Integrated Semantic Framework Update

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What ISF does

- Unifies lexical semantics (Wordnet) and structure semantics (DMRS) in a single representation
- Provides Predicate-Synsets mapping
- Provides a database of known constructions and transforms (some) structures
- Performs Word-Sense Disambiguation
- Performs batch processing textual data using Python
  - isf code: https://github.com/letuananh/intsem.fx
  - WSD code: https://github.com/letuananh/lelesk
  - corpus handler: https://github.com/letuananh/visualkopasu

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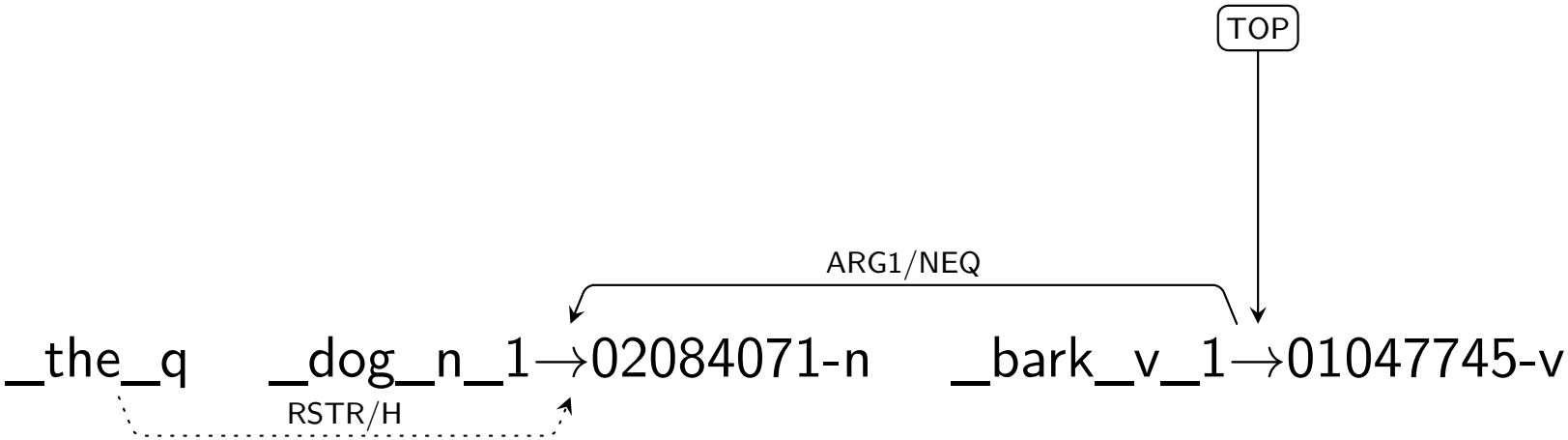
The easy cases

The dog barked.

- _dog_n_1 → 02084071-n
- _bark_v_1 → 01047745-v



Actually maps to multiple synsets and then does WSD.

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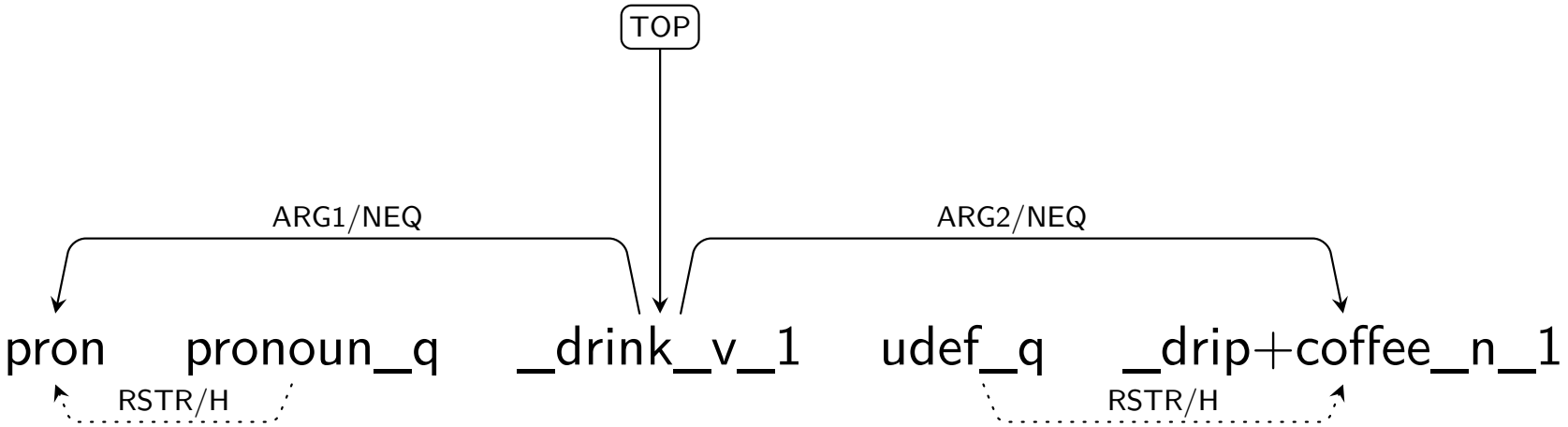
Noun-noun compounds

I drink drip coffee.

_drip_n_1 + _coffee_n_1 → _drip+coffee_n_1



- _drink_v_1 → 01170052-v: take in liquids
- _drip+coffee_n_1 → 07919894-n: coffee made by passing boiling water through a perforated container packed with finely ground coffee
- System merges _drip_n_1, udef_q, compound and _coffee_n_1
- Based on parsing MWEs in WN with the ERG

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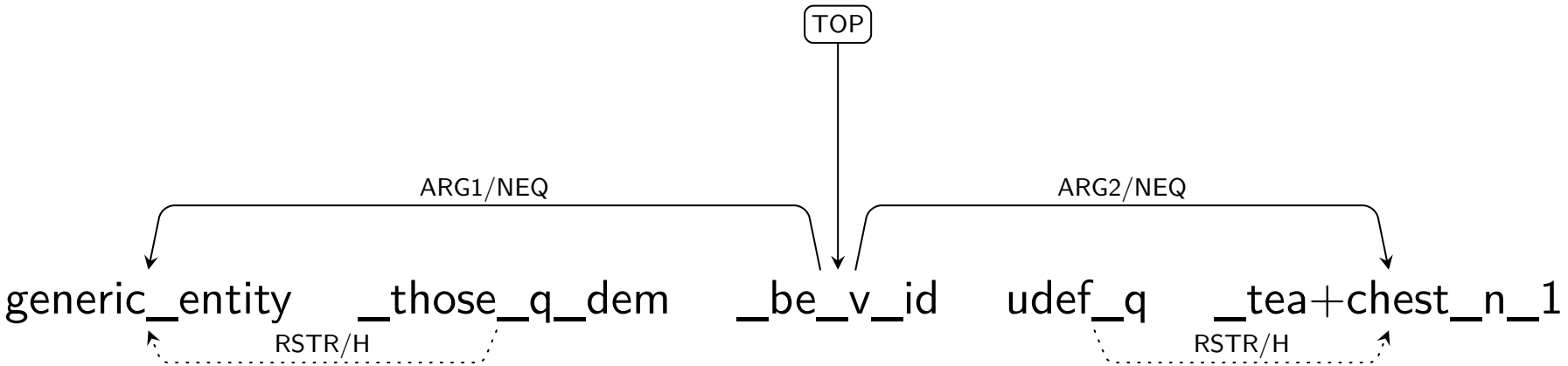
Noun-noun compounds (cont.)

Those are tea chests.



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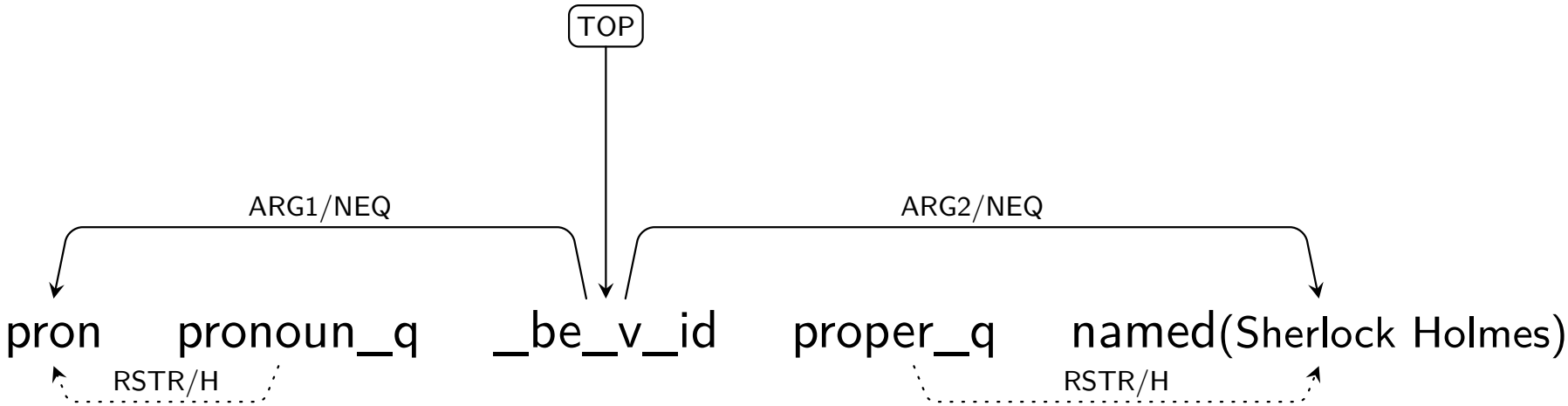
Compound names

He is Sherlock Holmes.



Sense-Predicate mapping

- Sense-Pred Mapping: To map gold annotations to DMRS
- Pred-Sense Mapping: To provide candidates for WSD
- Word-Sense Disambiguation
  - DMRS predicates are useful for constraining sense candidates in WSD
  - Construction transformation is useful for detecting multi-word expressions

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Best of Each

Tokenizer	Lemmatizer	Recall	Precision	F1
Dan/bridge/ISF	Dan/bridge/ISF	47.54%	45.03%	**46.25%**
Dan/ISF	Dan/ISF	47.36%	44.83%	46.06%
Dan/bridge	Dan/bridge	46.75%	42.82%	44.70%
Dan	Dan	46.55%	42.60%	44.49%
ERG/ISF	ERG/ISF	47.44%	43.37%	45.31%
ERG	ERG	46.85%	42.02%	44.30%
NLTK	NLTK	43.43%	29.24%	34.95%
Stanford tagger	NLTK	36.58%	27.27%	31.24%

Table: Scored based on parse-able sentences from each method

The same (not very good) WSD applied over all configurations

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Fair Comparison

Tokenizer	Lemmatizer	Recall	Precision	F1
Dan/bridge/ISF	Dan/bridge/ISF	46.57%	44.40%	45.46%
Dan/ISF	Dan/ISF	46.74%	44.40%	**45.54%**
Dan/bridge	Dan/bridge	45.76%	42.20%	43.91%
Dan	Dan	45.87%	42.18%	43.95%
ERG/ISF	ERG/ISF	47.22%	43.26%	45.15%
ERG	ERG	46.68%	41.95%	44.19%
NLTK	NLTK	43.49%	29.12%	34.89%
Stanford tagger	NLTK	36.58%	27.16%	31.17%

Table: Scored based on sentences that can be parsed by all (541 sentences)

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All

Tokenizer	Lemmatizer	Recall	Precision	F1
Dan/bridge/ISF	Dan/bridge/ISF	45.93%	45.03%	**45.48%**
Dan/ISF	Dan/ISF	43.08%	44.83%	43.94%
Dan/bridge	Dan/bridge	45.17%	42.82%	43.97%
Dan	Dan	42.34%	42.60%	42.47%
ERG/ISF	ERG/ISF	38.47%	43.37%	40.77%
ERG	ERG	37.99%	42.02%	39.90%
NLTK	NLTK	43.43%	29.24%	34.95%
Stanford tagger	NLTK	36.58%	27.27%	31.24%

Table: Scored based on all sentences (599 sentences). If a sentence could not be parsed recall will be worse.

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