



SFB 991



HEINRICH HEINE
UNIVERSITÄT DÜSSELDORF

Modeling nominalization in frames

A case study of *-ment* suffixation on causative
verbal bases

Lea Kawaletz & Ingo Plag

Heinrich-Heine-Universität

Concept Types and Frames in Language, Cognition, and Science (CTF'14)

Heinrich-Heine-Universität Düsseldorf, August 25 - 27, 2014

Background

Affix polysemy

- Various readings formed by one affix (Bauer et al. 2013, ch. 10)

EVENT	<i>assessment</i>
RESULT	<i>containment</i>
STATE	<i>contentment</i>
PRODUCT	<i>pavement</i>
INSTRUMENT	<i>entertainment</i>
LOCATION	<i>embankment</i>

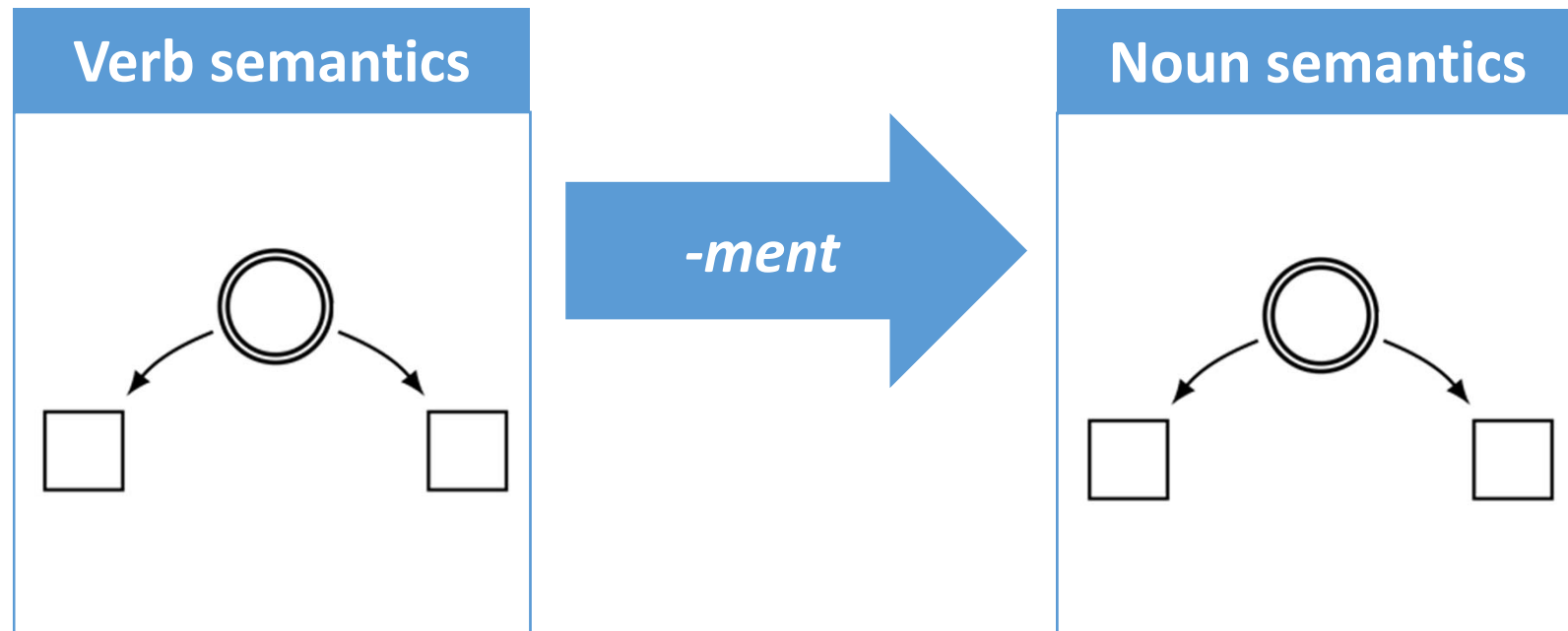
How do we get such readings?

- Certain base verbs evoke certain readings (Bauer et al. 2013, 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**.*

- Not restricted to syntactic arguments though
*My granny used to **embroider pillowcases**. I love the **embroidery** on this one.*

An interplay of verb and suffix



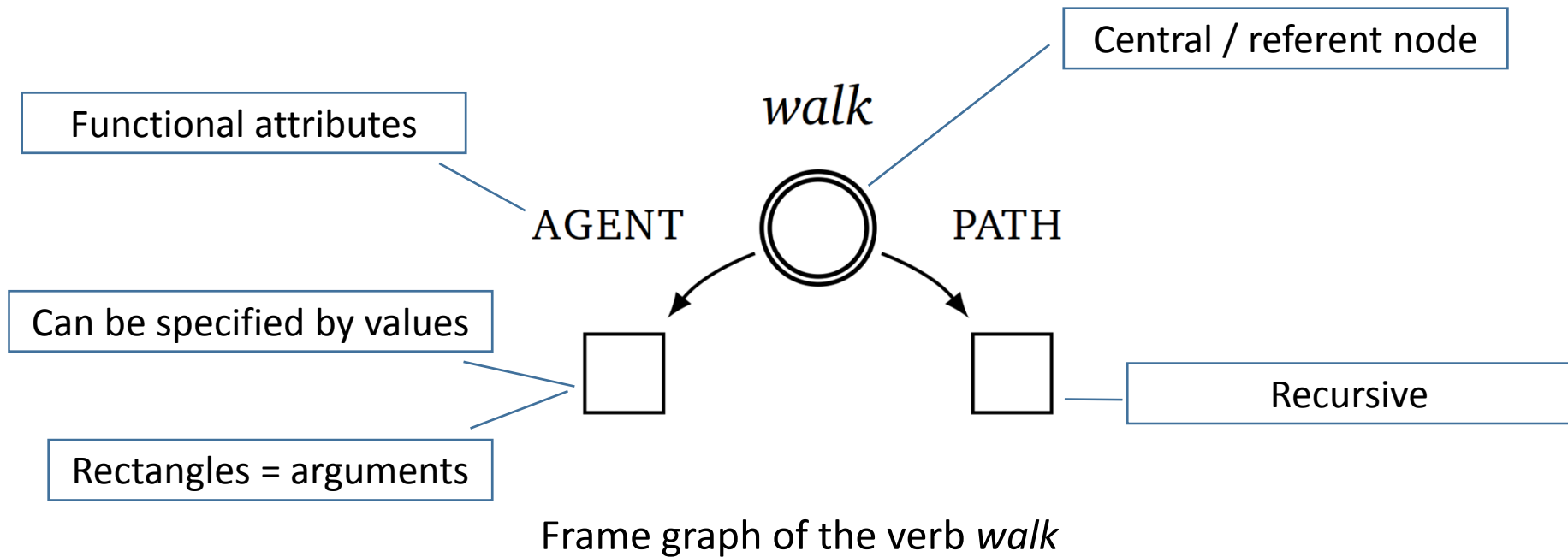
Frames

(e.g. Barsalou 1992 a,b; Löbner 2013; Petersen 2007)

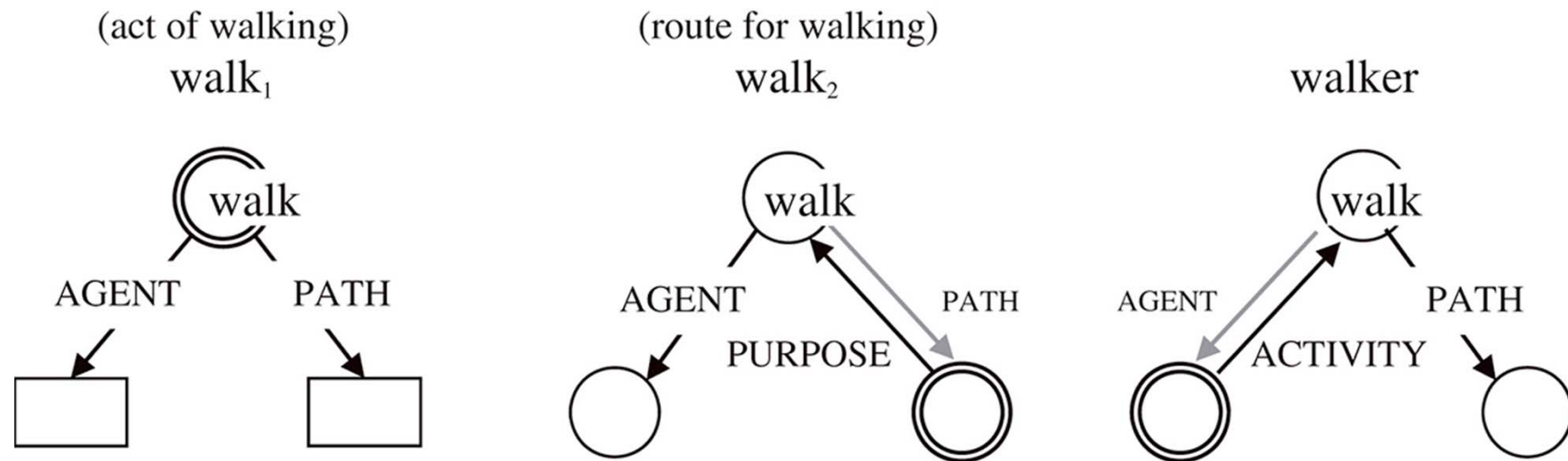
- a means to model mental representations of concepts as well as linguistic phenomena
- grounded in cognitive reality

Modeling semantics in frames

(e.g. Barsalou 1992 a,b; Löbner 2013; Petersen 2007)



Modeling semantic shifts in frames



Frame graphs for three nouns derived from the verb *walk*
(Löbner 2013, Figure 12.9)

Our study

-ment

- Nominal suffix attaching mainly to verbal bases
- Very productive in Early Modern English (15th-17th c.); nowadays still somewhat productive (Bauer et al. 2013, 199)
- Many (often highly lexicalized) derivatives, e.g.:
 - movement* 1393
 - department* c. 1450
 - treatment* 1560
- Aim: synchronic analysis of the productive process
 - Neologisms (1900-today)

Method: *-ment* data

- Data sources: Neologisms (*Oxford English Dictionary*) & Hapax Legomena (*Corpus of Contemporary American English*)
- 90 types derived from 24 verb classes (Levin 1993 / VerbNet)
- Largest classes: PSYCH verbs (N=16), CHANGE OF STATE verbs (N=13)
- Attestations from other sources (GloWbE, WebCorp, BNC, Twitter, Google)
- Semantic coding of derivatives

Semantic coding of derivatives

Starting point: Traditional semantic categories

(Beard 1995; Spencer 2010; Sil et al. 2010; Osswald 2005; Brandtner 2011; Ehrich & Rapp 2000, cf. also VerbNet semantic annotation)

- EVENT & STATE ('transposition')
- EXPERIENCER
- STIMULUS
- RESULT STATE
- ...

PSYCH verb bases

Definition of PSYCH verbs

- Semantically heterogeneous: psych states & changes of psych states (cf. Levin 1993, 188-193)
- Typically two arguments: STIMULUS & EXPERIENCER
- Traditional categories (Pesetsky 1995): OBJECT EXP & SUBJECT EXP
- Four subcategories following Levin (1993) / VerbNet:

	Subject Experiencer	Object Experiencer
Transitive Verbs	ADMIRE verbs <i>The tourists admired the paintings</i>	AMUSE verbs <i>The clown amused the children</i>
Intransitive Verbs with PP	MARVEL verbs <i>Megan marveled at the beauty of the Grand Canyon</i>	APPEAL verbs <i>This painting appeals to Malinda</i>

- AMUSE verbs = Complex events (causing subevent + caused subevent)

Some examples for attestations

- PSYCH CAUSATION EVENT

Today's evangelicals dance, listen to popular music, **partake in public amusements and diversions**, and attend the theater.

(COCA_ACAD_2010)

- RESULT STATE (of a PSYCH CAUSATION EVENT)

I know a lot of our compatriots also **feel the same angst, consternation and confoundment**. (GloWbE_ART_2012)

- STIMULUS (in a PSYCH CAUSATION EVENT)

No federal agency regulates **portable amusements**, and no state employee inspects mobile rides. (COCA_NEWS_2012)

Types in our dataset (N=16)

affrightment

approvement

bumfuzzlement

confoundment

dumbfoundment

endullment

enragement

enrapturement

nonplusment

perturbment

reassurance

upsetment

soothement

staggerment

marvelment

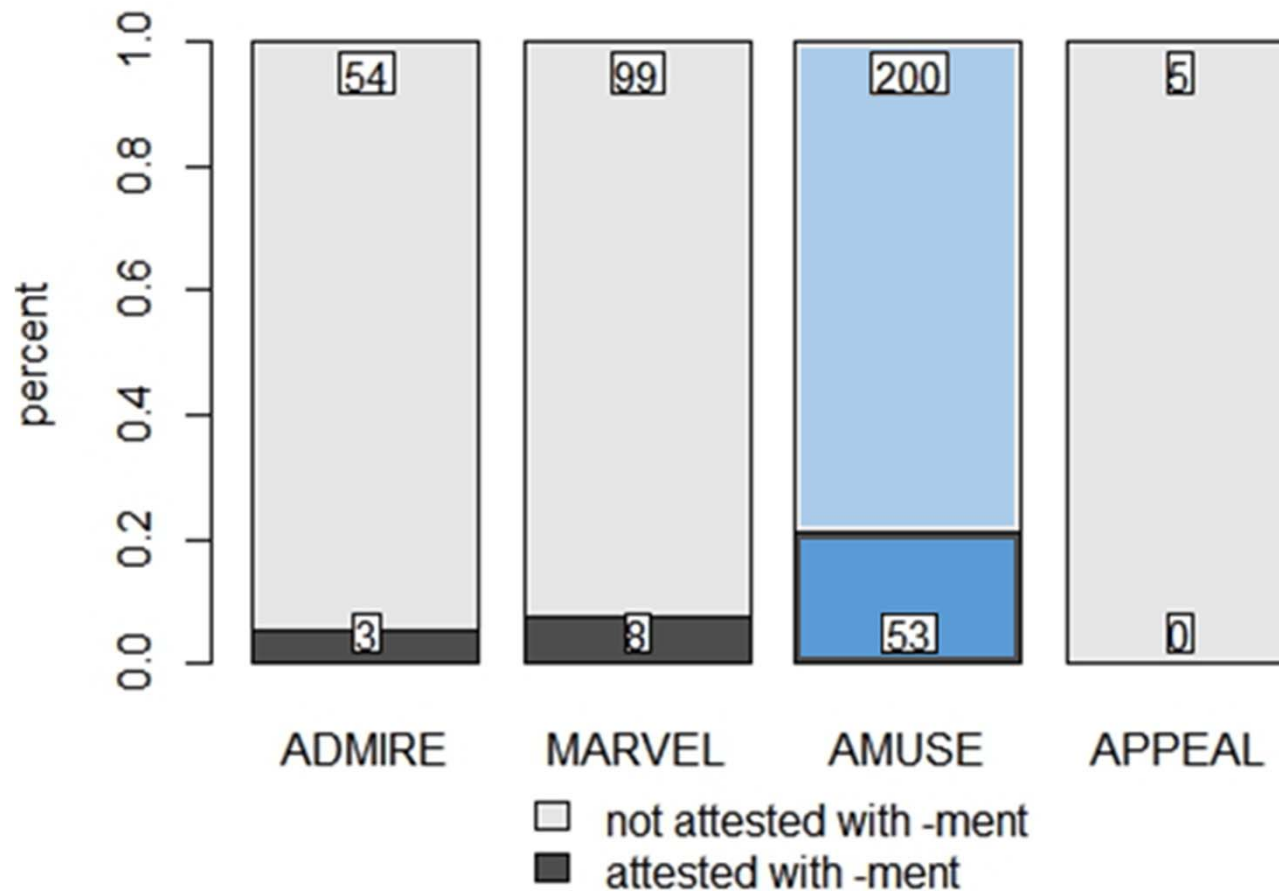
worriment

Results: Overview

- AMUSE verbs are preferred over the other three subcategories
- Semantic output:
 - PSYCH CAUSATION EVENT (Transposition) ✓
 - STIMULUS ✓
 - RESULT STATE ✓
 - ACTIVITY (causing subevent) ✓
 - CHANGE OF PSYCH STATE (caused subevent) ✓ (probably)
 - EXPERIENCER ☒

Base selection: AMUSE verbs are preferred

- seems to be a general tendency



Base selection: AMUSE verbs are preferred

- Artefact of lexical distribution: Only five APPEAL verbs, three of which are very infrequent
- Preference for other derivational processes
 - MARVEL verbs: conversion (*sorrow, freakout*)
 - ADMIRE verbs: *-ation* (*reaffirmation, adoration*) and conversion (*mistrust, grudge*)

Output semantics: RESULT STATE is dominant

- Not surprising: has been observed by many (e.g. Marchand 1969)
- It has been stated that STIMULUS & EVENT nominalizations should be impossible
- Pesetsky (1995, 71):

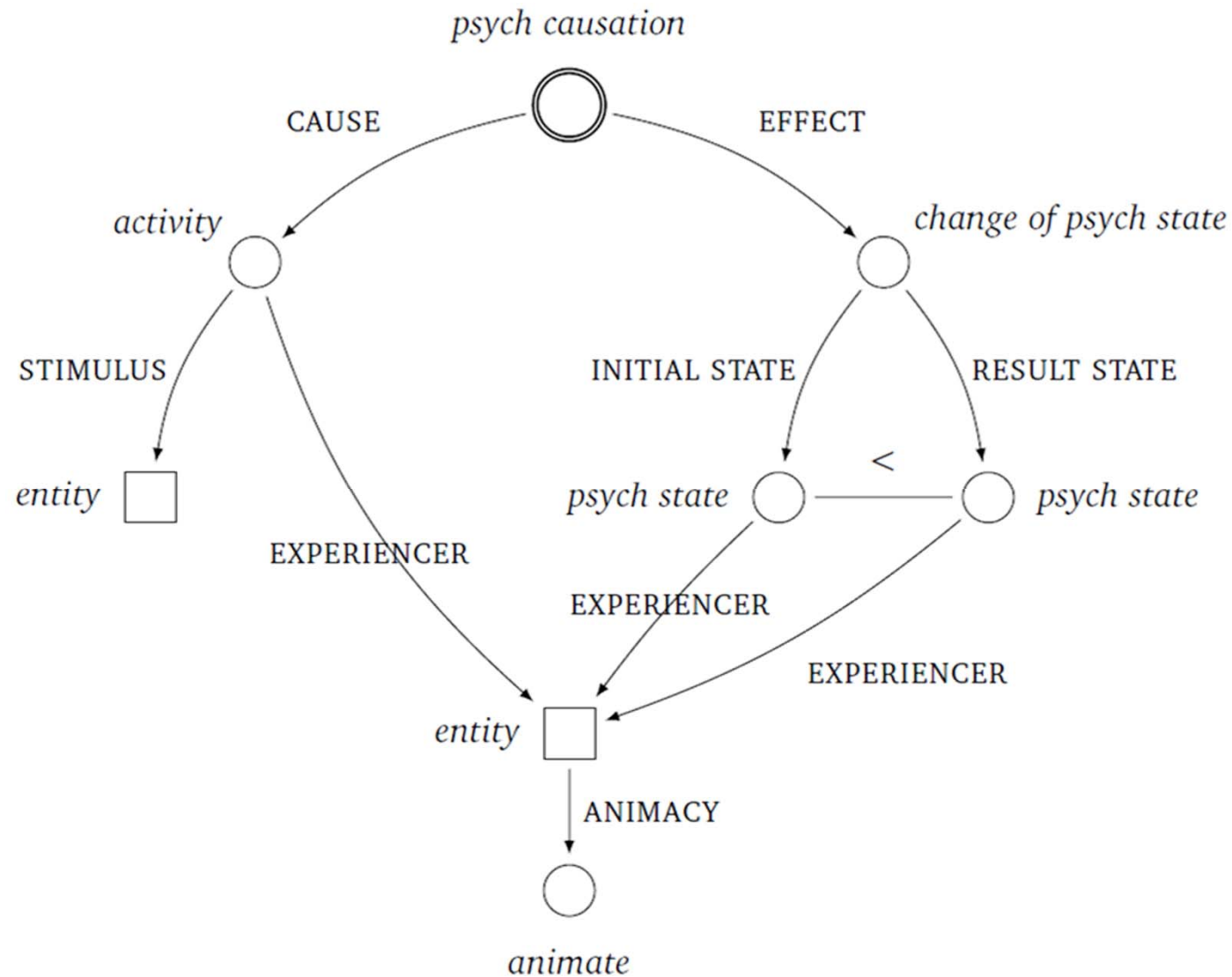
Now consider the nominalizations that are related to causative ObjExp verbs like *annoy*. **These nominalizations uniformly lack all causative force** (as observed first, perhaps, by Lakoff (1970:126)). The present analysis is *all* as an interesting alternative description of this fact is morphological *surprise*. Rather, they are nominalizations of corresponding noncausative predicates. Thus, ***annoyance* does not mean 'the process of making annoyed', but 'the state of being annoyed'**. ***Amusement* does not refer to something amusing someone, but to the state of being amused.**

- Our data provide counter-evidence to these views (cf. e.g. Bauer et al. 2013; Melloni 2011 for Italian)

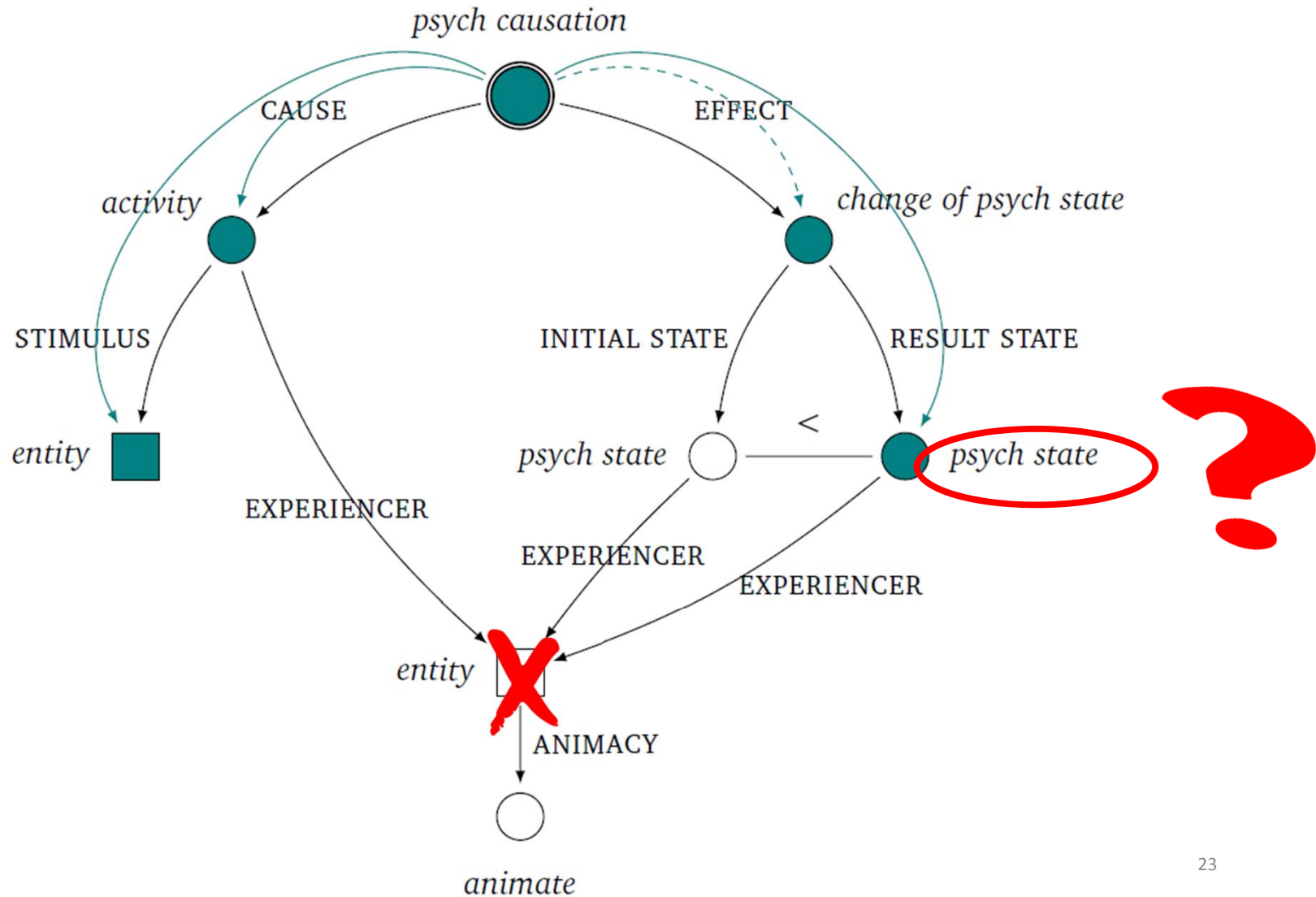
Output semantics: EXPERIENCER is not attested

- Affix rivalry
 - Suffix for EXPERIENCER and PATIENT: *-ee* (or *-er*)
- Verb class might disallow it
 - Not convincing, cf. *soothee*, *testee*
- *-ment* might disallow it
 - EXPERIENCER isn't mentioned in the pertinent literature
 - Data set: no [+animate] readings (except, potentially, STIMULUS)
 - At least a preference for [-animate]!

Modeling PSYCH causation (cf. Löbner 2013, Naumann 2013, Osswald & Van Valin 2014)



Modeling affix polysemy



CHANGE OF STATE verb bases

Preliminary Results

Definition of CHANGE OF STATE verbs

OTHER ALTERNATING VERBS OF CHANGE OF STATE (LEVIN 1993: 244-6)	REMEDY verbs (VerbNet)
Externally caused changes of (physical) state	
NP V NP.patient <i>Bill dried the clothes.</i>	NP V NP.patient <i>Bill repaired the tractor.</i>
NP V NP PP.instrument <i>Bill dried the clothes with a hairdryer.</i>	NP V NP PP.instrument <i>Bill repaired the tractor with duct tape.</i>
NP V ADV-middle <i>The clothes dried.</i>	NP V ADV-middle <i>New tractors repair easily.</i>
NP.patient V <i>The clothes dried</i>	*The tractor repaired.
NP.instrument V NP <i>The hairdryer dried the clothes</i>	*The duct tape repaired the tractor.

Types in our dataset (N=13)

OCOS

congealment
decenterment
discolorment
embrittlement
increasement
progressment
redoublement
worsenment

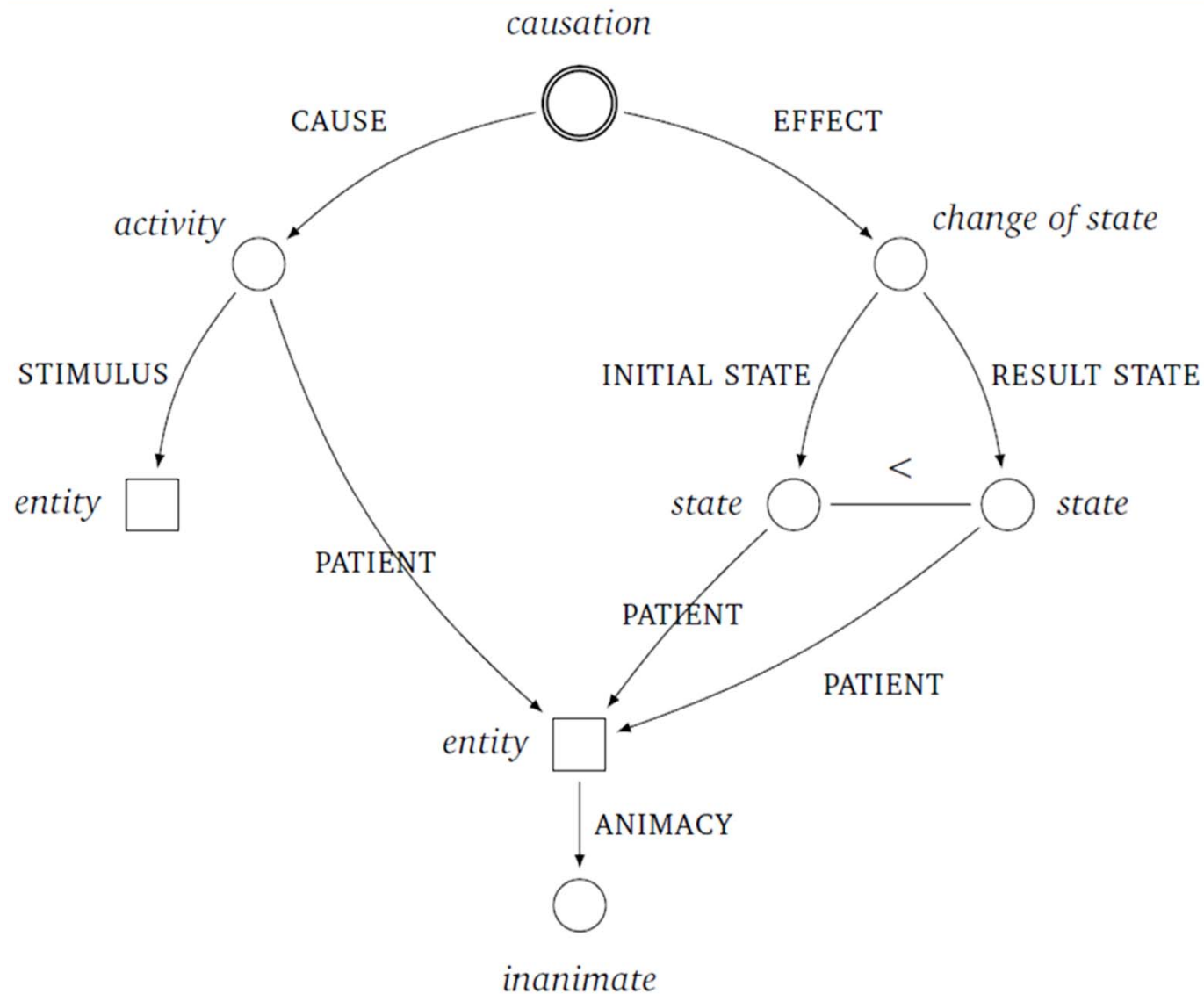
REMEDY

bedragglement
befoulment
besmirchment
debauchment
embetterment

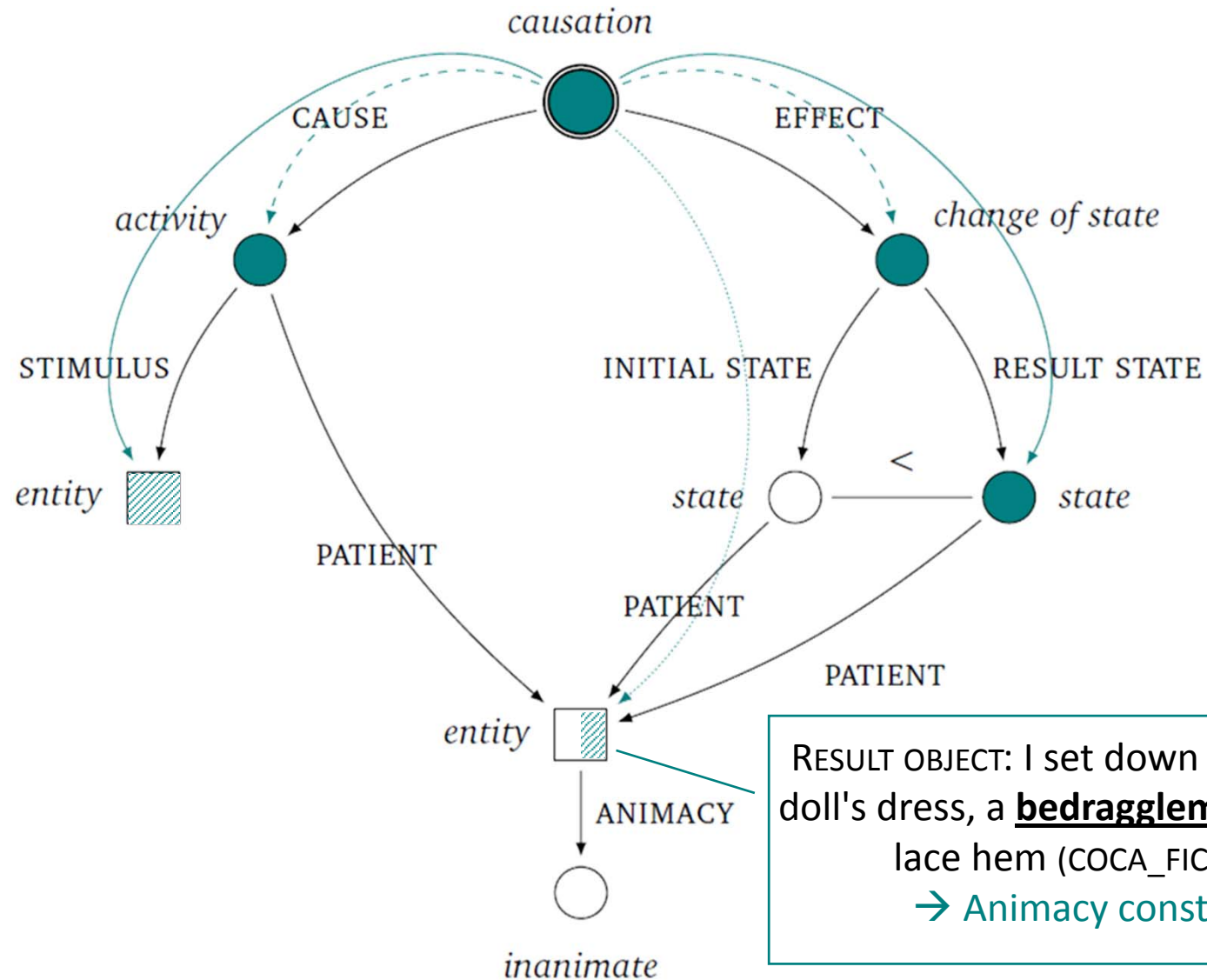
Results: Overview

- Five of the seven verb categories are not attested with *-ment*
- Semantic output:
 - CAUSATION EVENT (Transposition) ✓
 - STIMULUS (✓)
 - RESULT STATE ✓
 - ACTIVITY (causing subevent) ✓
 - CHANGE OF PSYCH STATE (caused subevent) ✓
 - PATIENT ☒
 - RESULT OBJECT ✓

Modeling affix polysemy



Modeling affix polysemy



Open questions (COS verbs)

- Are there systematic semantic differences between the derivations of ocos verbs and those of REMEDY verbs?
- Can the *change of state* node be selected for all base verbs?
- Is the presence/absence of STIMULUS readings systematic?
- How exactly is the STIMULUS reading related to the RESULT OBJECT reading?

Summary

- *-ment* has clear preferences for certain types of base verb (AMUSE, OCOS, REMEDY).
- Resulting derivatives show a well restricted set of possible readings (e.g. transposition, RESULT STATE, STIMULUS; no EXPERIENCER).
- Shifts can target argumental and non-argumental components of the semantic representation.
- Shifts are governed by certain constraints and/or preferences.

Conclusion

- Affix semantics:
 - The potential to induce particular kinds of shift in the semantic structure of the base
- Possible readings of *-ment* nominalizations emerge from the predictable interaction of base semantics with affix semantics
- Future work: finalize COS analysis and test modelling of semantically different verb bases (problem: far fewer types)

References

- Barsalou, Lawrence W. 1992a. *Cognitive psychology: An overview for cognitive sciences*. Hillsdale, NJ: Erlbaum.
- Barsalou, Lawrence W. 1992b. Frames, concepts, and conceptual fields. In Adrienne Lehrer & Eva Feder Kittay (eds.), *Frames, fields and contrasts: New essays in semantic and lexical organization*, 21–74. Hillsdale, NJ: Erlbaum.
- Bauer, Laurie, Rochelle Lieber & Ingo Plag. 2013. *The Oxford reference guide to English morphology*. Oxford: Oxford University Press.
- Beard, Robert. 1995. *Lexeme-morpheme base morphology: A general theory of inflection and word formation*. Albany: State University of New York.
- Brandtner, Regine. 2011. *Deverbal nominals in context: Meaning variation and copredication*. Stuttgart: Online Publikationsverbund der Universität Stuttgart.
- Davies, Mark. 2008-. The Corpus of Contemporary American English: 450 million words, 1990-present. <http://corpus.byu.edu/coca/>.
- Ehrich, Veronika & Irene Rapp. 2000. Sortale Bedeutung und Argumentstruktur: ung-Nominalisierungen im Deutschen. *Zeitschrift für Sprachwissenschaft* 19(2). 245–303.
- Levin, Beth. 1993. *English verb classes and alternations: A preliminary investigation*. Chicago: University of Chicago Press.
- Kipper, Karin, Anna Korhonen, Neville Ryant & Martha Palmer. 2008. A large-scale classification of English verbs. *Language Resources and Evaluation* 42(1). 21–40.
- Löbner, Sebastian. 2013. *Understanding semantics*, 2nd edn. London: Arnold.
- Marchand, Hans. 1969. *The categories and types of present-day English word-formation*. Munich: Beck.
- Melloni, Chiara. 2011. *Event and result nominals: A morpho-semantic approach*. Bern, New York: Peter Lang.
- Naumann, Ralf. 2013. An Outline of a Dynamic Theory of Frames. In N. Bezhanishvili, Sebastian Löbner, K. Schwabe & L. Spada (eds.), *Logic, Language, and Computation* (Lecture Notes in Computer Science 7758), 115–137. Berlin, New York: Springer.
- OED. 2013. *The Oxford English Dictionary online*. Oxford: Oxford University Press. www.oed.com.
- Osswald, Rainer. 2005. On result nominalization in German. In Emar Maier, Corien Bary & Janneke Huitink (eds.), *Proceedings of SuB9*, 256–270.
- Osswald, Rainer & van Valin, Robert D. 2014. FrameNet, frame structure, and the syntax-semantics interface. In Thomas Gamerschlag, Doris Gerland, Rainer Osswald & Wiebke Petersen (eds.), *Frames and concept types: Applications in language and philosophy*. Dordrecht: Springer.
- Pesetsky, David. 1995. *Zero syntax: Experiencers and cascades*. Cambridge: MIT Press.
- Sil, Avirup, Fei Huang & Alexander Yates. 2010. Extracting action and event semantics from web text. In *Proceedings of the AAAI 2010 Fall Symposium on Commonsense Knowledge*, 108–113.
- Spencer, Andrew. 1991. *Morphological theory: An introduction to word structure in generative grammar*. Oxford: Blackwell.

Thank you very much for your attention!
