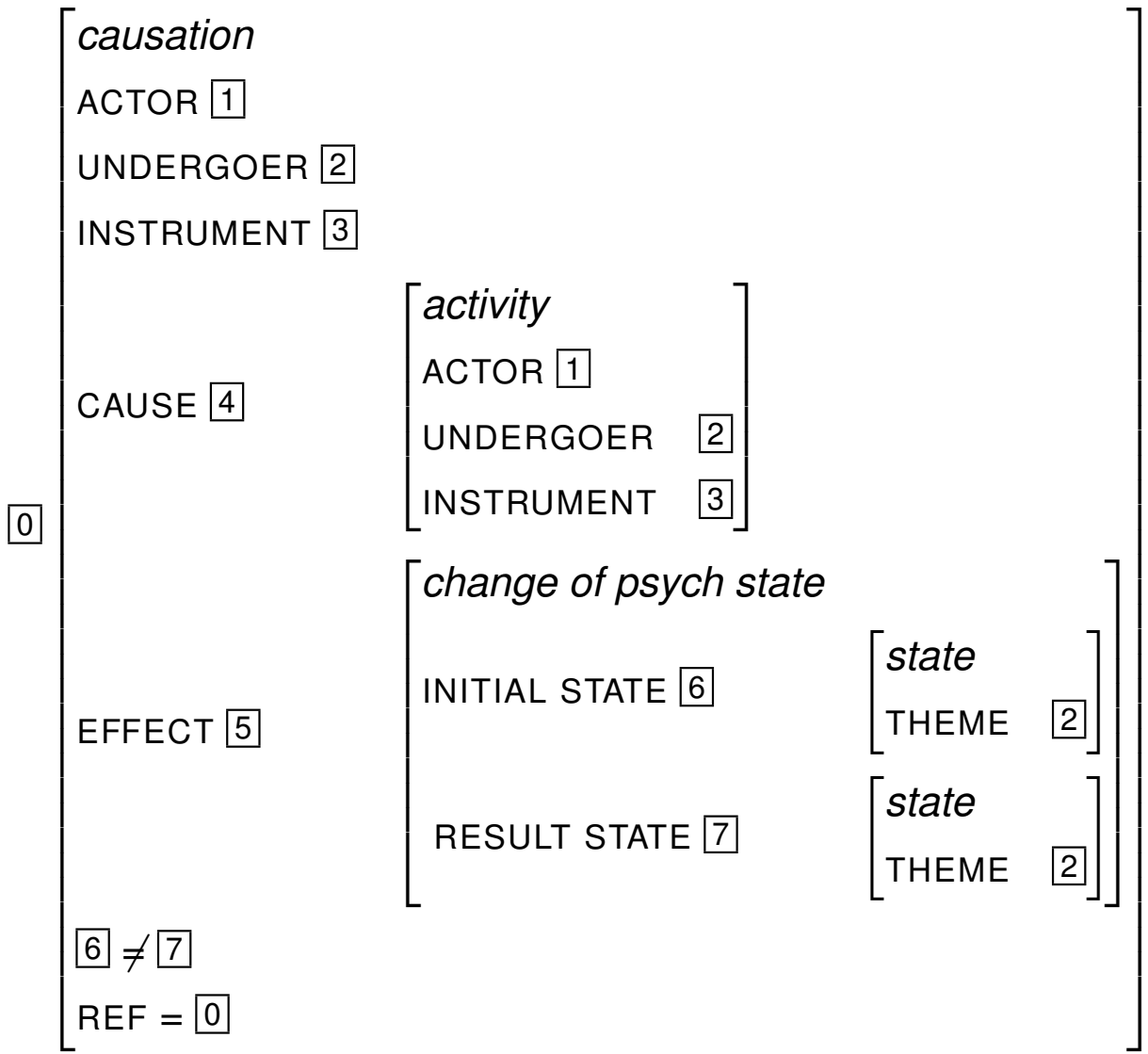
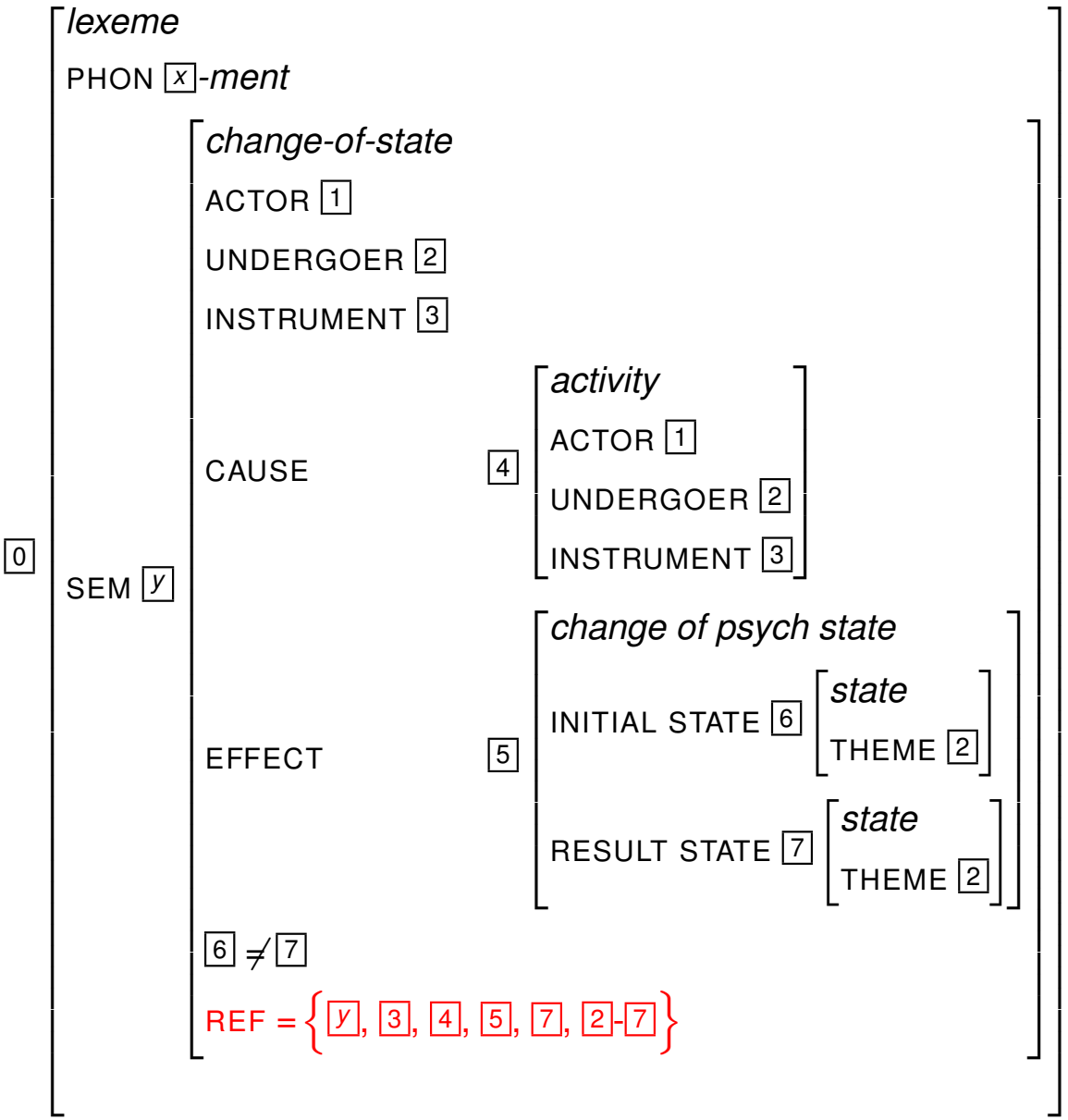
Formalization: Change-of-state verbs



Formalization: *-ment* on CHANGE-OF-STATE verbs



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$$\boxed{0}\begin{bmatrix} \textit{addressment} \\ \text{SPEAKER } \boxed{1} \\ \text{AUDIENCE } \boxed{2} \\ \text{TOPIC } \boxed{3} \\ \text{MESSAGE } \boxed{4} \\ \text{MEDIUM } \boxed{5} \\ \text{REF} = \left\{ \boxed{0}, \boxed{3}, \boxed{4}, \boxed{5} \right\} \end{bmatrix}$$

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- Frame-based approach can elegantly model some aspects of the interaction of base and affix.
- Shifts can target argumental and non-argumental components of the semantic representation.
- Shifts cannot target animate elements in the semantic representation.
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- Cognitive Linguistics: semantic relationships between stems, affixes, and derived words are metonymic (Radden and Kövecses 1999, Barcelona 2002, Basilio 2009, Janda 2011)
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Definition and formalization

"a source concept ... provides mental access to the target concept" (Janda 2011:360)

- source = concept of base
- context = affix
- target = concept of derived word
- milk FOR thing containing milk
- CONTAINED FOR CONTAINER METONYMY
- sugar FOR thing containing sugar
- BASE FOR DERIVATIVE

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Is all derivation metonymic?

- There are instances of derivation that cannot be explained by metonymy.
- Whenever meaning is added, and not shifted
- A case in point: prefixal negation
  - standard negatives ('not X', e.g. *dislike*)
  - privatives ('without X/remove X from', e.g. *decaffeinate*)
  - reversatives ('reverse action of X-ing', e.g. *unlock*)
  - pejoratives ('do X wrongly', e.g. *misassemble*)
  - scale external (irrelevance of the scale or polar opposition, e.g. *amelodic*)
  - stereotype negation (a non-stereotypical exemplar of its category, e.g. *non-person*)
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  - stereotype negation (a non-stereotypical exemplar of its category, e.g. *non-person*)
  - contrary negation (terminal points on a gradable scale, e.g. *clear-unclear*)
  - contradictory negation (no intermediate states, e.g. *animate-inanimate*)

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Stereotype negation

She calls her new way of eating the 'undiet' because it has no restrictions (from COCA, Bauer et al. 2013: 373)

- *un-* negates the value of an attribute of the base lexeme.

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$$\begin{bmatrix} \textit{lexeme} \\ \text{PHON } \boxed{x} \\ \text{CAT N} \\ \text{SEM} \begin{bmatrix} \text{IND } \boxed{y} \\ \text{RESTR} \begin{bmatrix} \dots \\ \text{ATTRIBUTE}_i\ \alpha \end{bmatrix} \end{bmatrix} \end{bmatrix} \quad \begin{bmatrix} \textit{lexeme} \\ \text{PHON } \textit{un-}\boxed{x} \\ \text{CAT N} \\ \text{SEM} \begin{bmatrix} \text{IND } \boxed{y} \\ \text{RESTR} \begin{bmatrix} \dots \\ \text{ATTRIBUTE}_i\ \neg\alpha \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Stereotype negation: Unified lexical rule for *un-*

$$\left[\begin{array}{l}
\textit{lexeme} \\
\text{PHON } \textit{un-}\boxed{x} \\
\text{CAT N} \\
\text{SEM}\left[\begin{array}{l}\text{IND } \boxed{y} \\ \text{RESTR } \boxed{1} \,!\left[\text{ATTRIBUTE}_i \neg\ \alpha\right]\end{array}\right] \\
\text{M-DTRS}\left[\begin{array}{l}\textit{lexeme} \\ \text{PHON } \boxed{x} \\ \text{CAT N} \\ \text{SEM}\left[\begin{array}{l}\text{IND } \boxed{y} \\ \text{RESTR}\boxed{1}\left[\begin{array}{l}\ldots \\ \text{ATTRIBUTE}_i\ \alpha\end{array}\right]\end{array}\right]\end{array}\right]
\end{array}\right]$$

Unified lexical entry for *undiet*

$$\left[\begin{array}{l}
\textit{lexeme} \\
\text{PHON } /\text{ʌn}/\text{-}\boxed{x} \\
\text{CAT N} \\
\text{SEM}\left[\begin{array}{l}
\text{IND } \boxed{y} \\
\text{RESTR}\left[\begin{array}{l}
\textsc{Purpose}\ \text{weight loss} \\
\textsc{Eating}_i\ \neg\ \text{restricted} \\
\ldots
\end{array}\right]
\end{array}\right] \\
\text{M-DTRS}\left[\begin{array}{l}
\textit{lexeme} \\
\text{PHON } /\text{daɪət}/\ \boxed{x} \\
\text{CAT N} \\
\text{SEM}\left[\begin{array}{l}
\textsc{Purpose}\ \text{weight loss} \\
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\ldots
\end{array}\right]
\end{array}\right]
\end{array}\right]$$

Back to *-ment*!

Formalizing *-ment* across verb classes

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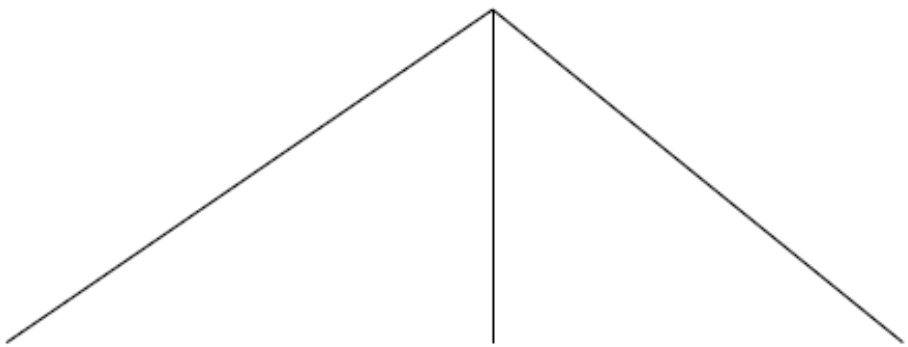
$$\boxed{0}\begin{bmatrix} \textit{lexeme} \\ \text{PHON } \boxed{x}\textit{-ment} \\ \text{CAT N} \\ \text{SEM } \boxed{y} \\ \text{M-DTRS } \boxed{z} \end{bmatrix}$$

$$\boxed{z}\begin{bmatrix} \textit{lexeme} \\ \text{PHON } \boxed{x} \\ \text{CAT V} \\ \text{SEM } \boxed{y}\begin{bmatrix} \text{SEM } \textit{psych causation} \\ \text{STIMULUS } \boxed{1} \\ \text{EXPERIENCER } \boxed{2} \\ \text{CAUSE } \boxed{3}\begin{bmatrix} \textit{activity} \\ \text{ACTOR } \boxed{1} \\ \text{UNDERGOER } \boxed{2} \end{bmatrix} \\ \text{EFFECT } \boxed{4}\begin{bmatrix} \textit{change of psych state} \\ \text{INITIAL STATE } \boxed{5}\begin{bmatrix} \textit{psych state} \\ \text{EXPERIENCER } \boxed{2} \end{bmatrix} \\ \text{RESULT STATE } \boxed{6}\begin{bmatrix} \textit{psych state} \\ \text{EXPERIENCER } \boxed{2} \end{bmatrix} \end{bmatrix} \\ \boxed{5} \neq \boxed{6} \end{bmatrix} \end{bmatrix}$$

Unification and inheritance

$$\boxed{0}\begin{bmatrix} \textit{lexeme} \\ \text{PHON } \boxed{x}\textit{-ment} \\ \text{CAT N} \\ \text{SEM } \boxed{y} \\ \text{M-DTRS } \boxed{z} \end{bmatrix}$$



$$\boxed{0}\begin{bmatrix} \textit{lexeme} \\ \text{SEM } \boxed{y} \\ \text{M-DTRS } \boxed{z}\ \text{PSYCH} \end{bmatrix} \qquad \boxed{0}\begin{bmatrix} \textit{lexeme} \\ \text{SEM } \boxed{y} \\ \text{M-DTRS } \boxed{z}\ \text{C-OF-S} \end{bmatrix} \qquad \boxed{0}\begin{bmatrix} \textit{lexeme} \\ \text{SEM } \boxed{y} \\ \text{M-DTRS } \boxed{z}\ \text{ILLUSTRATE} \end{bmatrix}$$

Problem

- Where do the referential restrictions reside?
  - PSYCH VERBS: REF = {y, 1, 3, 4, 6}
  - CHANGE-OF-STATE VERBS: REF = {y, 3, 4, 5, 7, 2-7}
  - ILLUSTRATE VERBS: REF = {0, 3, 4, 5}
- Underspecification?
- Inheritance hierarchy?

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Conclusion

Frame-based approach can be fruitfully employed to model derivational semantics

- Interaction of base and affix
- Interpretation of derivatives: metonymic shift in the frame of the base

Problems with the metonymy approach to word formation

- Overgeneral notion of metonymy
- Metonymic expressions proper vs. metonymy in word-formation
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Thank you very much for your attention!

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