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Parsing Natural Language Sentences by Semi-supervised Methods

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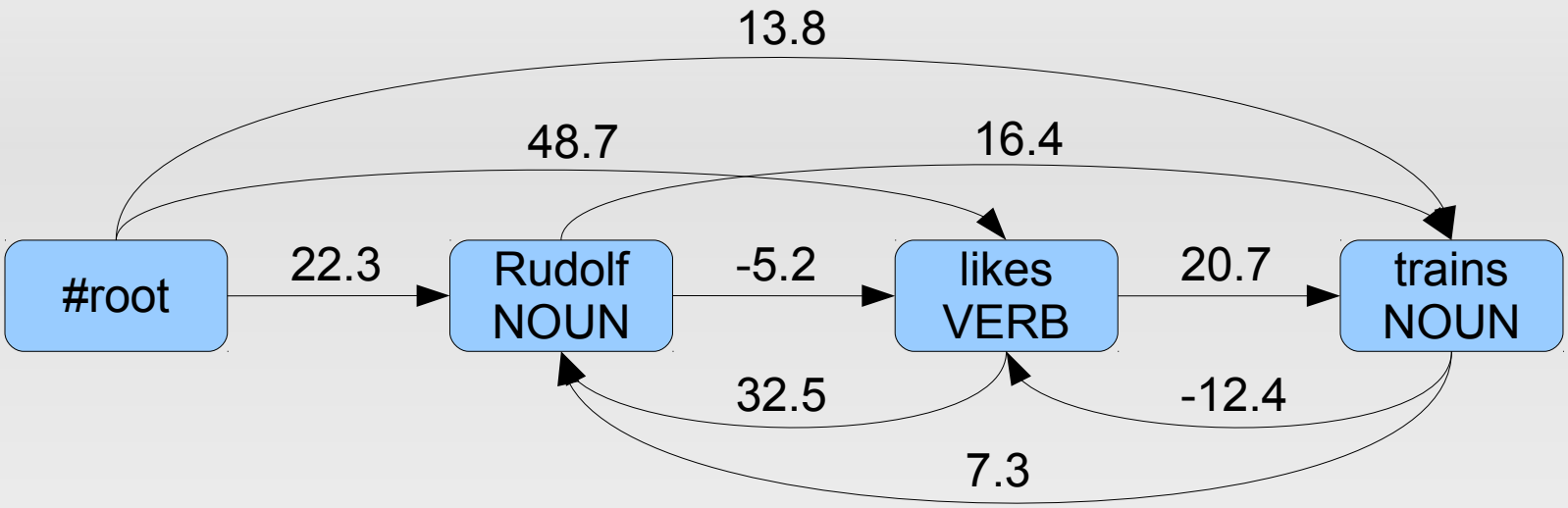
Outline

- Intro and motivation
- MSTParser and its delexicalization
- Delexicalized parser transfer
  - single-source
  - multi-source
    - tree combination
    - model interpolation
- Choice of parsing annotation style

Semi-supervised parsing

- fully supervised dependency parsing
  - requires training data (treebank) or a grammar
  - there are ~100 treebanks (manually annotated)
  - there are ~7 000 languages
  - + various domains, language evolution...
- semi-supervised parsing
  - utilize existing resources, avoid new annotations
    - treebanks for other langs (HamleDT: 30 langs)
    - unannotated data (here: POS tagged)

(Lexicalized) MSTParser



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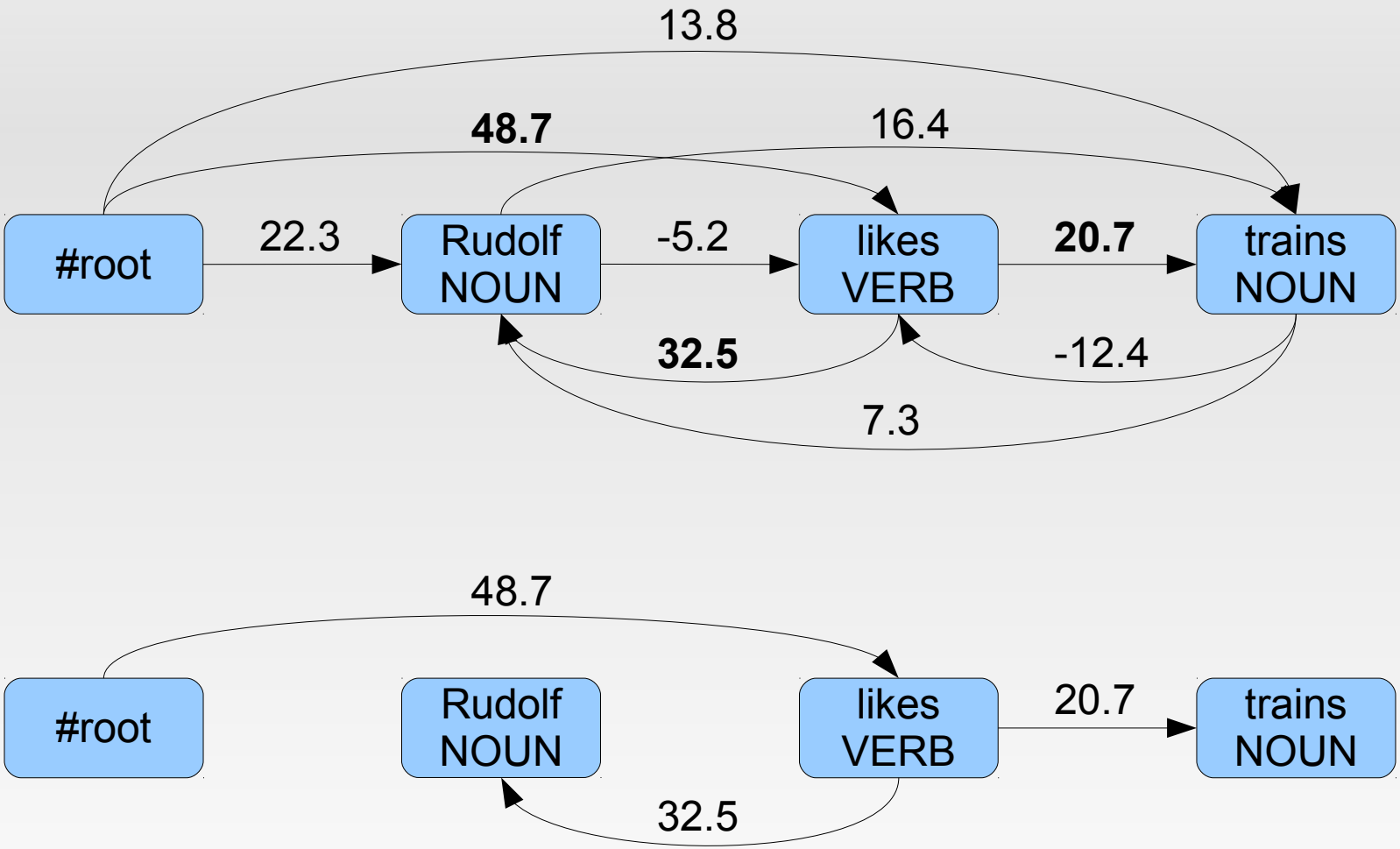
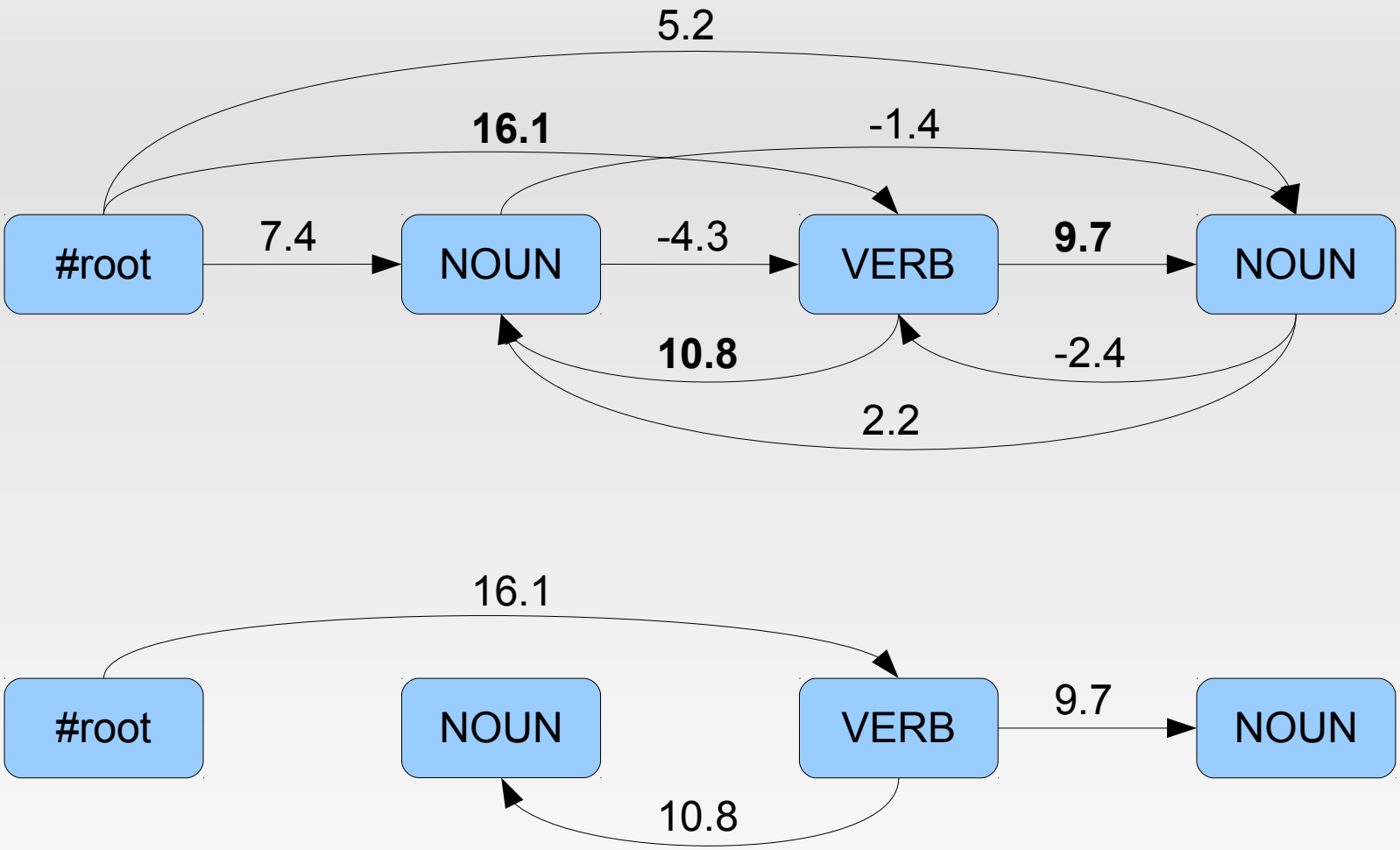


Delexicalized MSTParser



Single-source delex parser transfer

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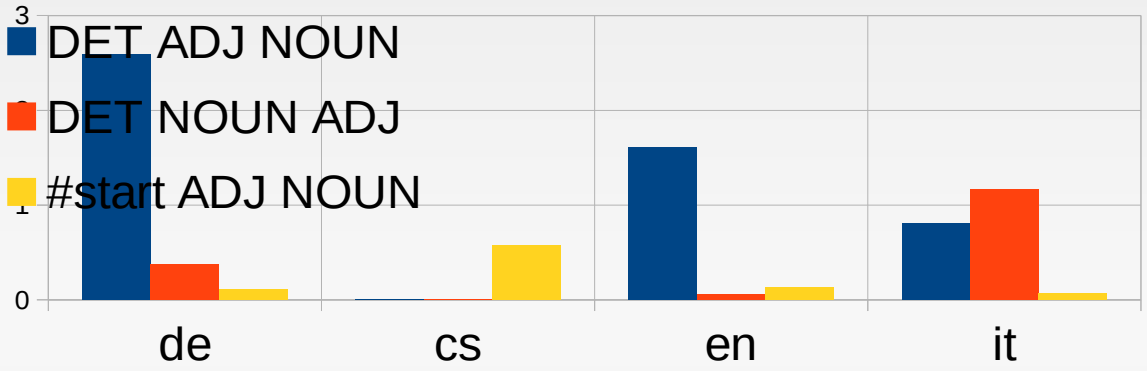
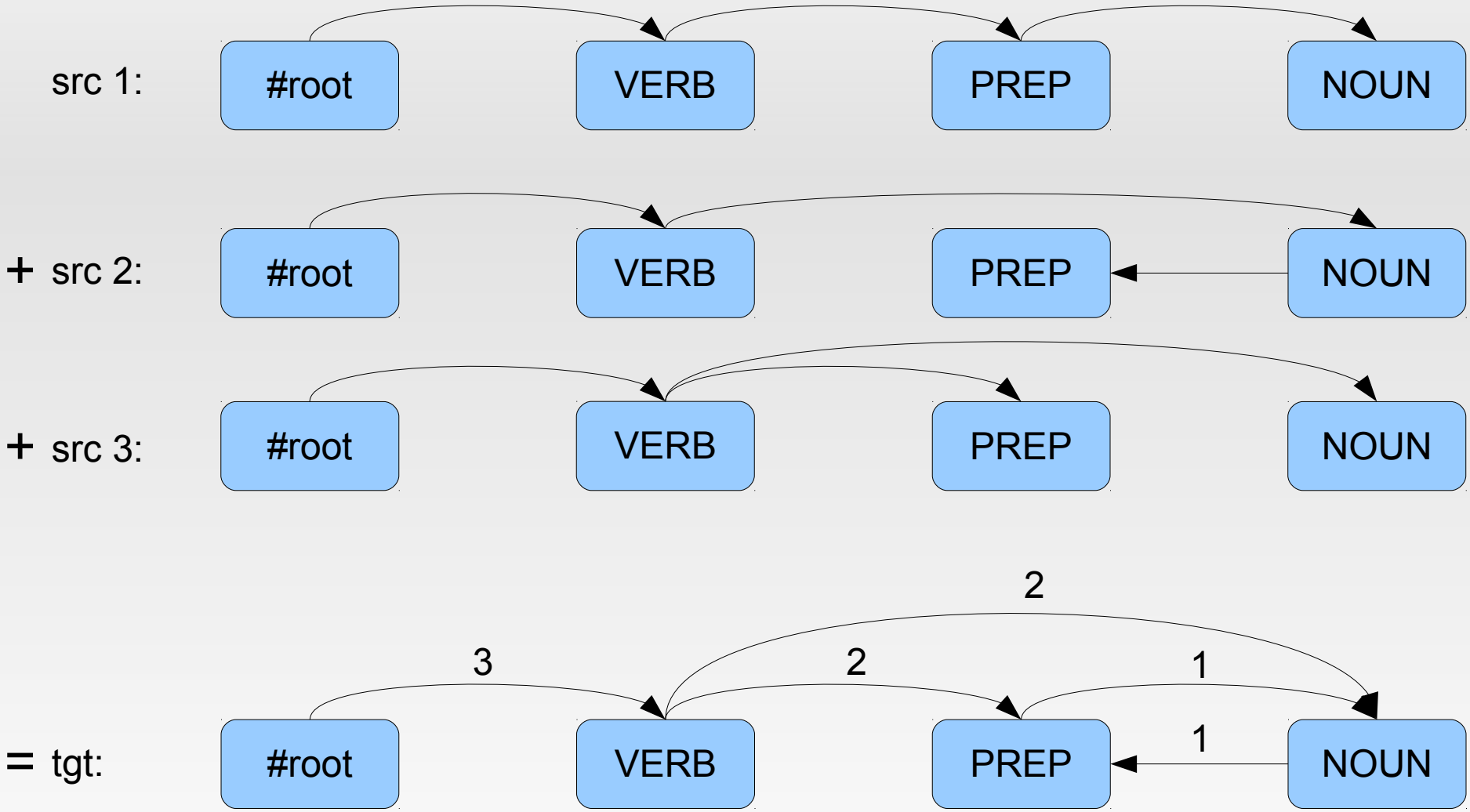
  - KL_{cpos3}: POS trigram distribution in tagged corpora



Multi-source: tree combination



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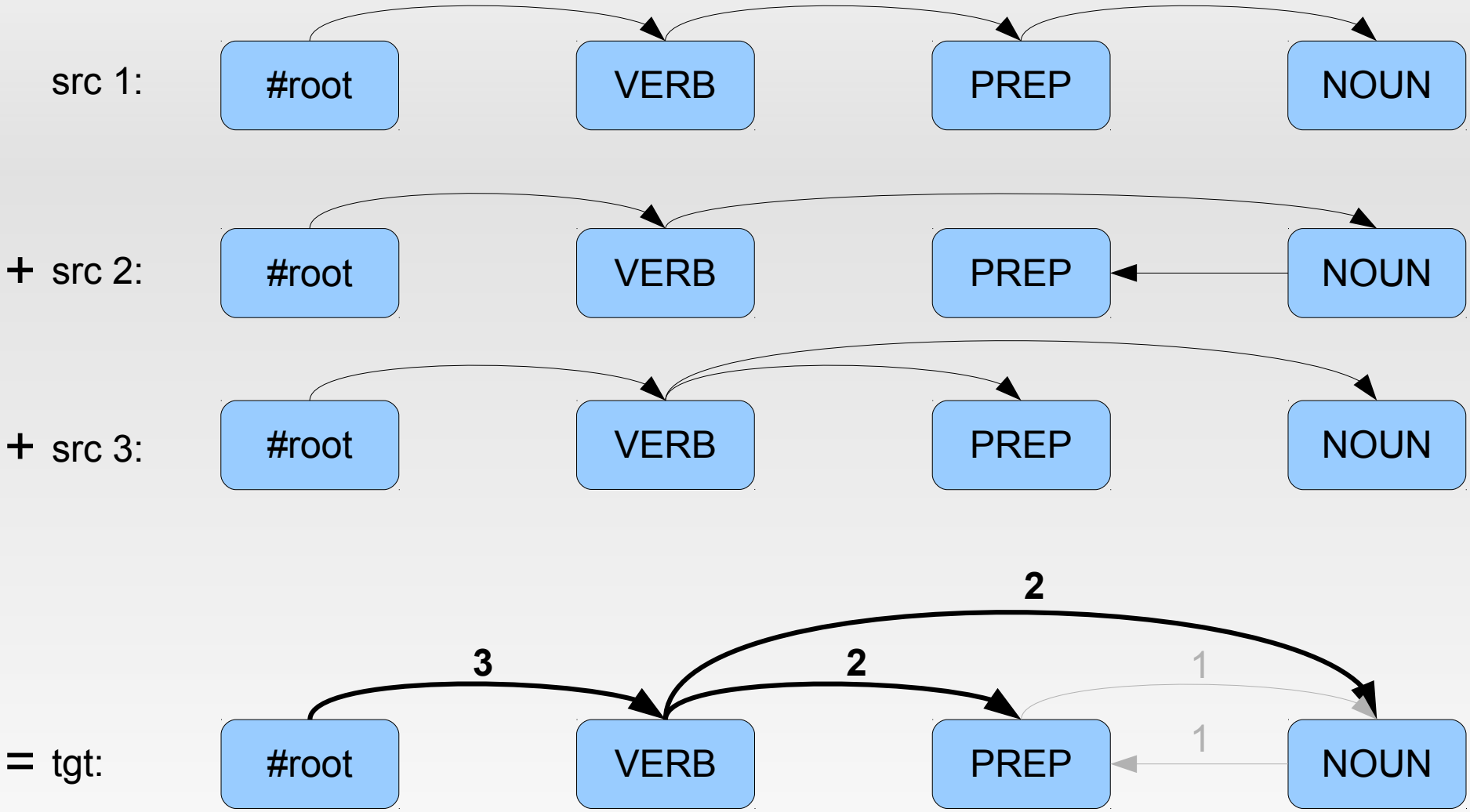

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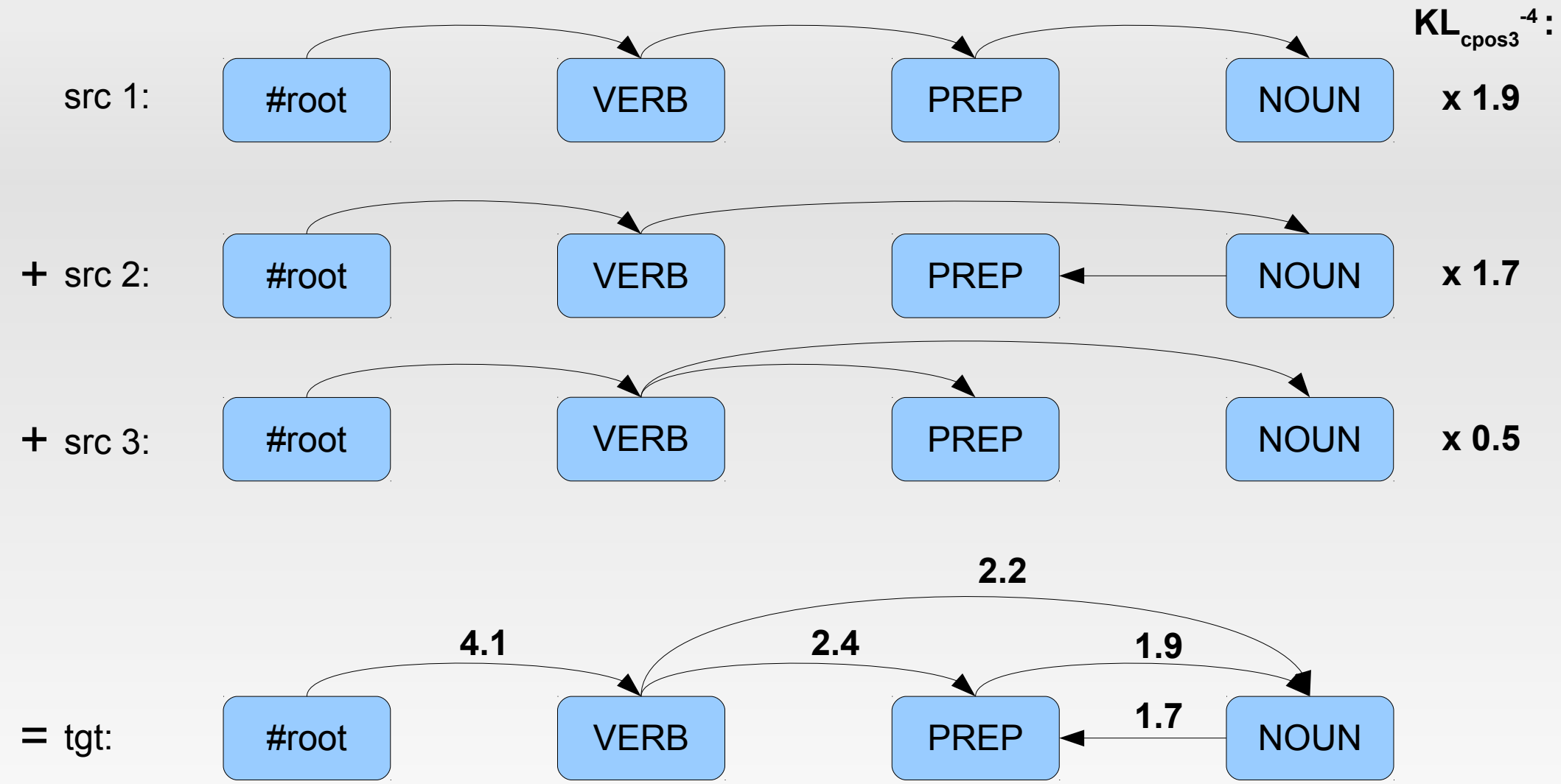

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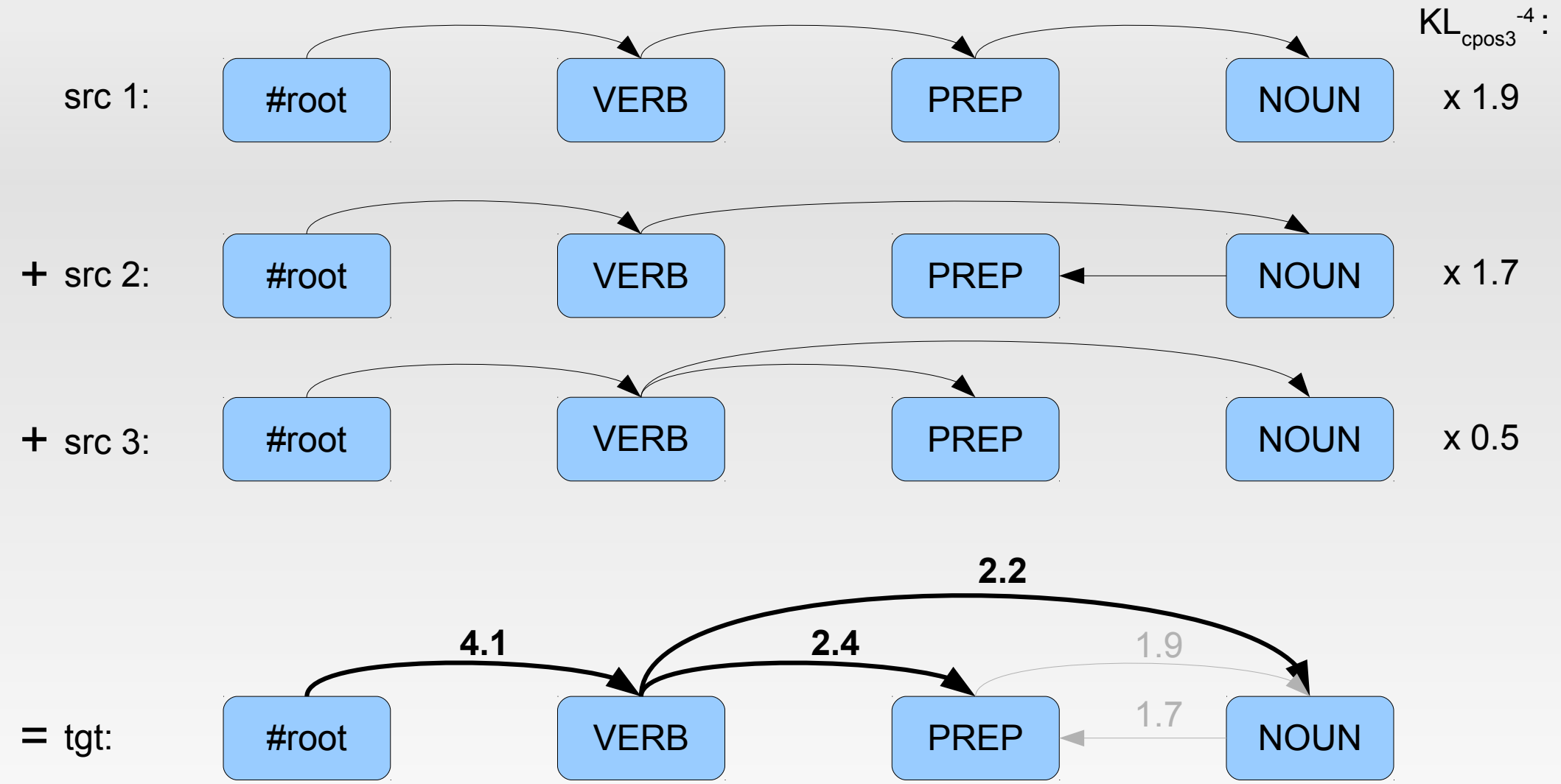
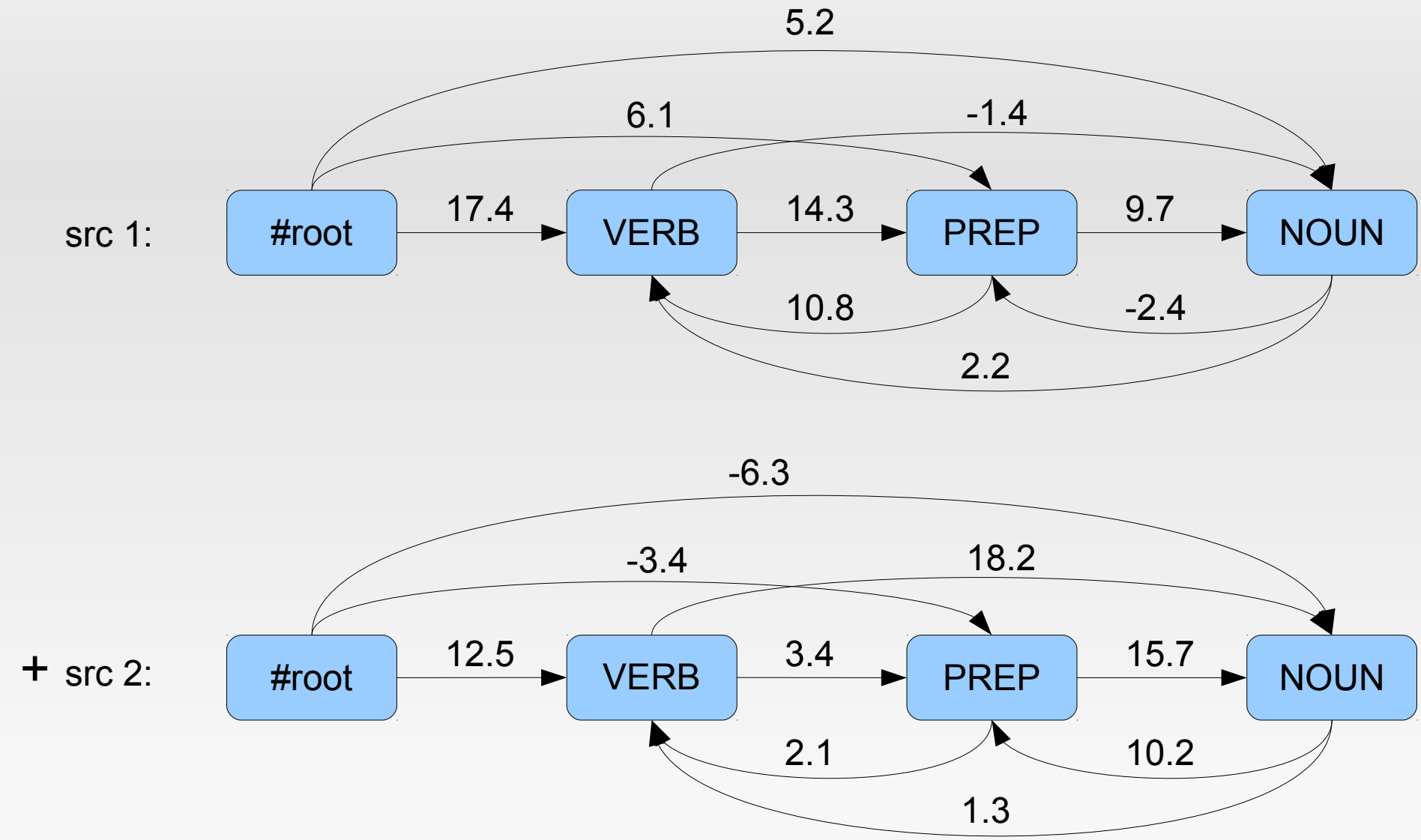
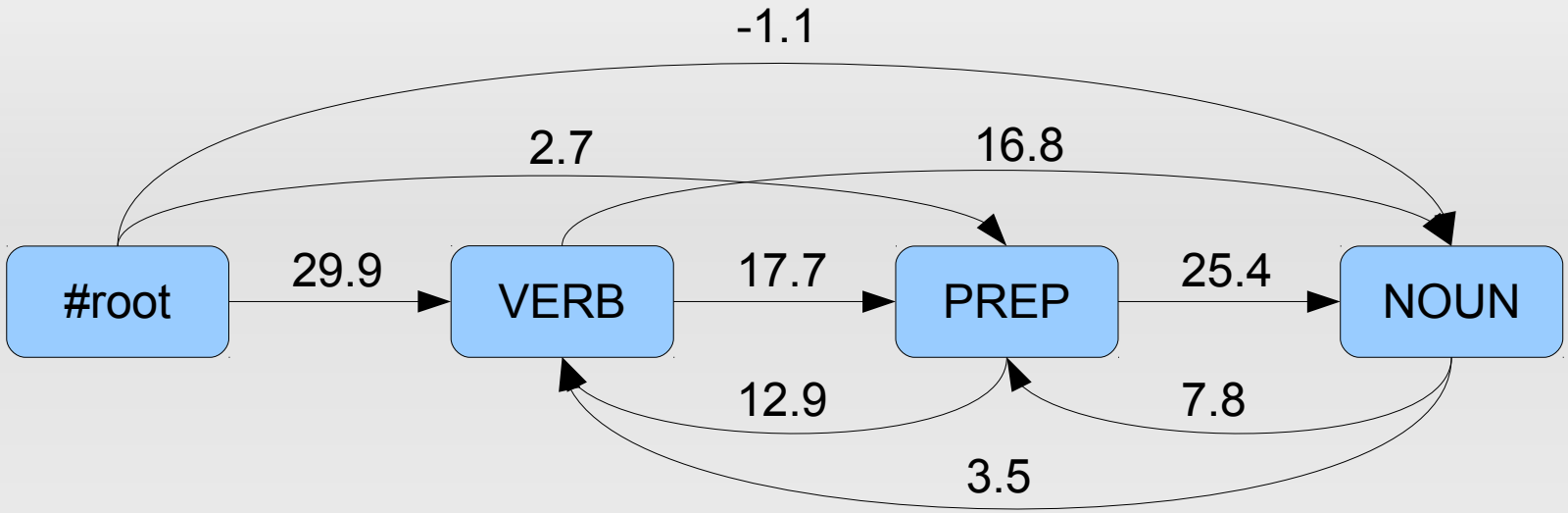


Multi-source: model interpolation



Multi-source: model interpolation

= **tgt (∑):**



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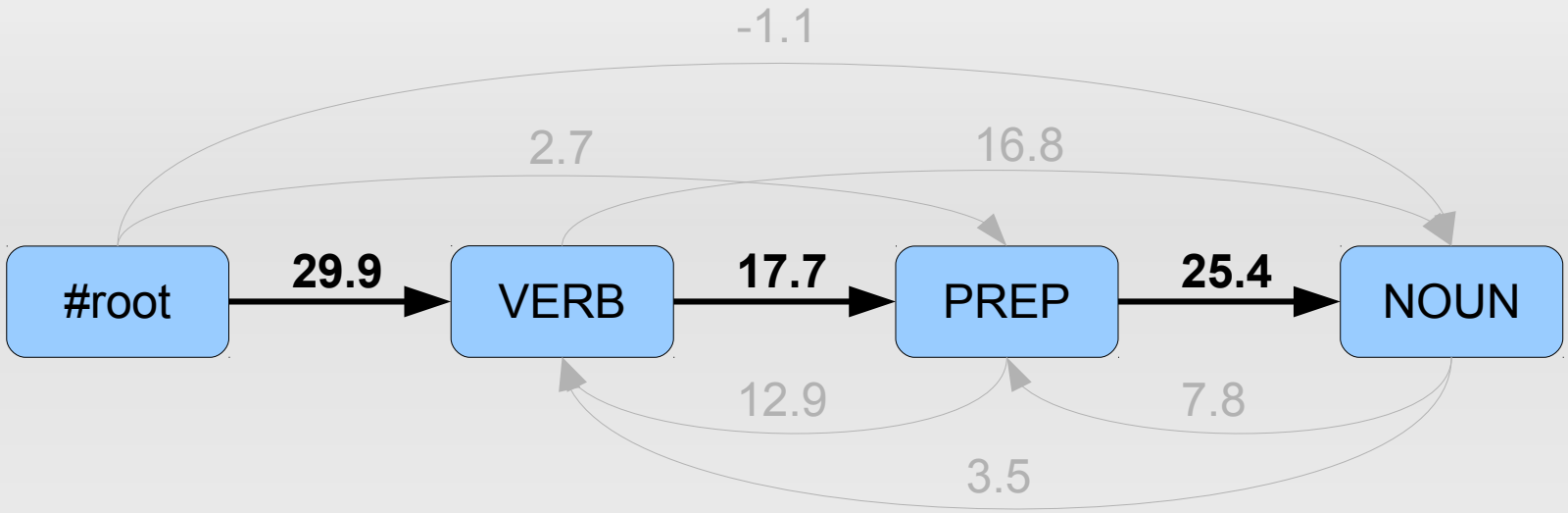
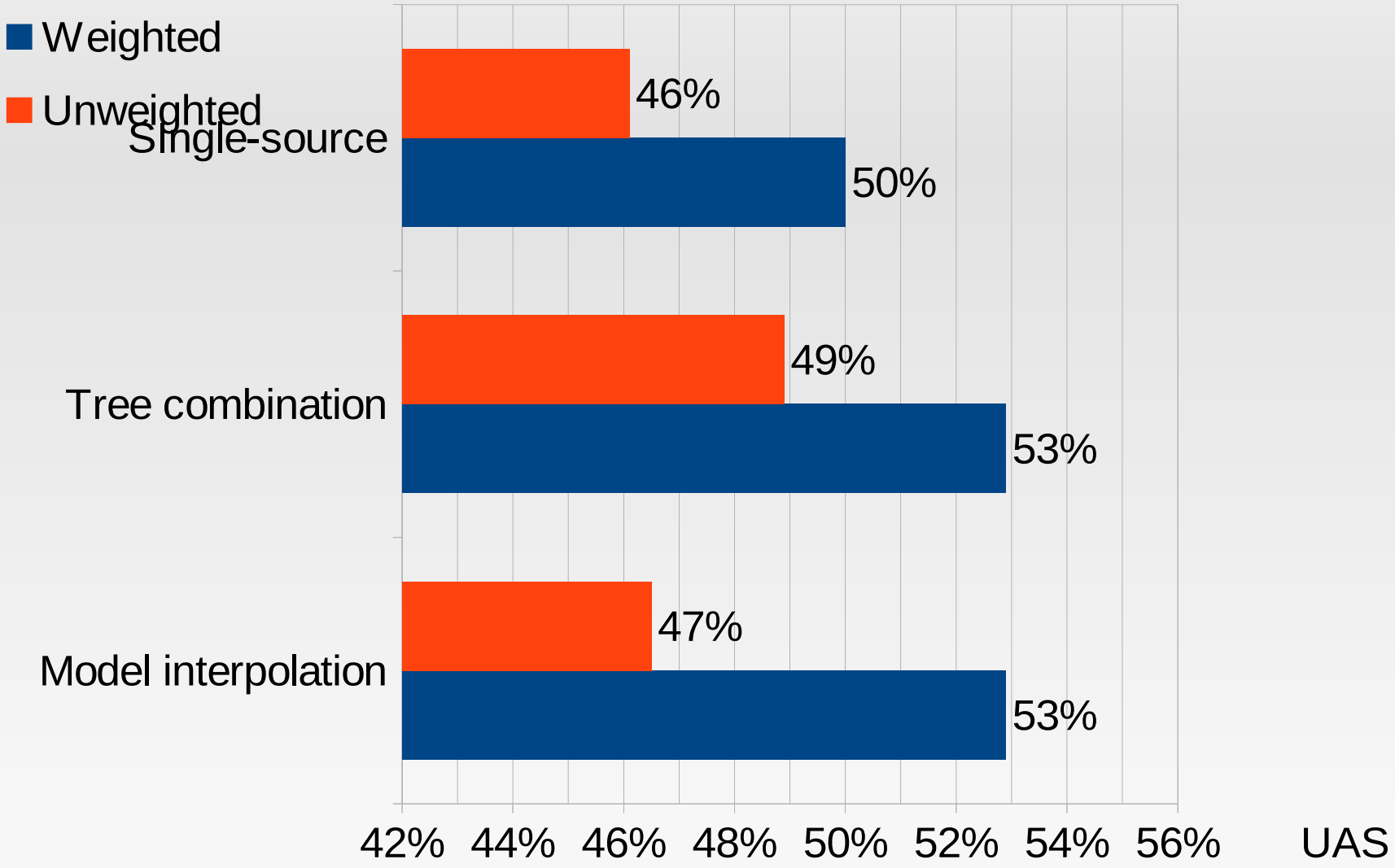


Evaluation on HamleDT (30 langs)



Annotation style (multi-source)

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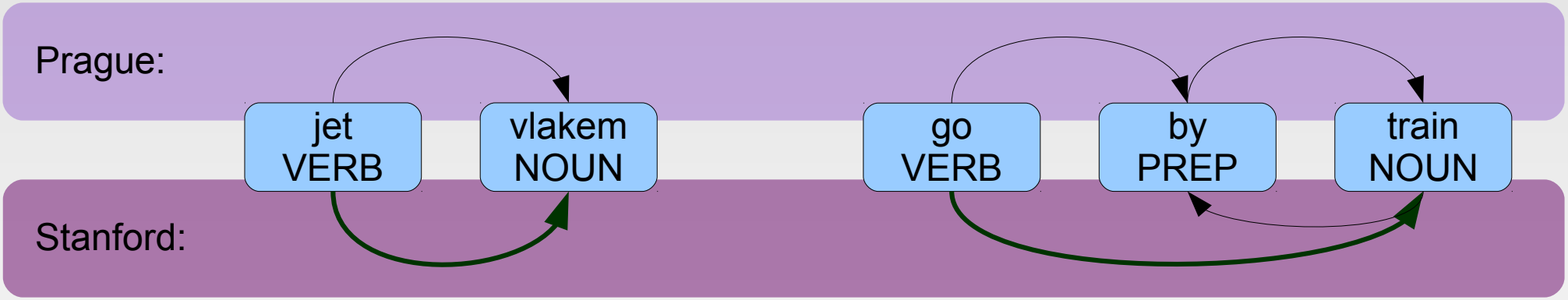

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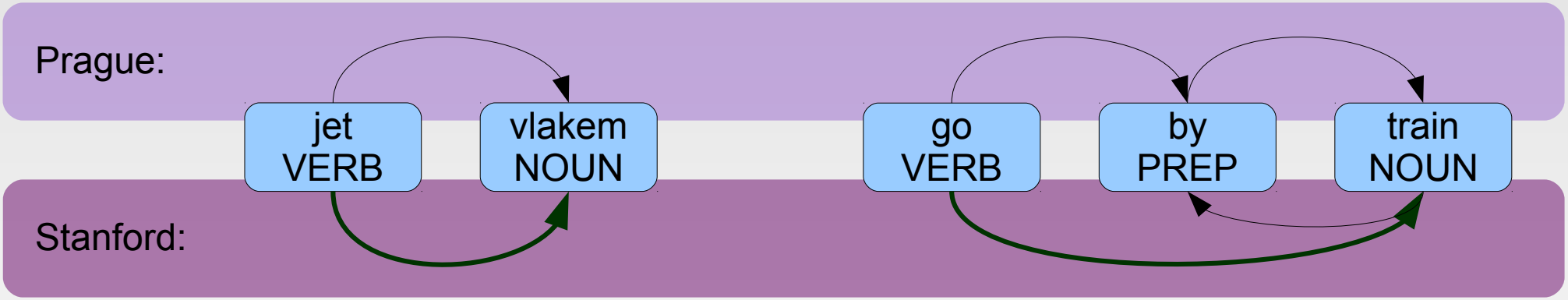

- interesting results when combining both adposition annotation styles (+0.39% UAS)
  - solitary langs: big improvement (et +3%, fa +2%)

Conclusion

- Delexicalized parser transfer
  - single-source
  - multi-source: tree combination, model interpolation
  - KL_{cpos3}: lang similarity for src selection/weighting
- Annotation style for parsing
  - Prague better than Stanford
  - Stanford adpositions good for cross-lingual transfer

Thank you for your attention

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