AMR at JHU Summer Workshop

Abstract Meaning Representation vs. Tectogrammatics

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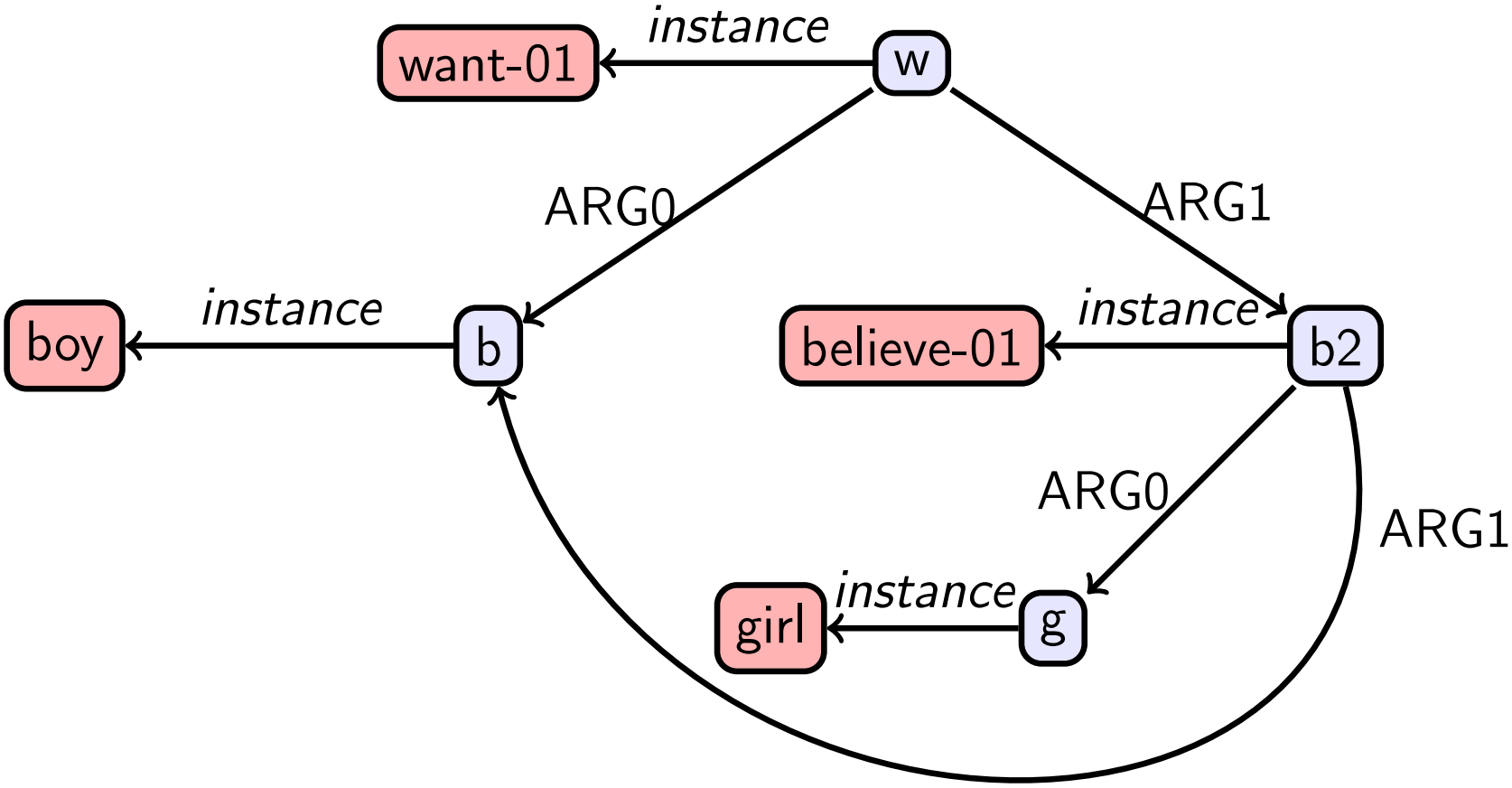
JHU Summer Workshop 2014 in Prague

- ASR Machines That Know When They Do Not Know; led by Hynek Heřmanský
- PRELIM Probabilistic Representations of Linguistic Meaning, led by Jason Eisner and Ben Van Durme
- CLAMR Cross-Lingual Abstract Meaning Representations for Machine Translation; led by Martha Palmer
  - Graph-theoretic team (Dan Gildea, David Chiang, Adam Lopez, Giorgio Satta, Naomi Saphra,...)
  - AMR Parsing team (Jeff Flanigan, Xiaochang Peng, Chuan Wang, Yuchen Zhang, Wei-te Chen,...)
  - Tecto-to-AMR team (Tim O'Gorman, Ondřej Bojar, Ondřej Dušek, Roman Sudarikov, Zdeňka Urešová, Silvie Cinková, Martin Popel,...)

Motivation for Tecto-to-AMR

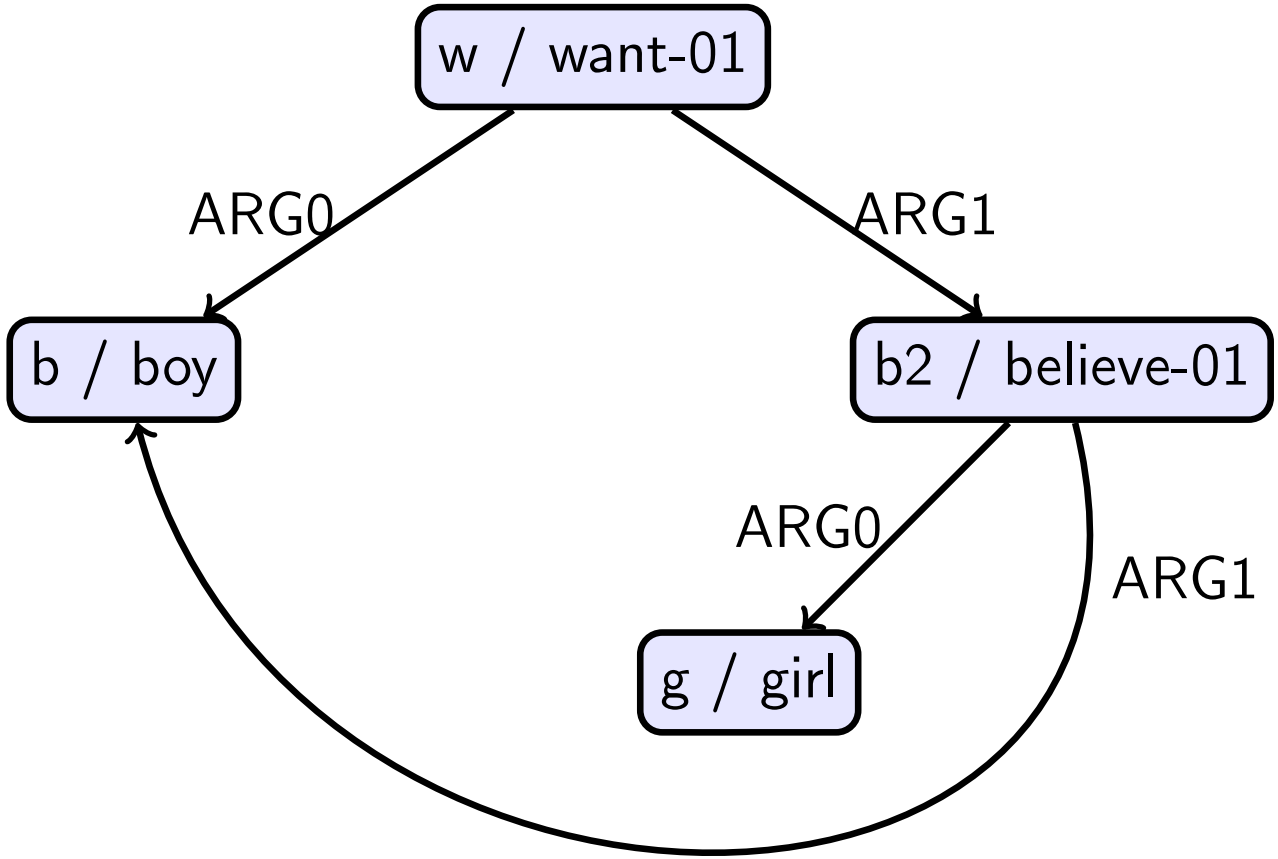
- convert PCEDT and CzEng to AMR
- (yet another) pipeline for AMR parsing
- explore the differences between
  - AMR and Tecto
  - Czech and English AMR

AMR basics



- The boy wants the girl to believe him.
- The boy wants to be believed by the girl.
- The boy has a desire to be believed by the girl.
- The boy's desire is for the girl to believe him.
- The boy is desirous of the girl believing him.

AMR basics



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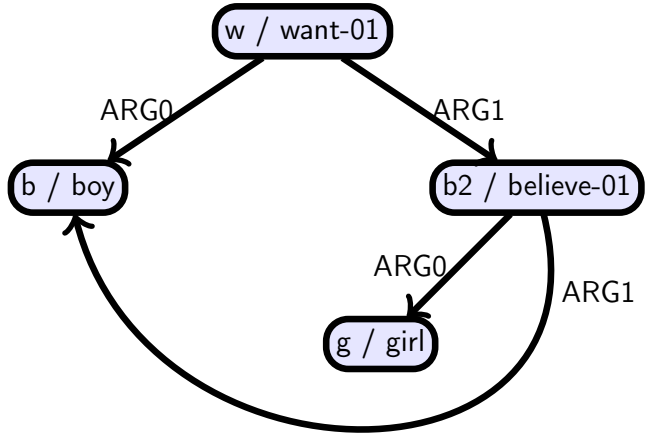


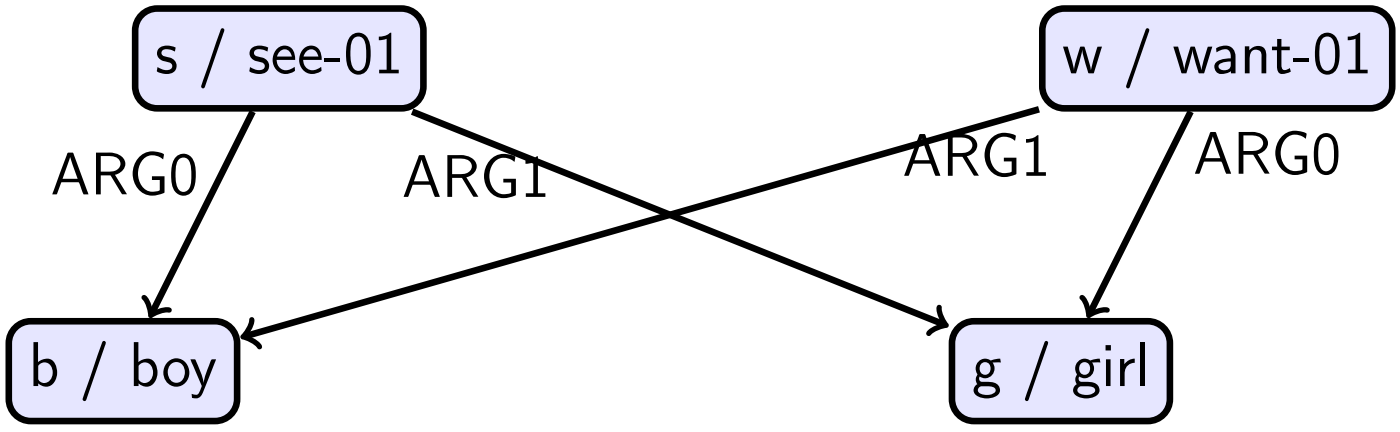
Penman format

```
(w / want-01
    :ARG0 (b / boy)
    :ARG1 (b2 / believe-01
        :ARG0 (g / girl)
        :ARG1 b))
```

Triples format

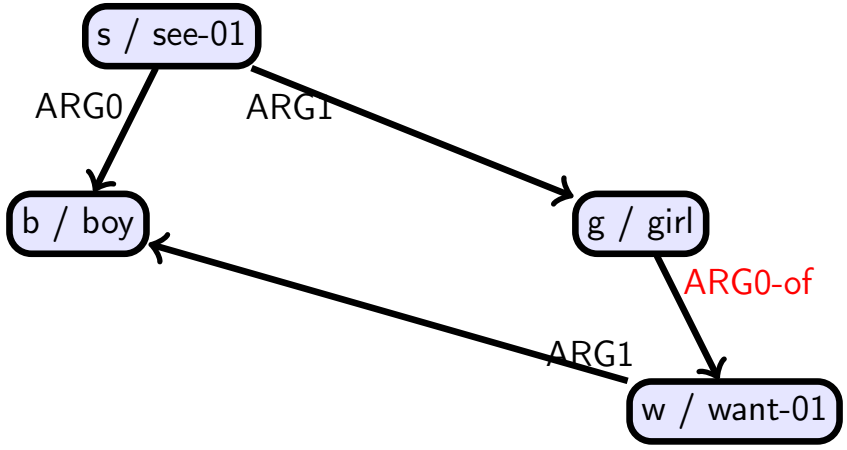
instance(w, want-01)
instance(b, boy)
instance(b2, believe-01)
instance(g, girl)
ARG0(w, b)
ARG1(w, b2)
ARG0(b2, g)
ARG1(b2, b)

AMR basics – inverse roles and re-focusing



- The boy saw the girl. The girl wants the boy.
- The boy saw the girl who wanted him.
- The boy saw the girl who he was wanted by.
- The girl who wanted the boy was seen by him.

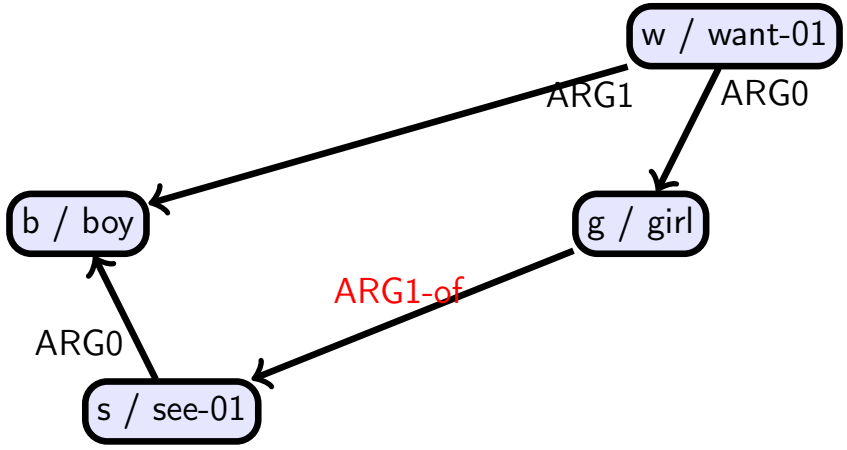
AMR basics – inverse roles and re-focusing



- The boy saw the girl who wanted him.
- The boy saw the girl who he was wanted by.
- The girl who wanted the boy was seen by him.

```
(s / see-01
    :ARG0 (b / boy)
    :ARG1 (g / girl
        :ARG0-of (w / want-01
            :ARG1 b)))
```

AMR basics – inverse roles and re-focusing



- The girl who was seen by the boy wants him.
- The boy is wanted by the girl he saw.
- The girl wanted the boy who saw her.

```
(w / want-01
    :ARG0 (g / girl
        :ARG1-of (s / see-01
            :ARG0 (b / boy)))
    :ARG1 b)
```

AMR (v1.2) relations

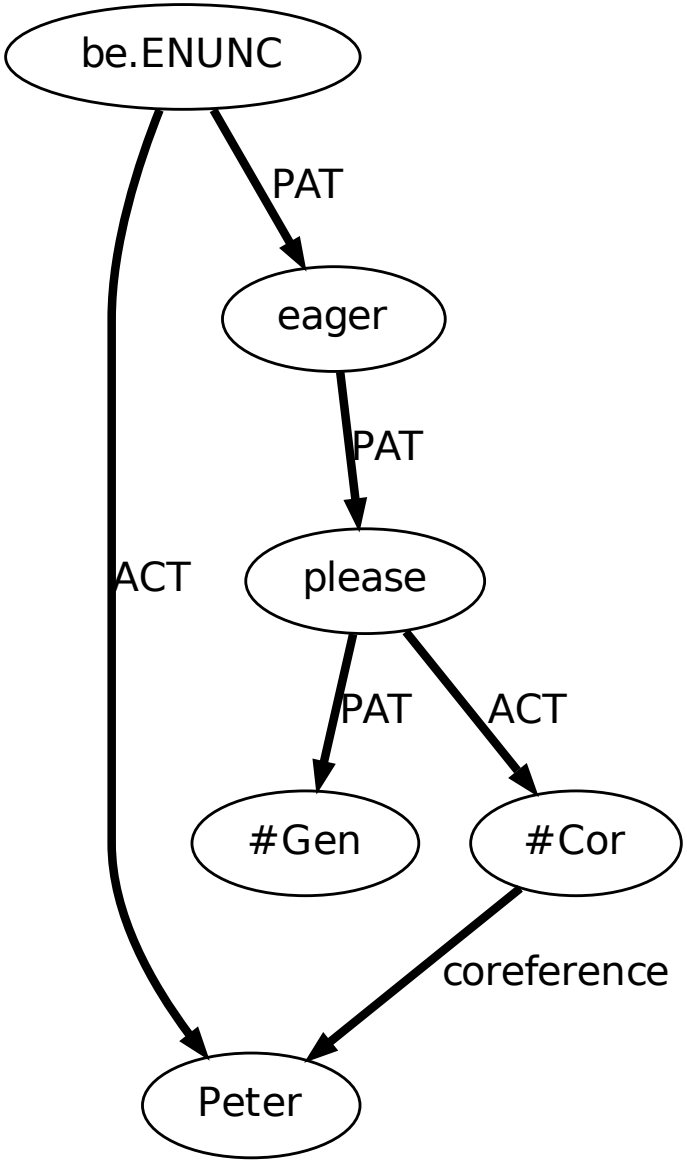
Core	:ARG0, :ARG1, :ARG2, :ARG3, :ARG4, :ARG5 (OntoNotes)
Coord	:op1, :op2, :op3, :op4, . . .
Date	:calendar, :century, :day, :dayperiod, :decade, :era, :month, :quarter, :season, :timezone, :weekday, :year, :year2
Other	:accompanier, :age, :beneficiary, :compared-to, :concession, :condition, :consist-of, :degree, :destination, :direction, :domain, :duration, :example, :extent, :frequency, :instrument, :location, :manner, :medium, :mod, :mode, :name, :ord, :part, :path, :polarity, :poss, :purpose, :quant, :scale, :source, :subevent, :time, :topic, :unit, :value

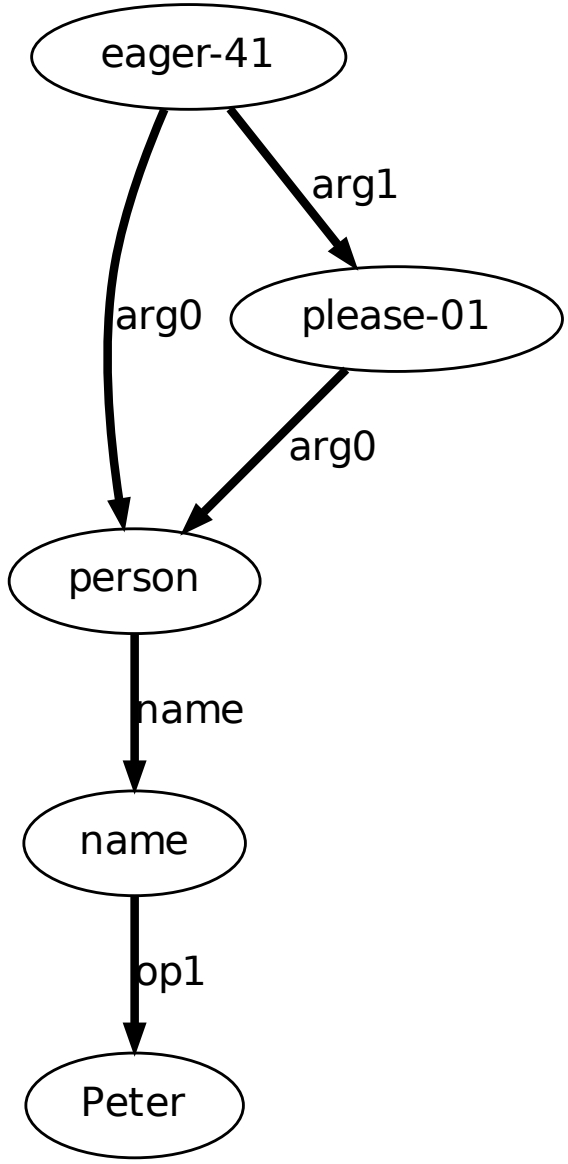
For details see `http://amr.isi.edu/` and AMR guidelines.

What's done

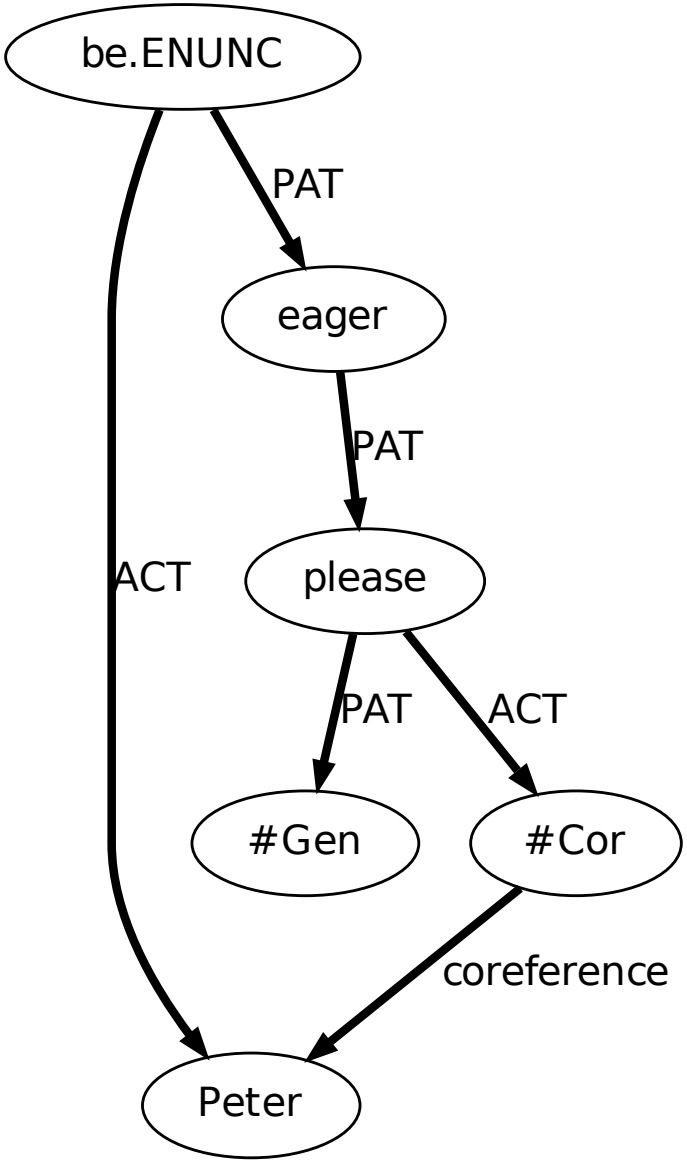
- 100 Czech sentences manually annotated with AMR
- Treex support (`Read::Amr`, TrEd visualization of t-amr layer)
- Tecto-to-AMR transformation using PML-TQ
- Tecto-to-AMR transformation using Tsurgeon
- NameTag trained for English (by Milan Straka, on BBN)
- feedback for Martha Palmer (light verb constructions)
- complex predications list (*give blessing* $\rightarrow$ *bless*)
- verbalization list
  (*beekeeper* $\rightarrow$ person :ARG0-of keep-01 :ARG1 bee)
- ...

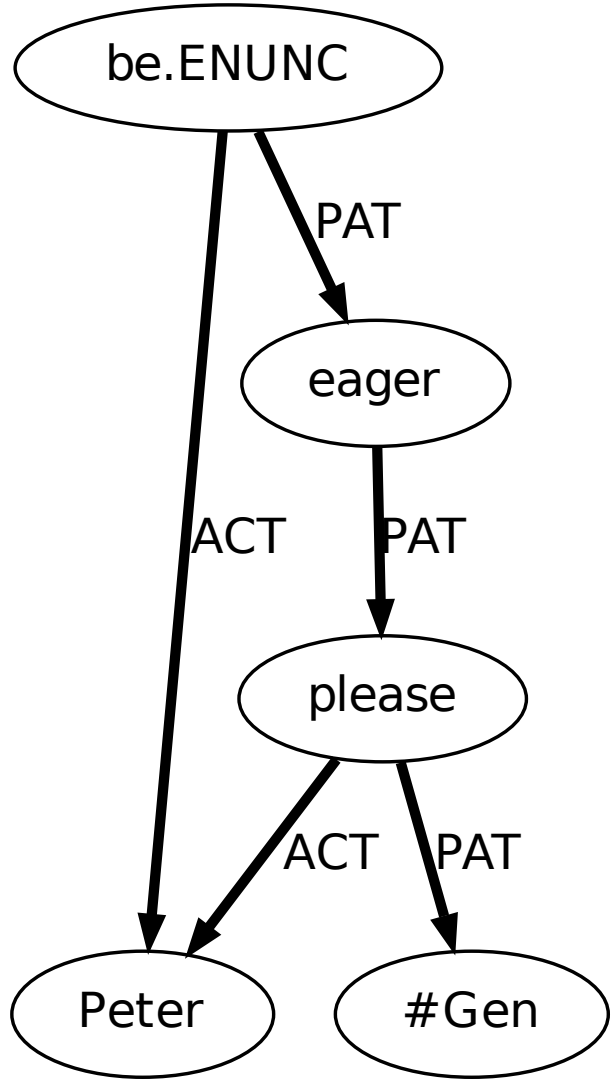
Tecto-to-AMR: “Peter is eager to please"



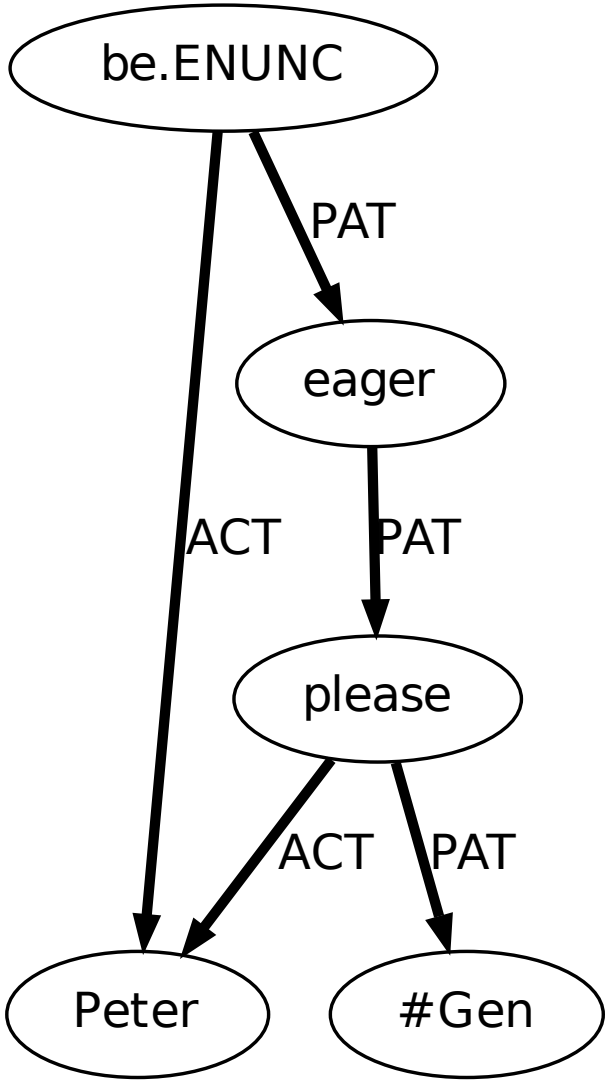


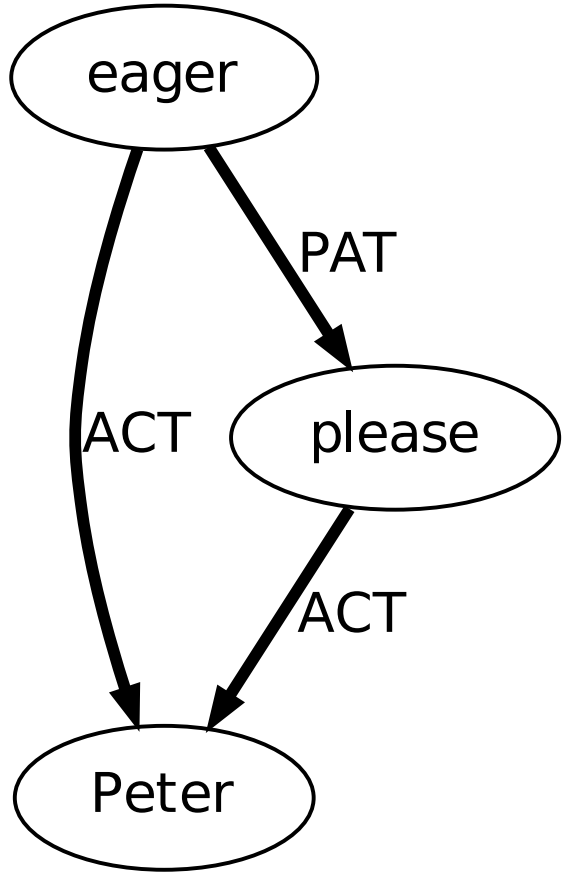
Tecto-to-AMR: 1. Merging of Coreferent Nodes



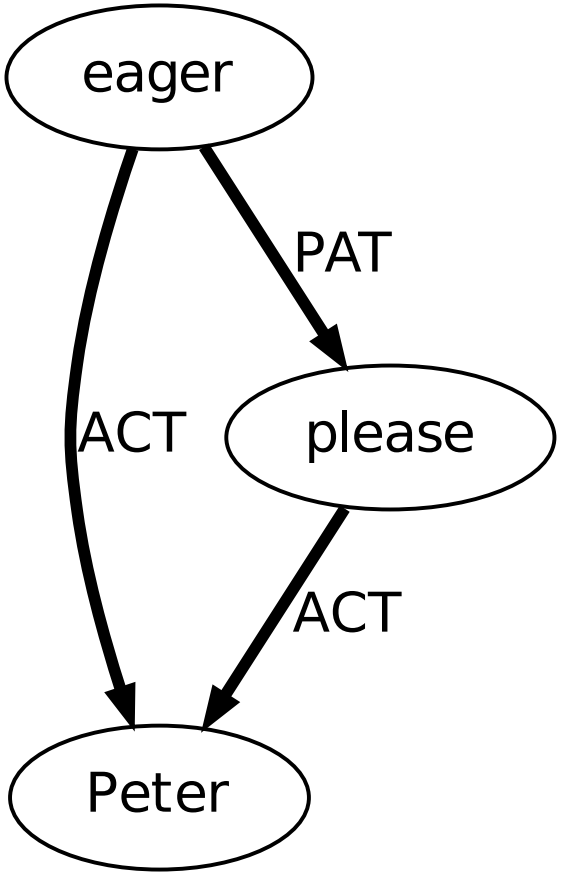


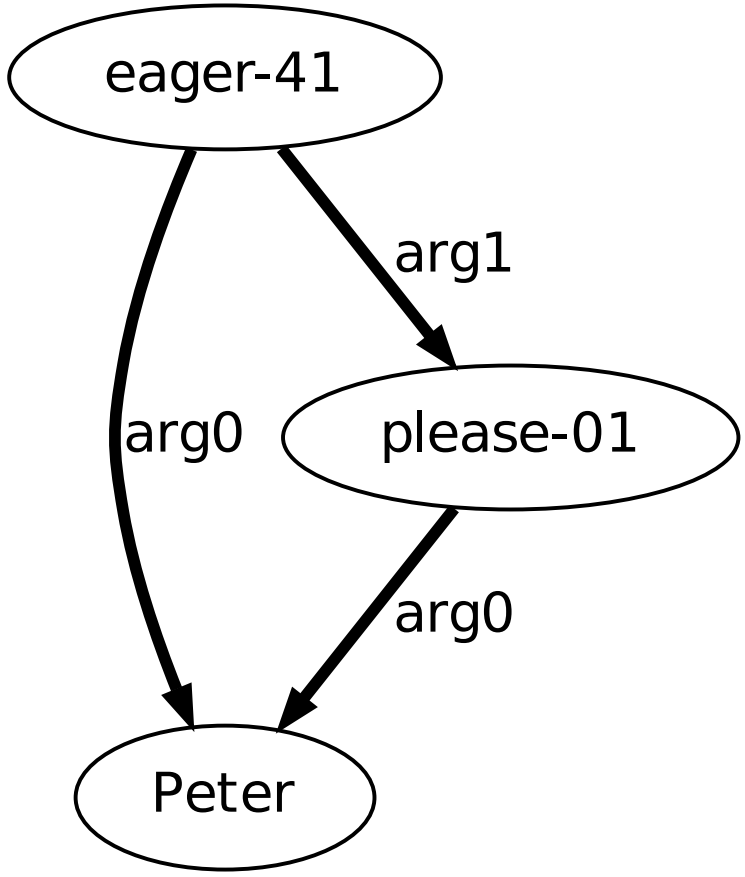
Tecto-to-AMR: 2. Elimination of semantically light words



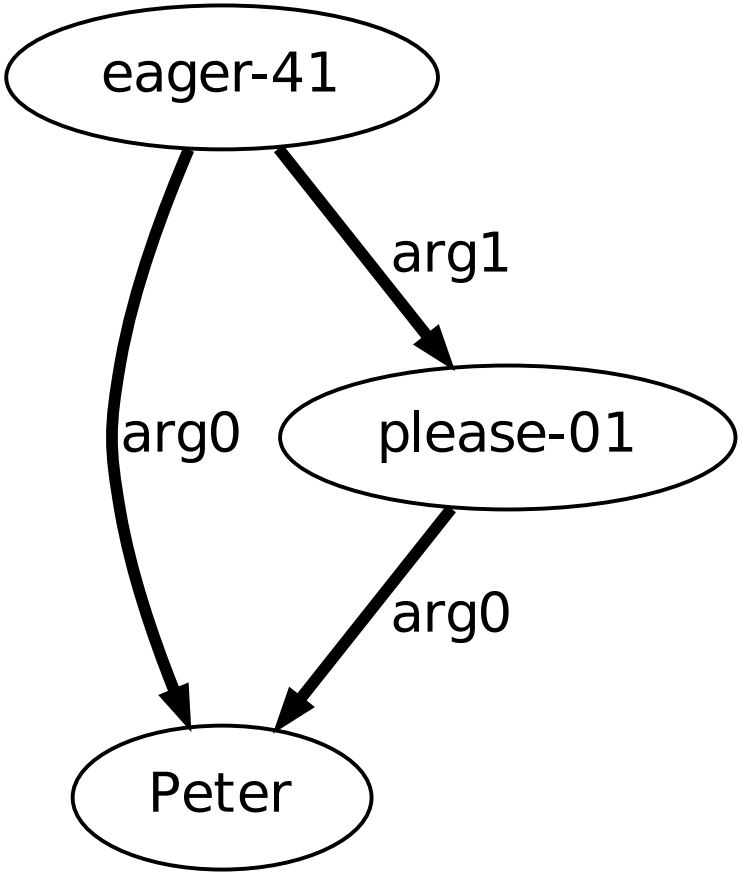


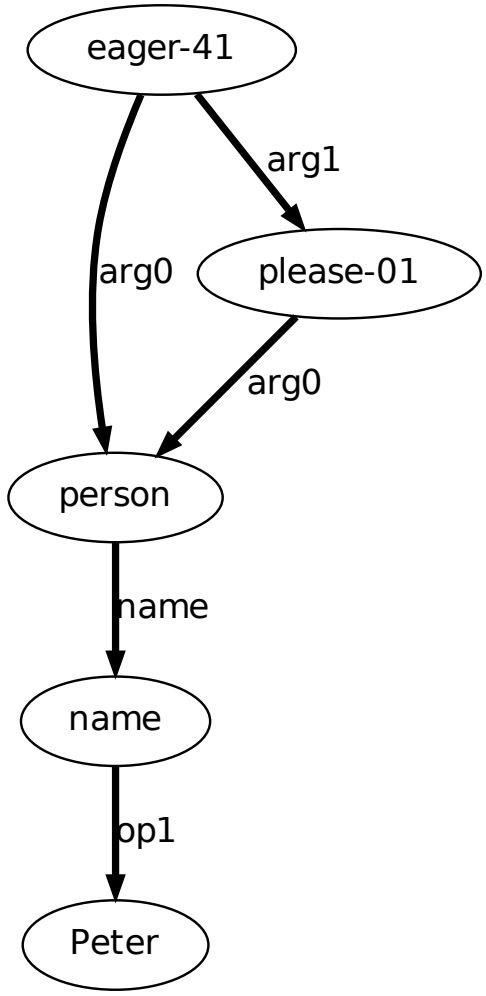
Tecto-to-AMR: 3. Semantic Roles and Senses





Tecto-to-AMR: 4. Add Named Entities

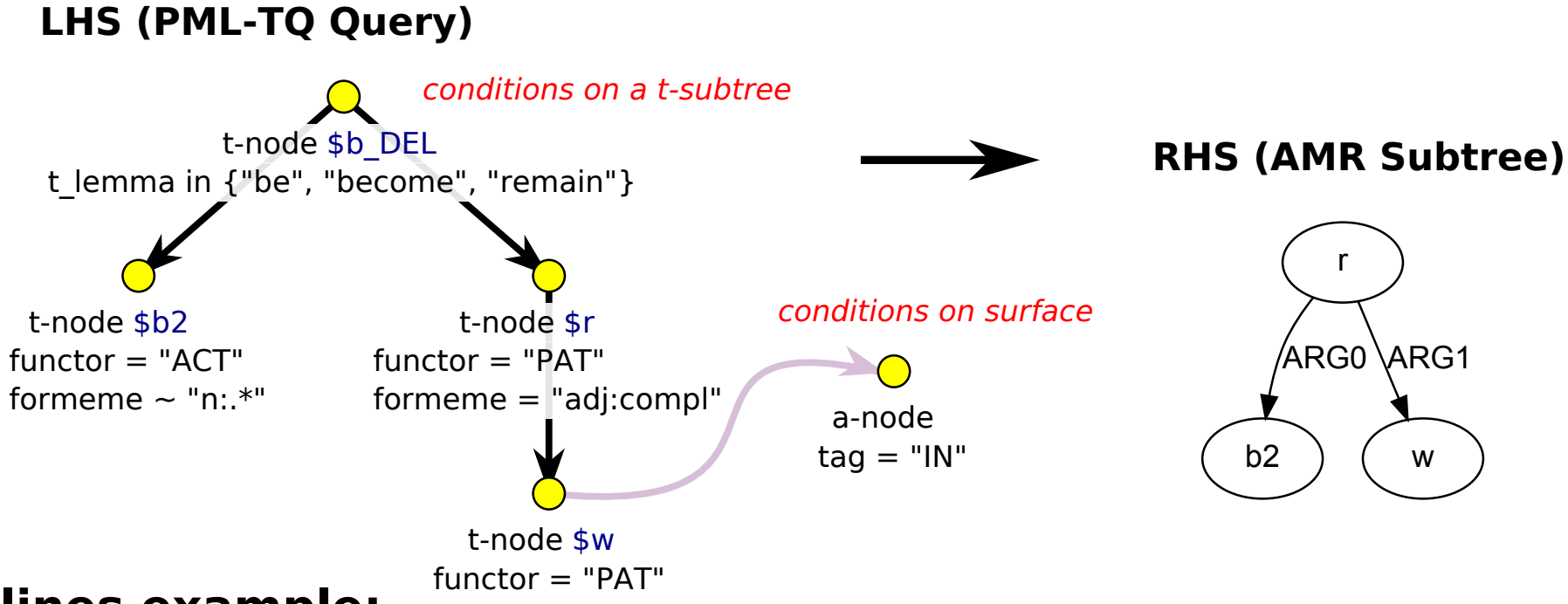




PML-TQ rules

- Based on AMR guidelines (generalized)
- For copula, attributes, non-core roles . . .
- PML-TQ is for querying, not for transformation

A PML-TQ rule

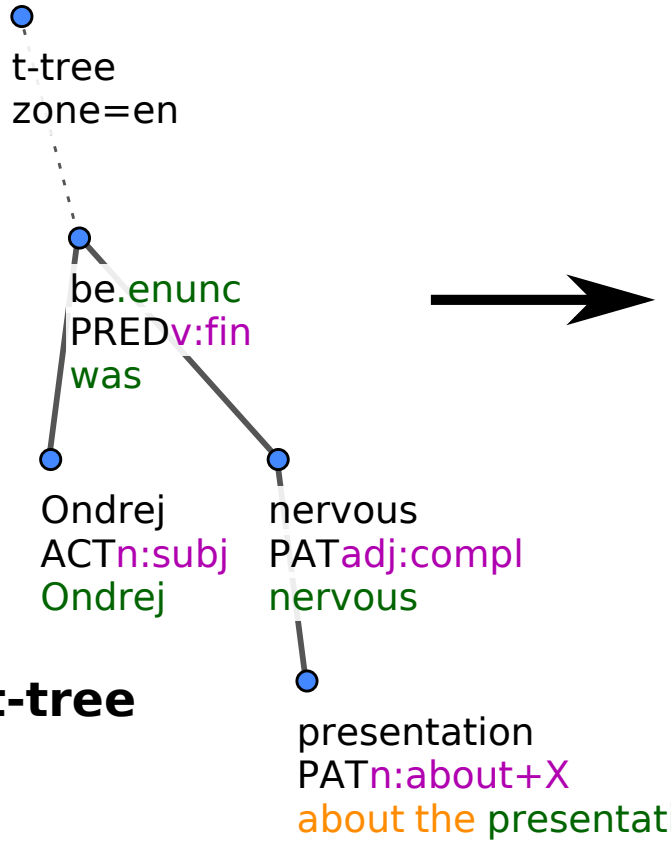


Guidelines example:

The boy is responsible for the work.

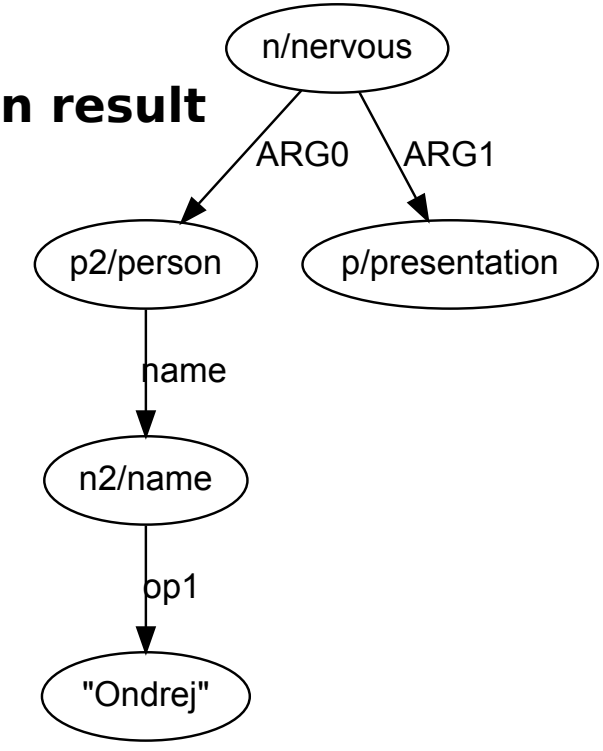
PML-TQ rules

Rule application



Matching t-tree

Conversion result



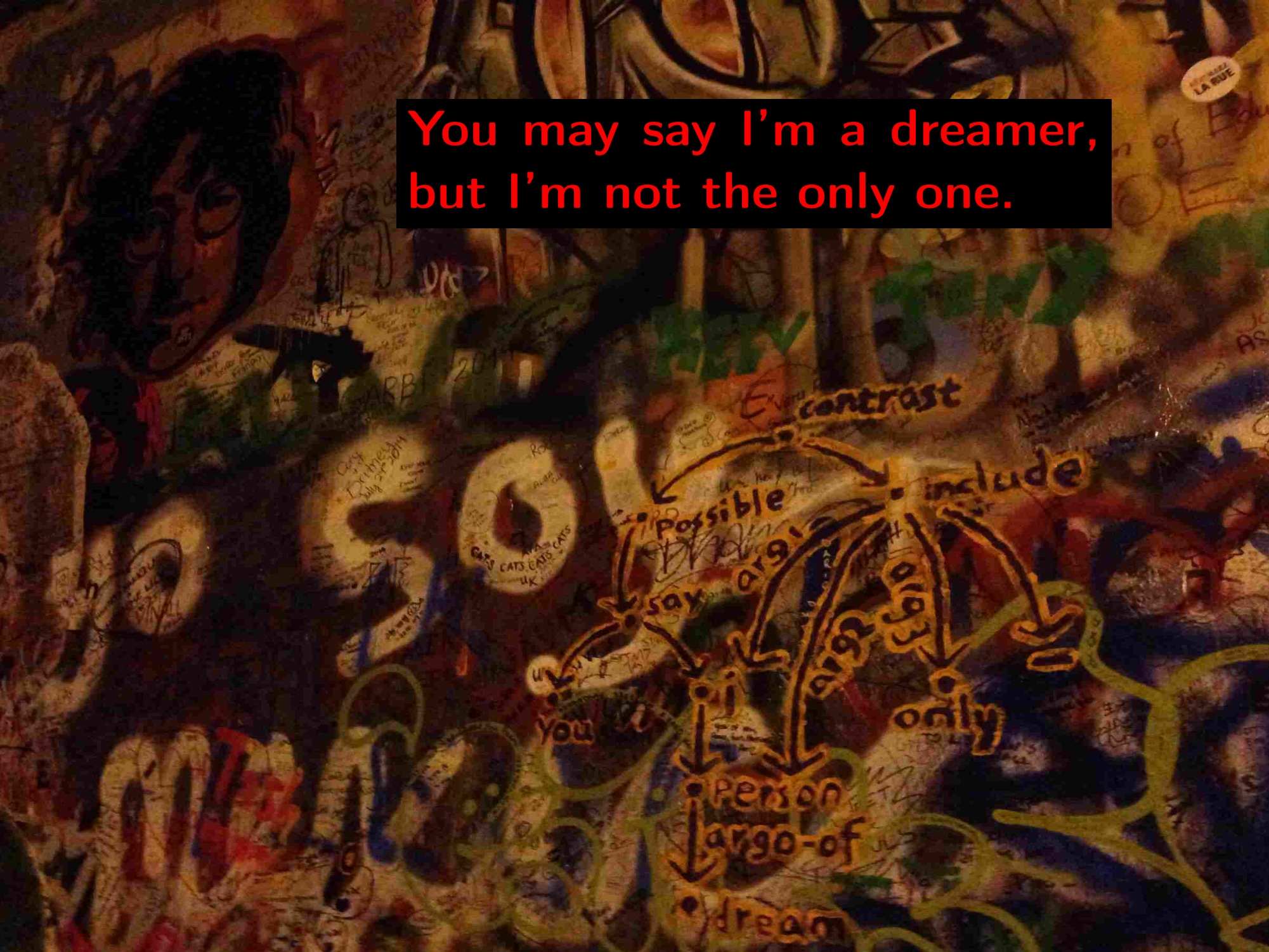
Matching sentence:

Ondrej was nervous about the presentation.

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 (text-to-AMR parser)				44	45


contrast
Possible
include
say
you
if
only
Person
largo-of
dream


You may say I'm a dreamer,
but I'm not the only one.
contrast
include
Possible
say
you
only
Person
dream