Tecto to AMR and translation

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Introduction

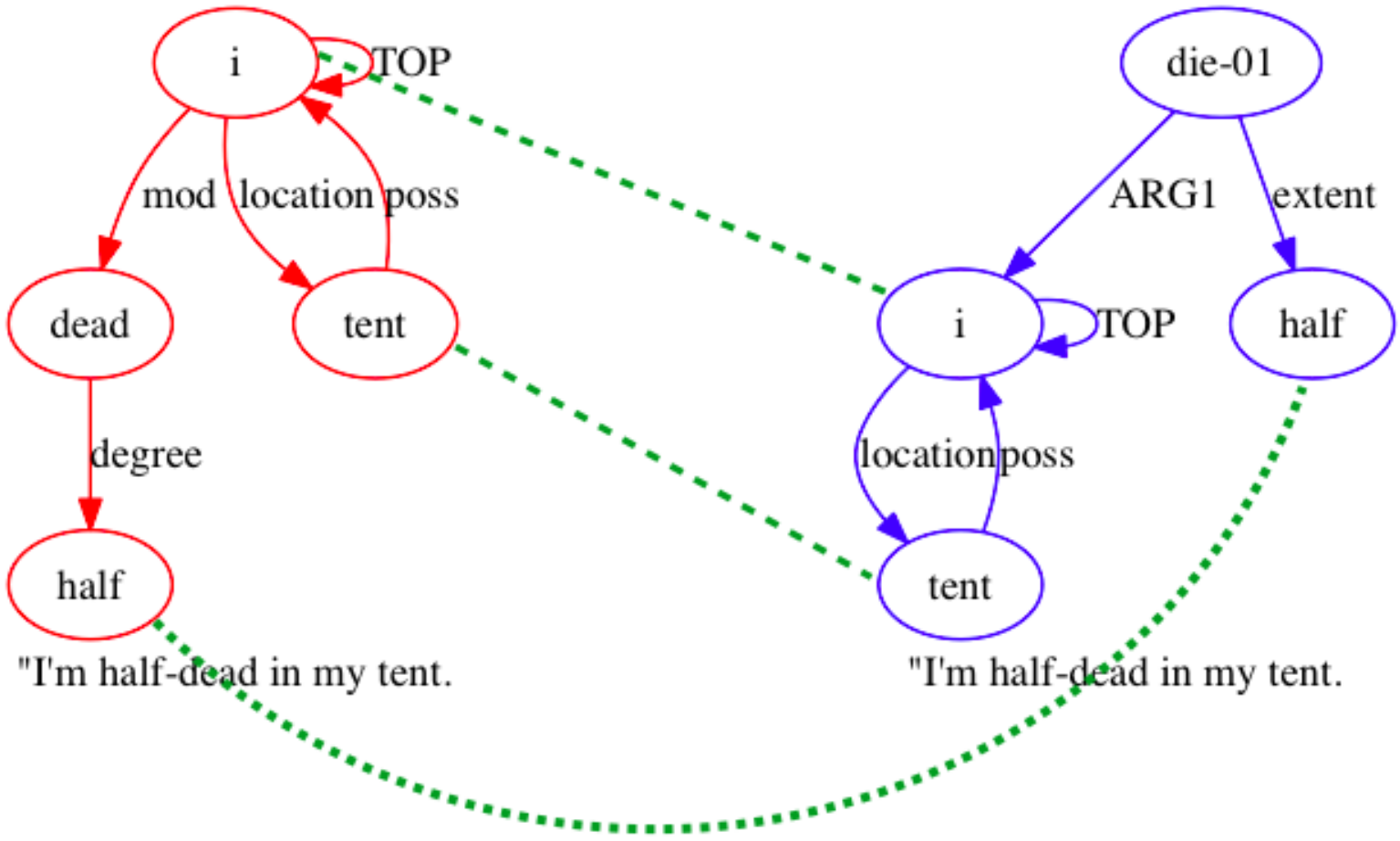
Motivation

- We are investigating the value of parallel Abstract Meaning Representations (AMRs)
- Question 1: How similar are AMRs made in different languages? How do you compare them?
- Question 2: How could we get a large corpus of parallel AMRs?

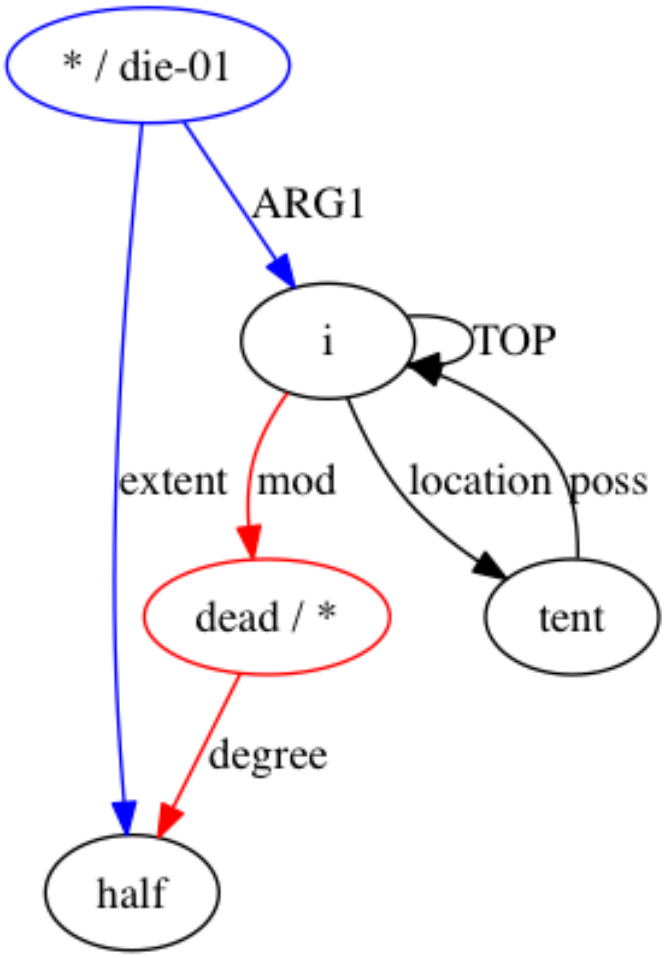
AMRICA

- (AMR Inspector with Cross-language Alignment)
- Usual evaluation and alignment methods break across languages.
- Extension to Smatch (Cai & Knight 2012).

Smatch Classic

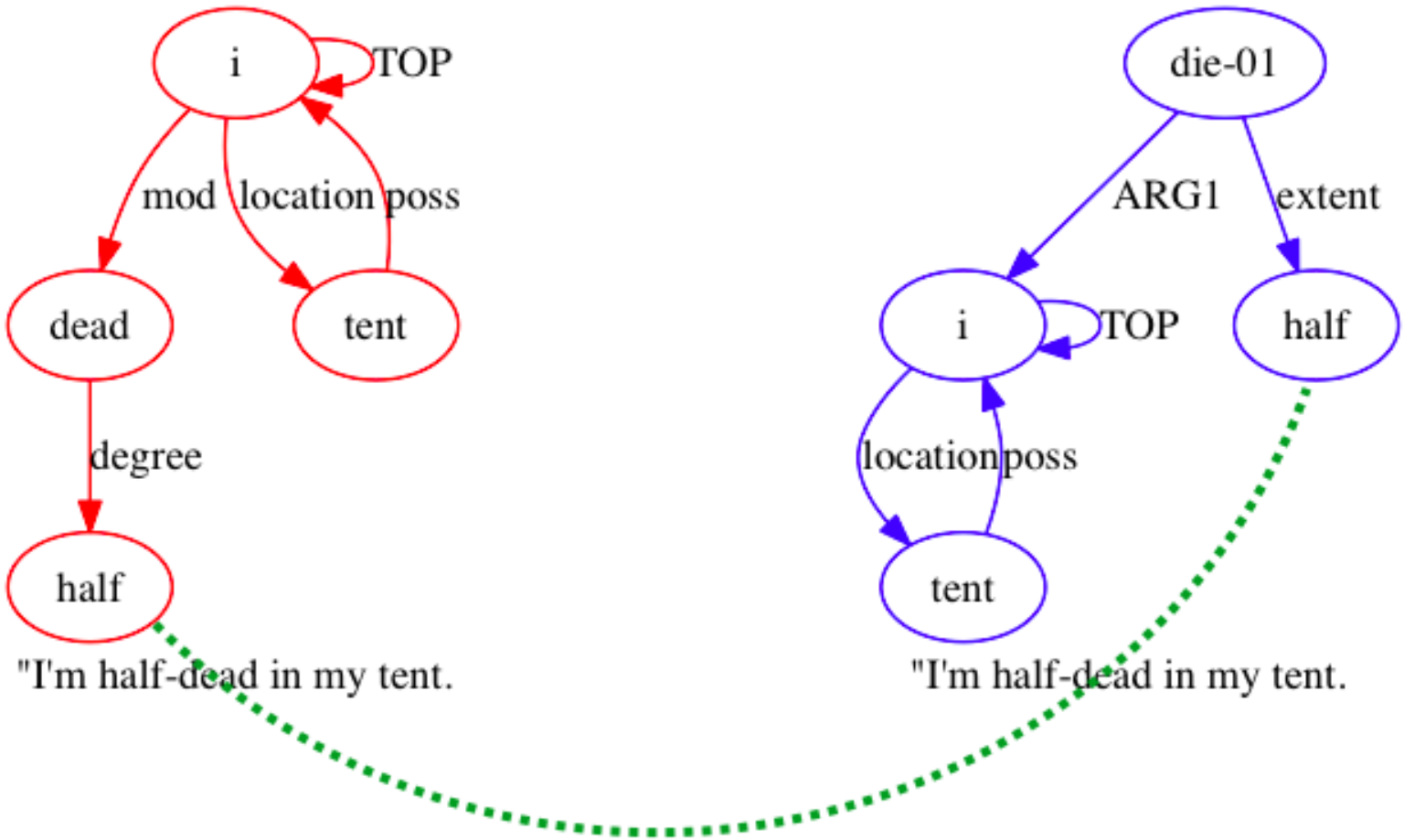


Smatch Classic

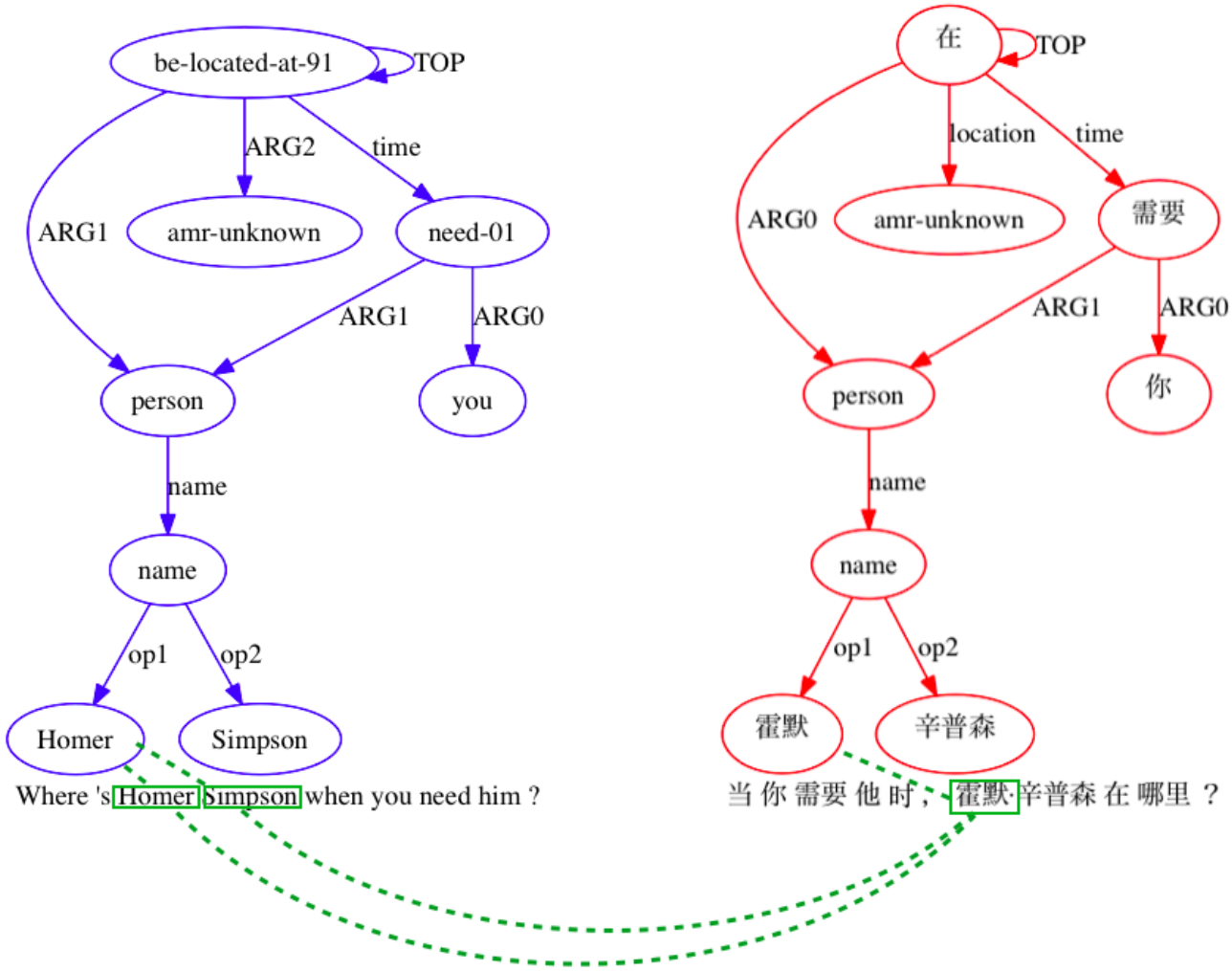


"I'm half-dead in my tent.

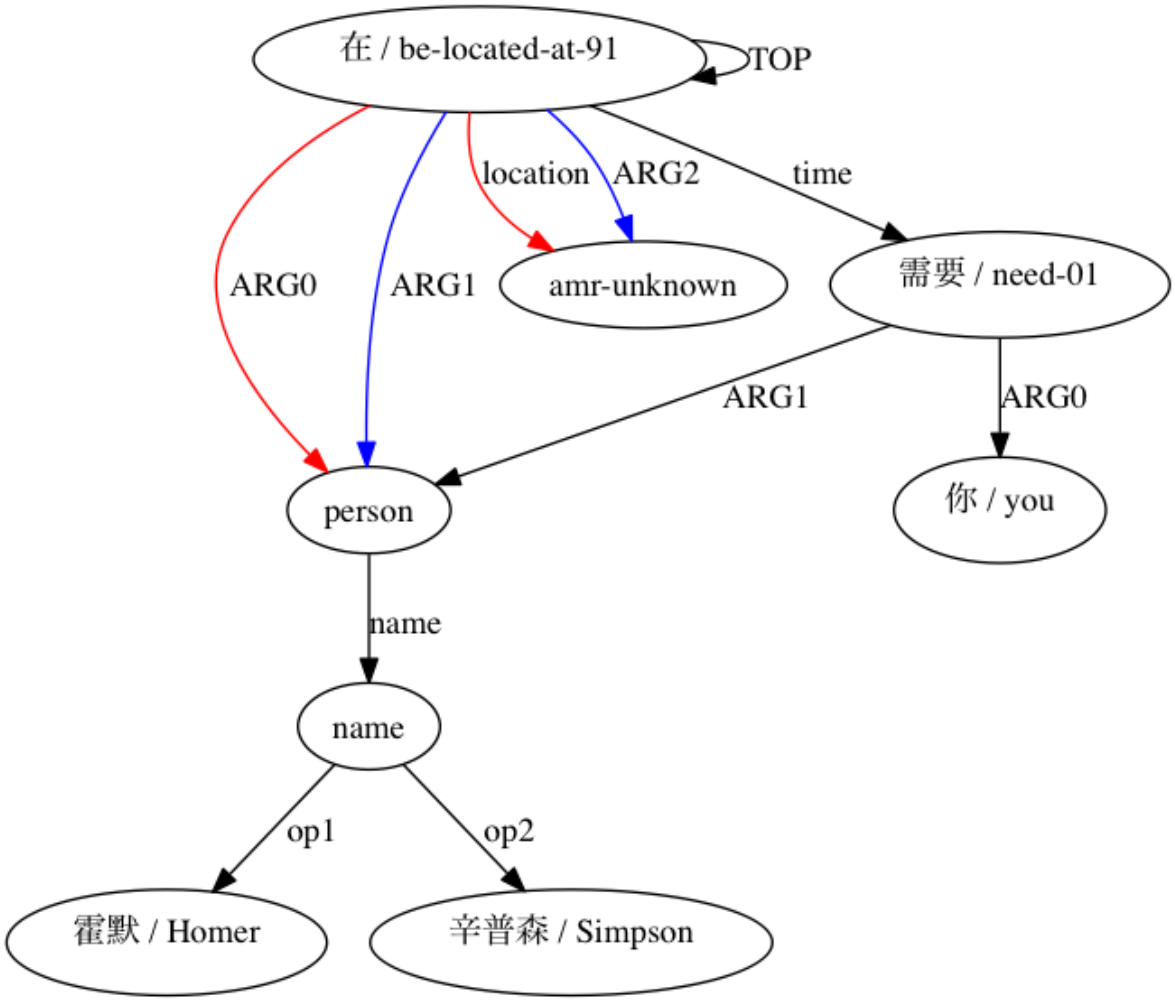
Smatch Classic



AMRICA


be-located-at-91
TOP
ARG2
time
ARG1
amr-unknown
need-01
ARG1
ARG0
person
you
name
name
op1
op2
Homer
Simpson
Where 's Homer Simpson when you need him ?
在
TOP
location
time
ARG0
amr-unknown
需要
ARG1
ARG0
person
你
name
name
op1
op2
霍默
辛普森
当 你 需要 他 时 , 霍默 辛普森 在 哪里 ？

AMRICA


在 / be-located-at-91
TOP
location
ARG2
time
ARG0
ARG1
amr-unknown
需要 / need-01
ARG1
ARG0
person
你 / you
name
name
op1
op2
霍默 / Homer
辛普森 / Simpson
Where 's Homer Simpson when you need him ?
当 你 需要 他 时 , 霍默·辛普森 在 哪里 ?

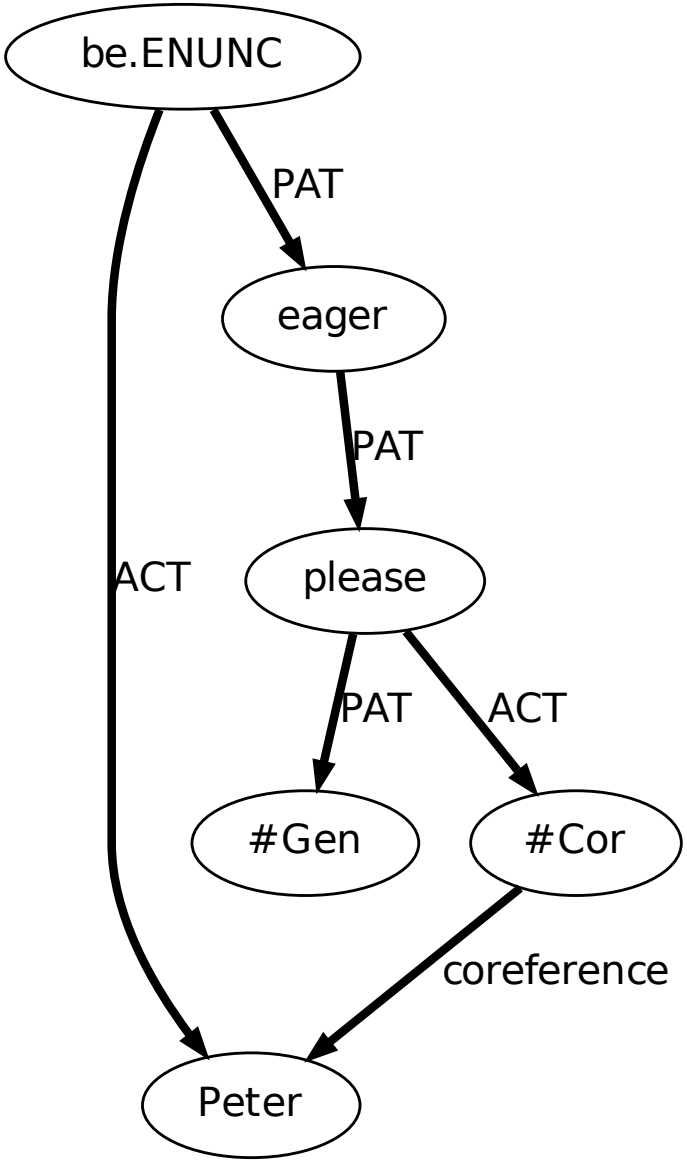
T-layer to AMR conversion

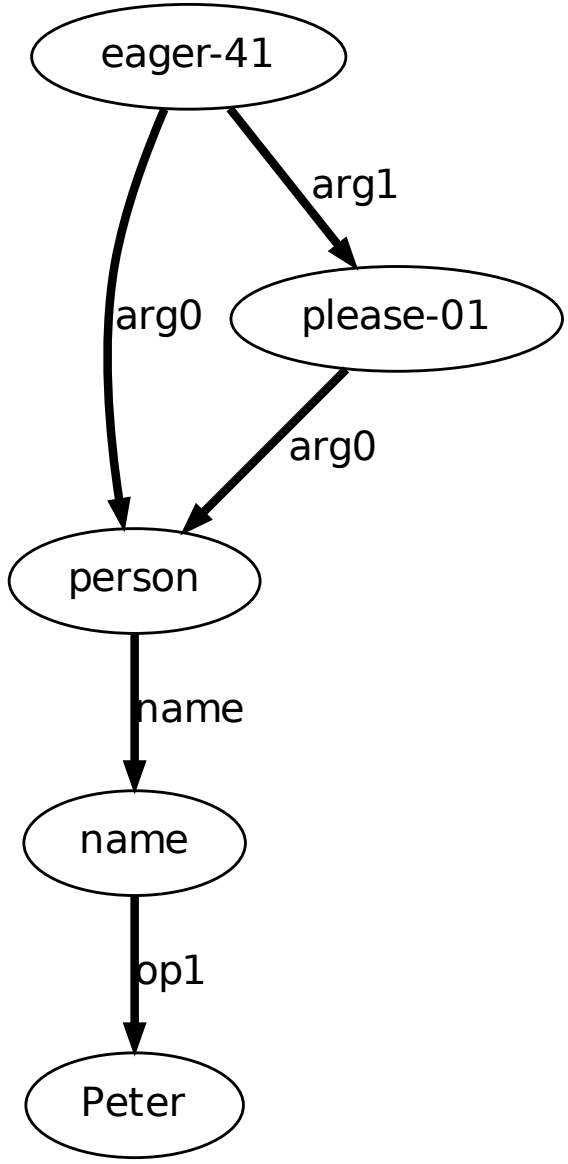
- PCEDT: Large parallel corpus (WSJ) annotated with t-layer for English and Czech
- T-layer to AMR conversion would provide a large static parallel AMR corpus.
- Could be used dynamically to turn a "t-layer" parser into an AMR parser.

Why this might work

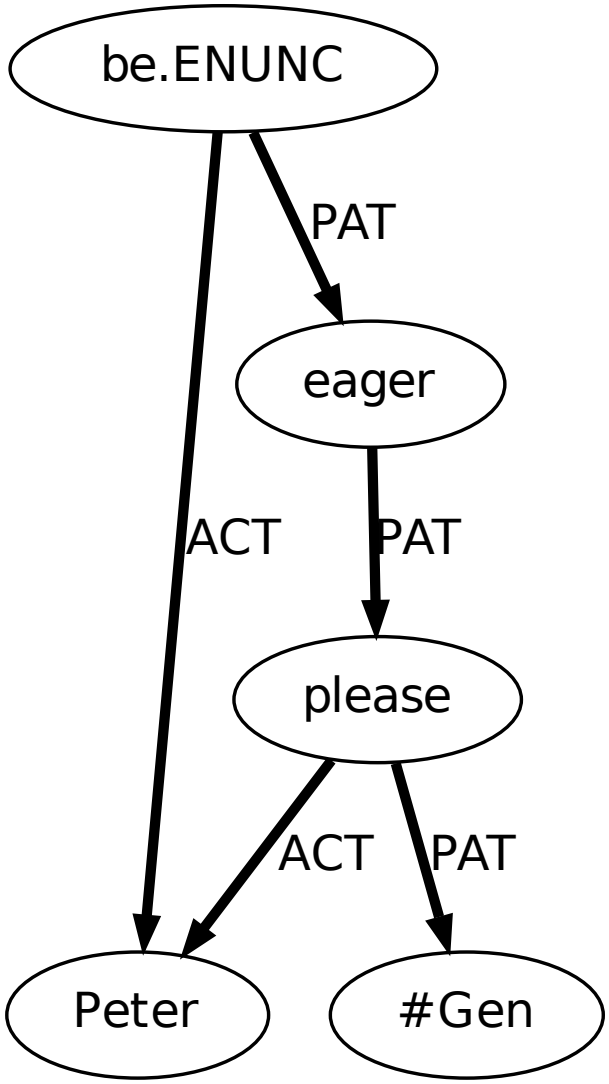
- AMR and t-layer are very similar:
  - Both abstract away from syntax.
  - Both make all semantic links in a sentence in a graph format.
  - Both do coreference
- Various minor structural differences.
- AMR is more abstract, makes more inference.

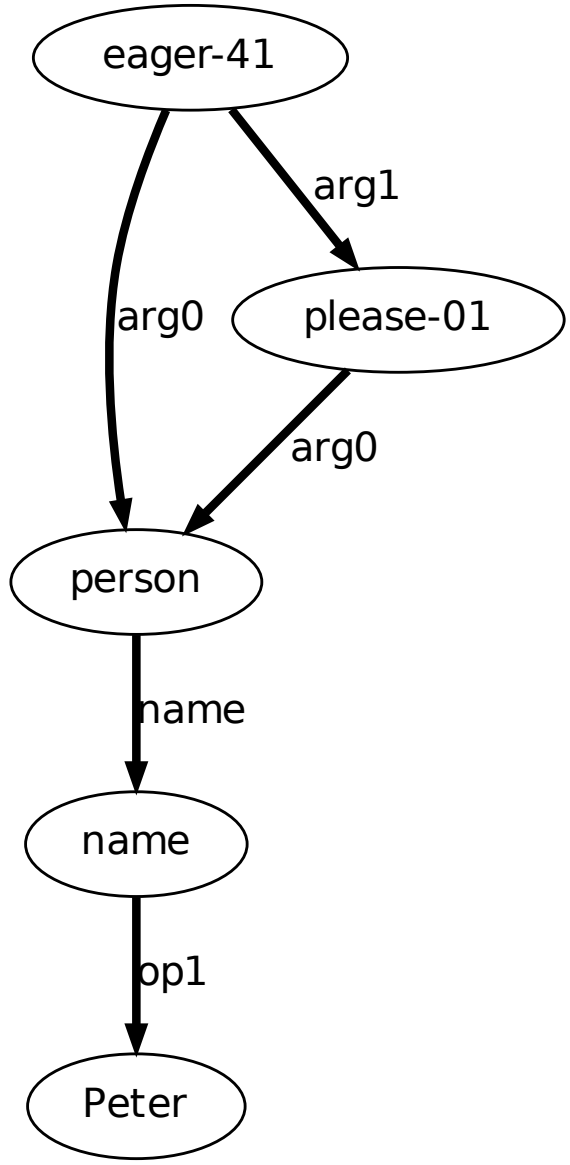
“Peter is eager to please”



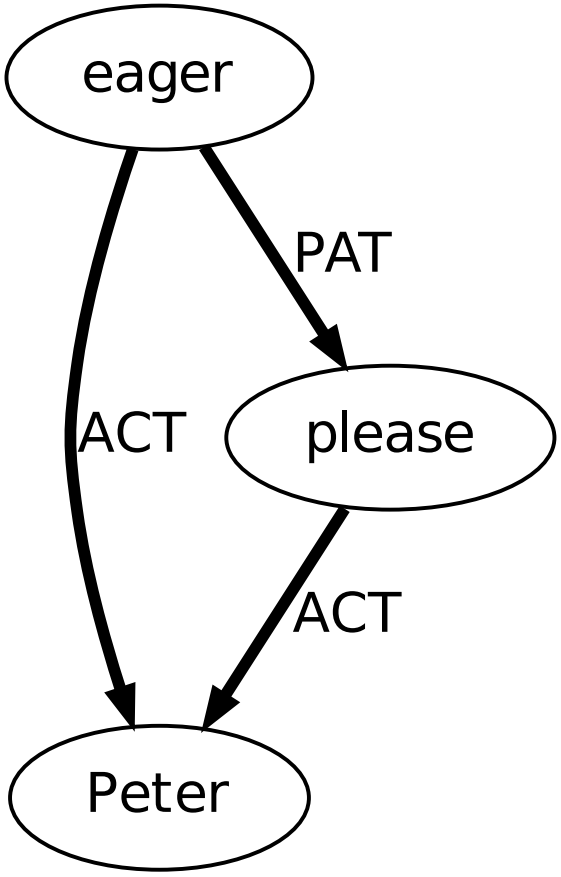


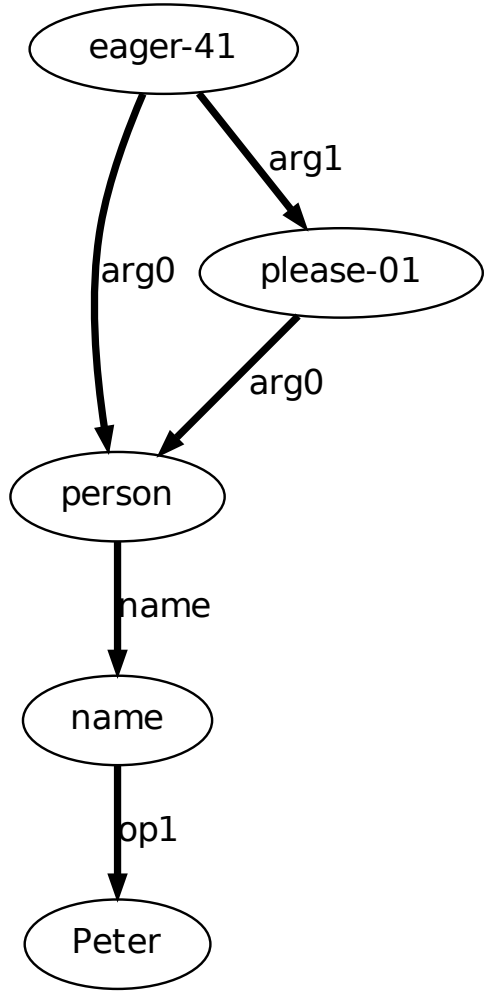
Merging of Coreferent Nodes



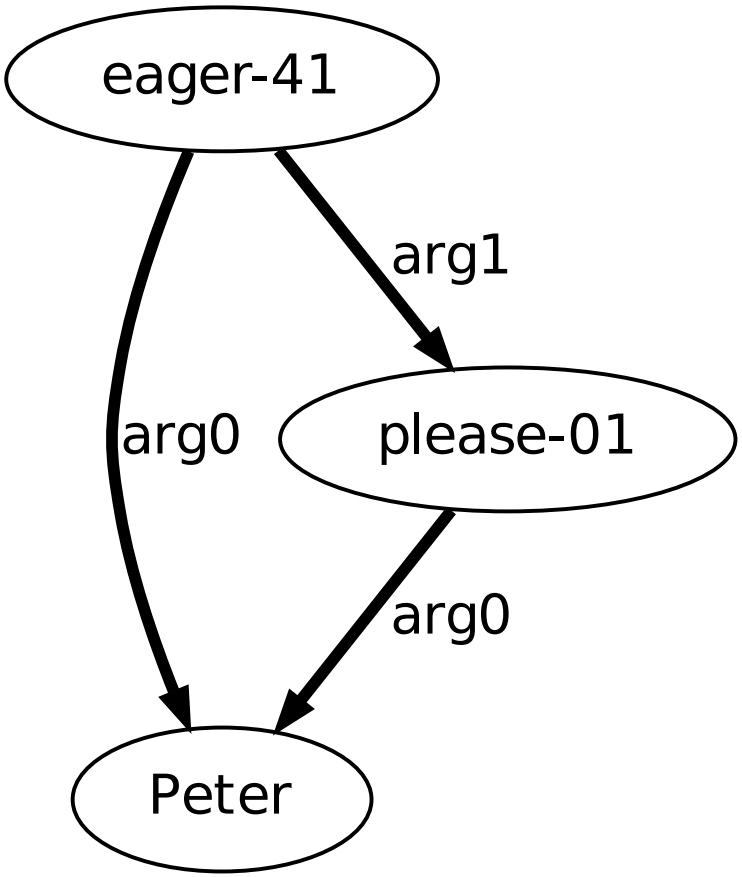


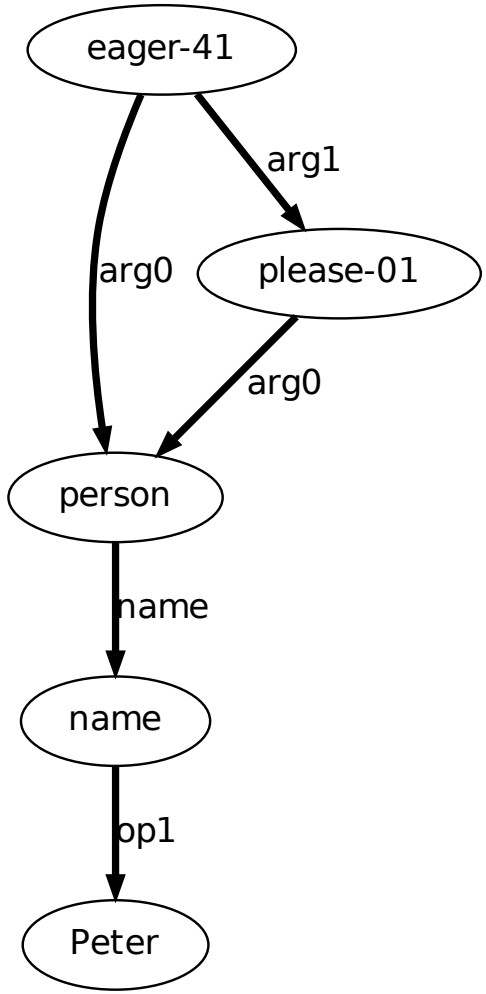
Elimination of semantically light words



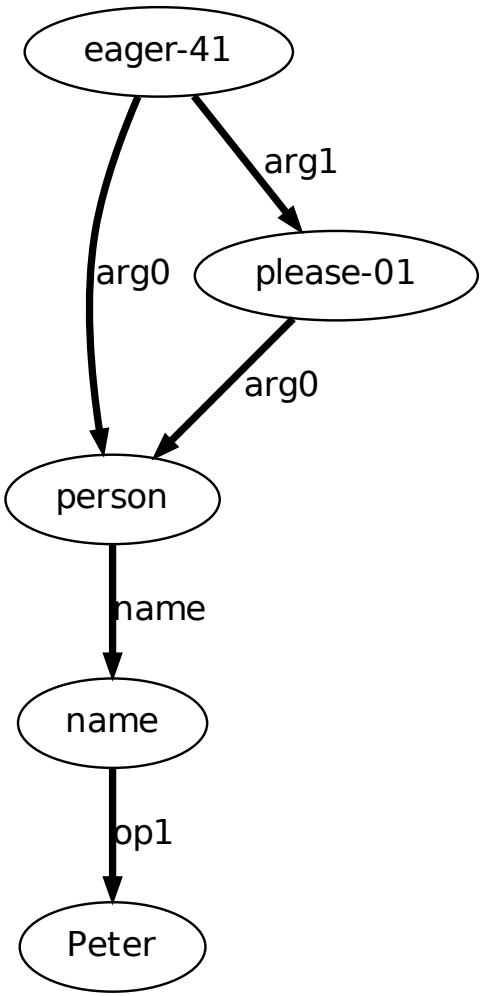


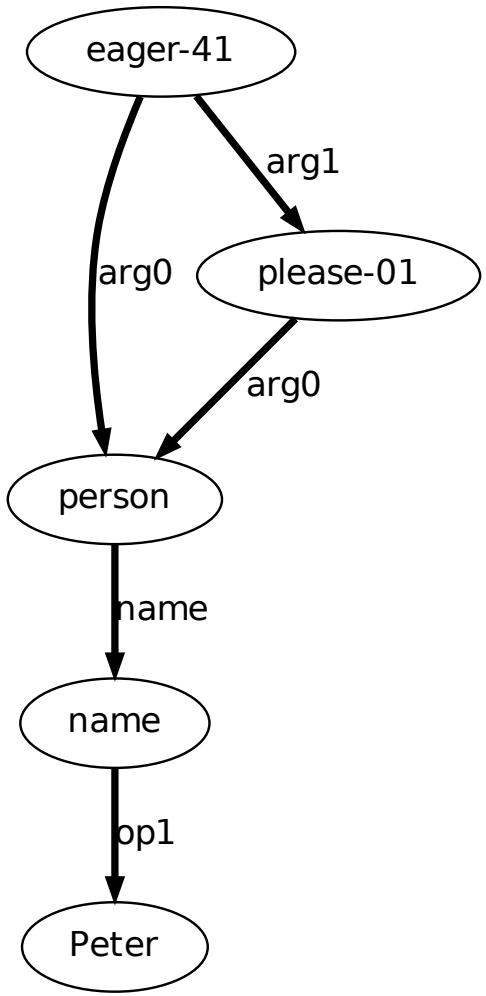
Semantic Roles and Senses





Add Named Entities





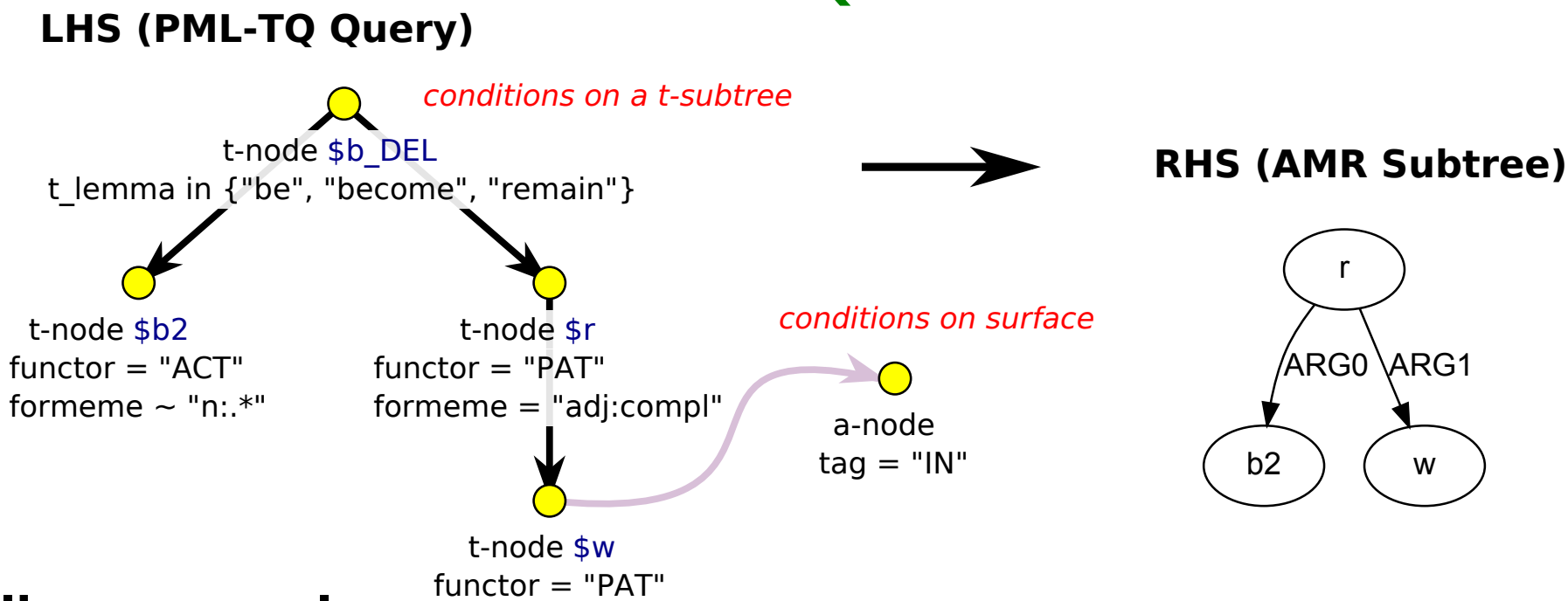
Conversion Procedures

- Converted t-trees to AMR format
- Added named entities using NER systems (Stanford and NameTag)
- Tried two strategies for doing more complex changes to the graphs:
  - PML-TQ
  - Tsurgeon
- List-based verbalization and semantic role mapping

PML-TQ rules

- Based on AMR guidelines (generalized)
- For copula, attributes, non-core roles . . .

A PML-TQ rule

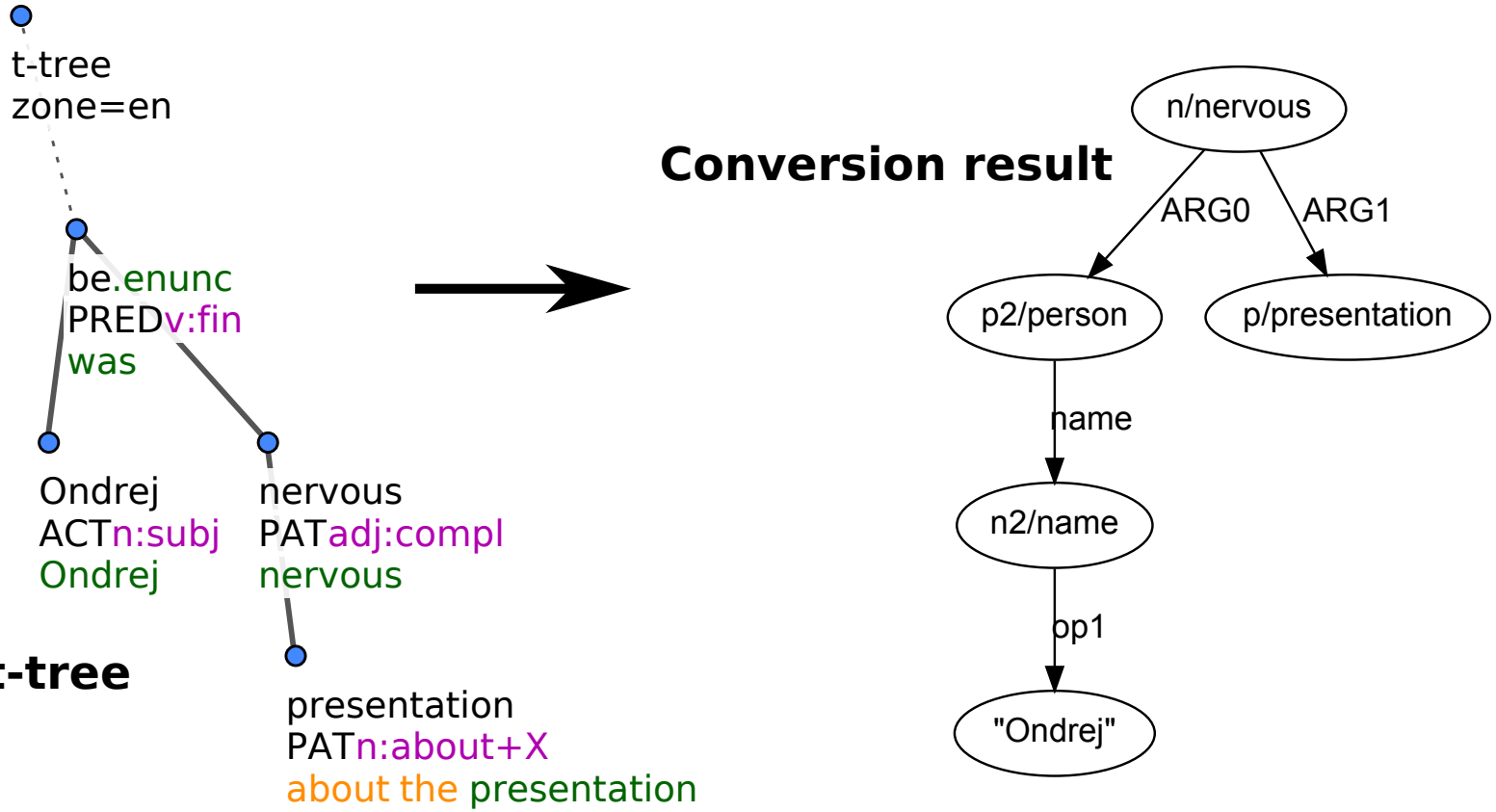


Guidelines example:

The boy is responsible for the work.

PML-TQ rules

Rule application



Matching sentence:

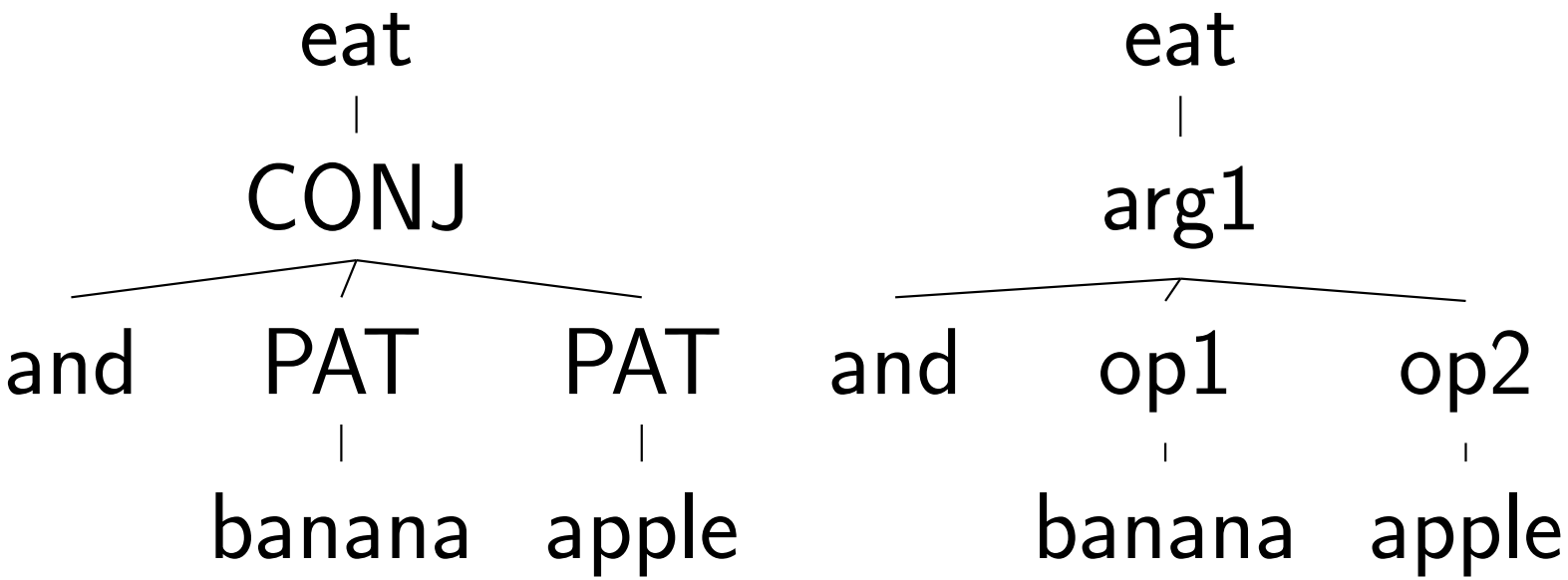
Ondrej was nervous about the presentation.

Tsurgeon tree transformation rules

- We converted to constituency trees so as to use a tree tranformation tool, **Tsurgeon** (Levy and Andrews 2006) to quickly implement hand-written rules.

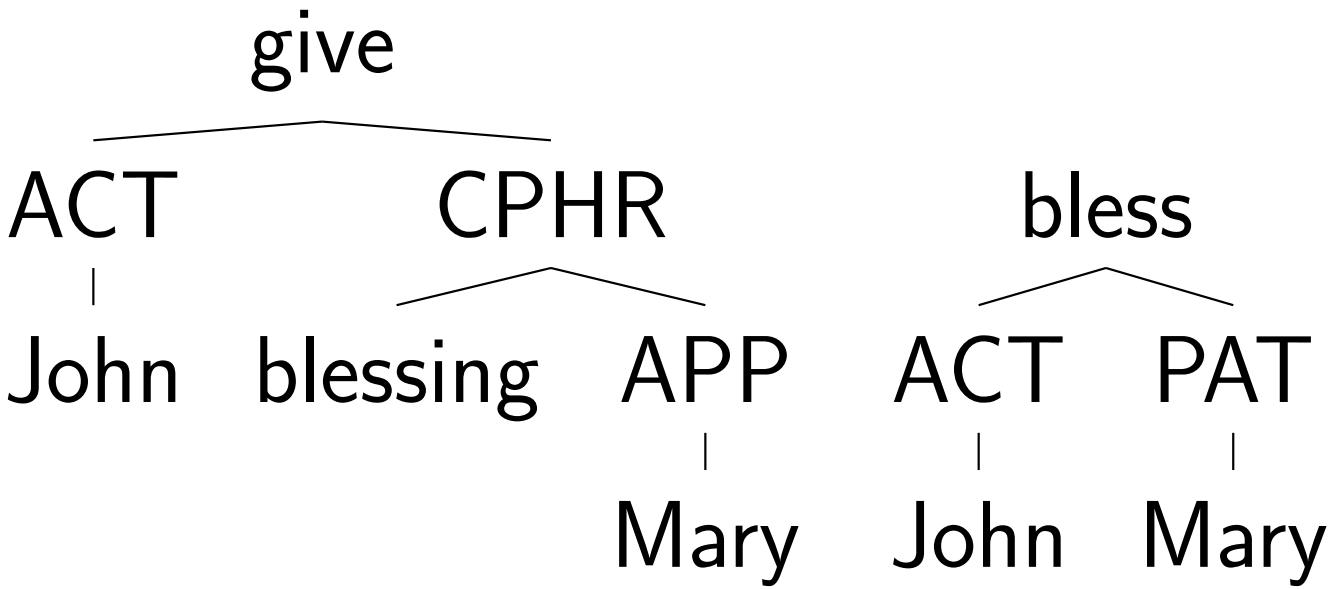
Tsurgeon tree transformation rules

- Many of the structural differences are just notational differences:



List-based Methods

- Verbalizations are based on dictionary look-ups:
  - beekeeper $\rightarrow$ person :ARG0-of keep-01 :ARG1 bee
- As are complex predications:



Using Existing Resources

	Vallex	Propbank Lexicon	Other WSJ annotation	Lexical Lists
Map t-layer roles to AMR roles	X	X	X	
Verbalize nouns/adjectives		X		X
Introduce inferrable predicates				X
Named Entities			X	X

Results of EN t-to-AMR Conv

	Semantic Role Mapping	Named Entities	Verbalization Lists	Smatch	Smatch w/o senses
Baseline (direct conversion)				20	28
Baseline (direct conversion)	X			33	41
Baseline (direct conversion)	X	X		37	45
Baseline (direct conversion)	X	X	X	40	48
PML-TQ (guidelines-based)	X		X	35	43
PML-TQ (guidelines-based)	X	X	X	38	47
Tsurgeon (rule-based)	X	X	X	44	52
JAMR				44	45