Scratching the Surface of Possible Translations

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Institute of Formal and Applied Linguistics (ÚFAL)

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Outline

1. Introduction
2. Compact Representations for Many References
3. Collected Data
4. Analysis
5. Conclusion

Introduction

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Broad perspective:

- Relation between sentence meaning and the string is complicated.
  - Many variations of a sentence preserve the meaning.
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Narrow use case:

- Machine translation is evaluated by comparing output to a reference.
  - There are many good translations of a sentence
  - Only very few of them are available as a reference translation.
- We want to improve MT evaluation using more/all references.

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All sequences of Czech words

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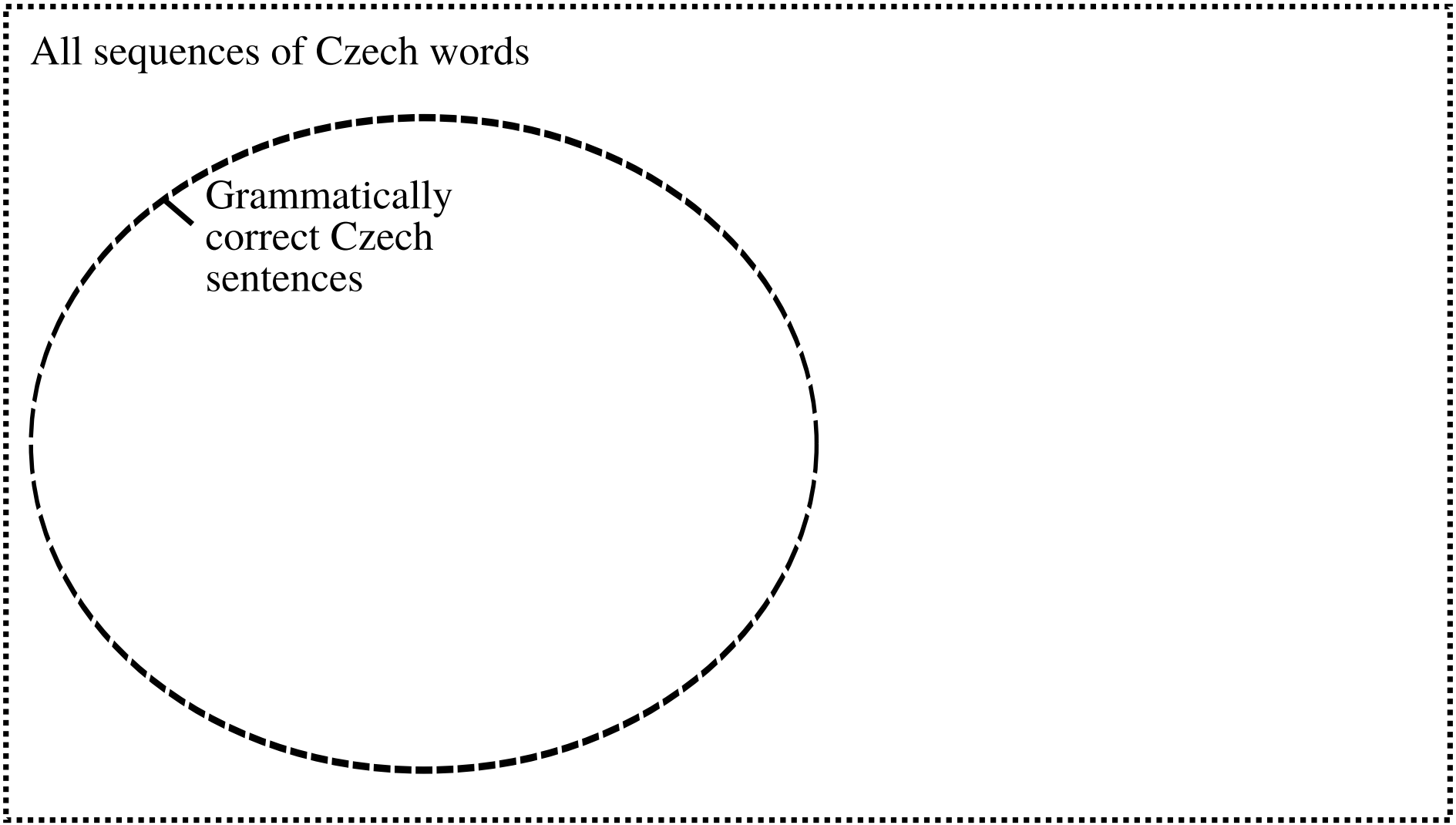

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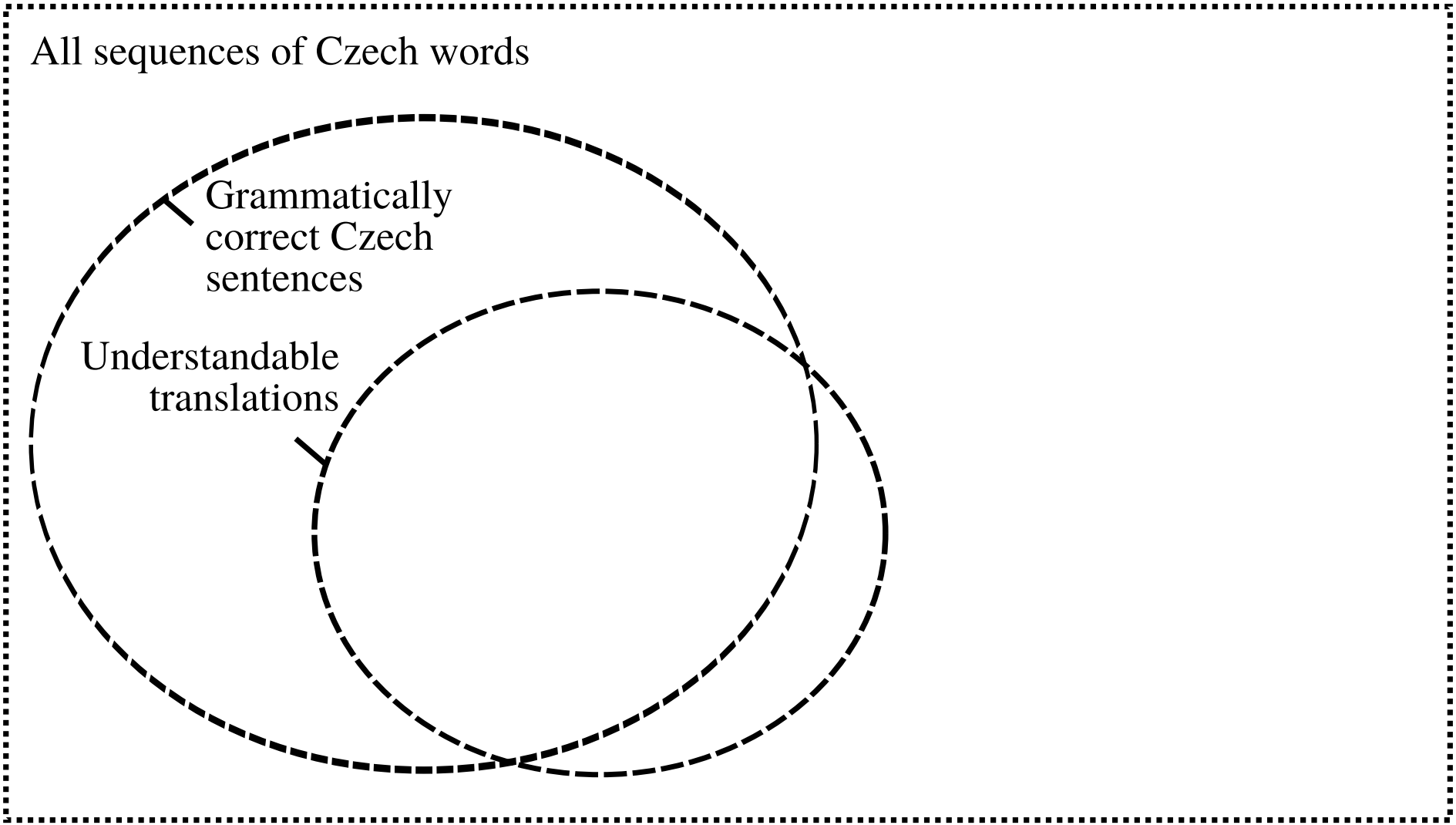

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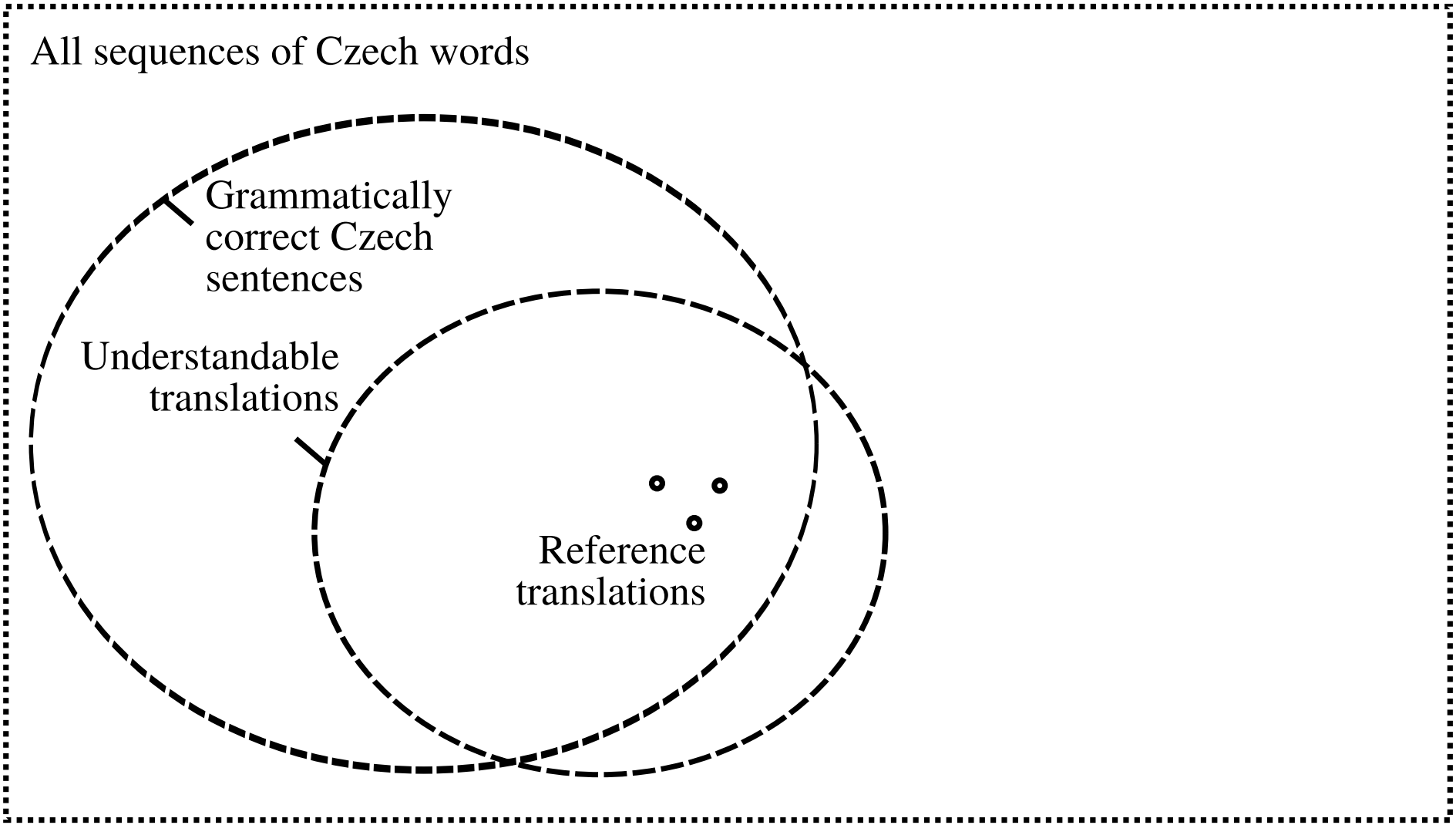

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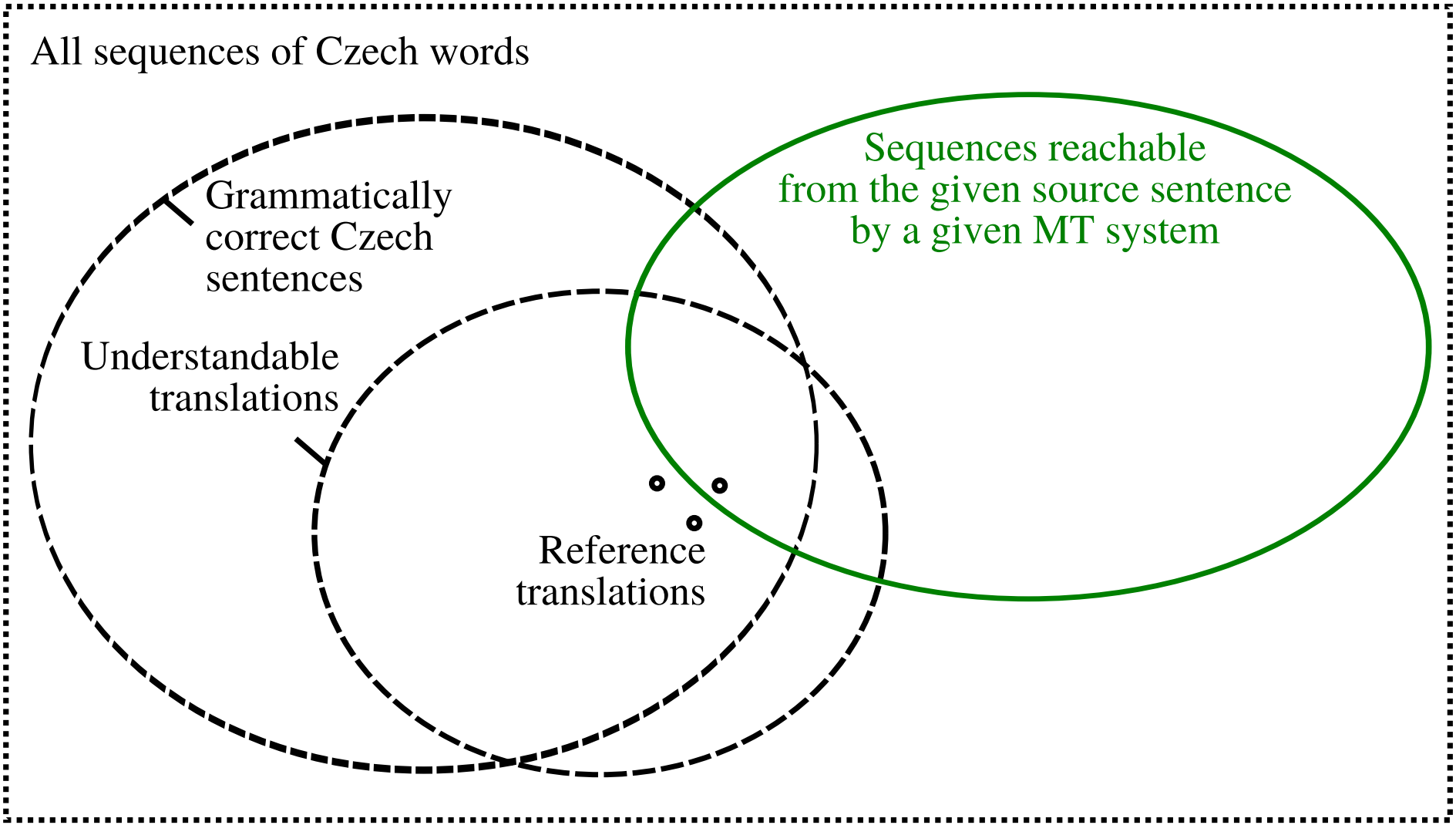

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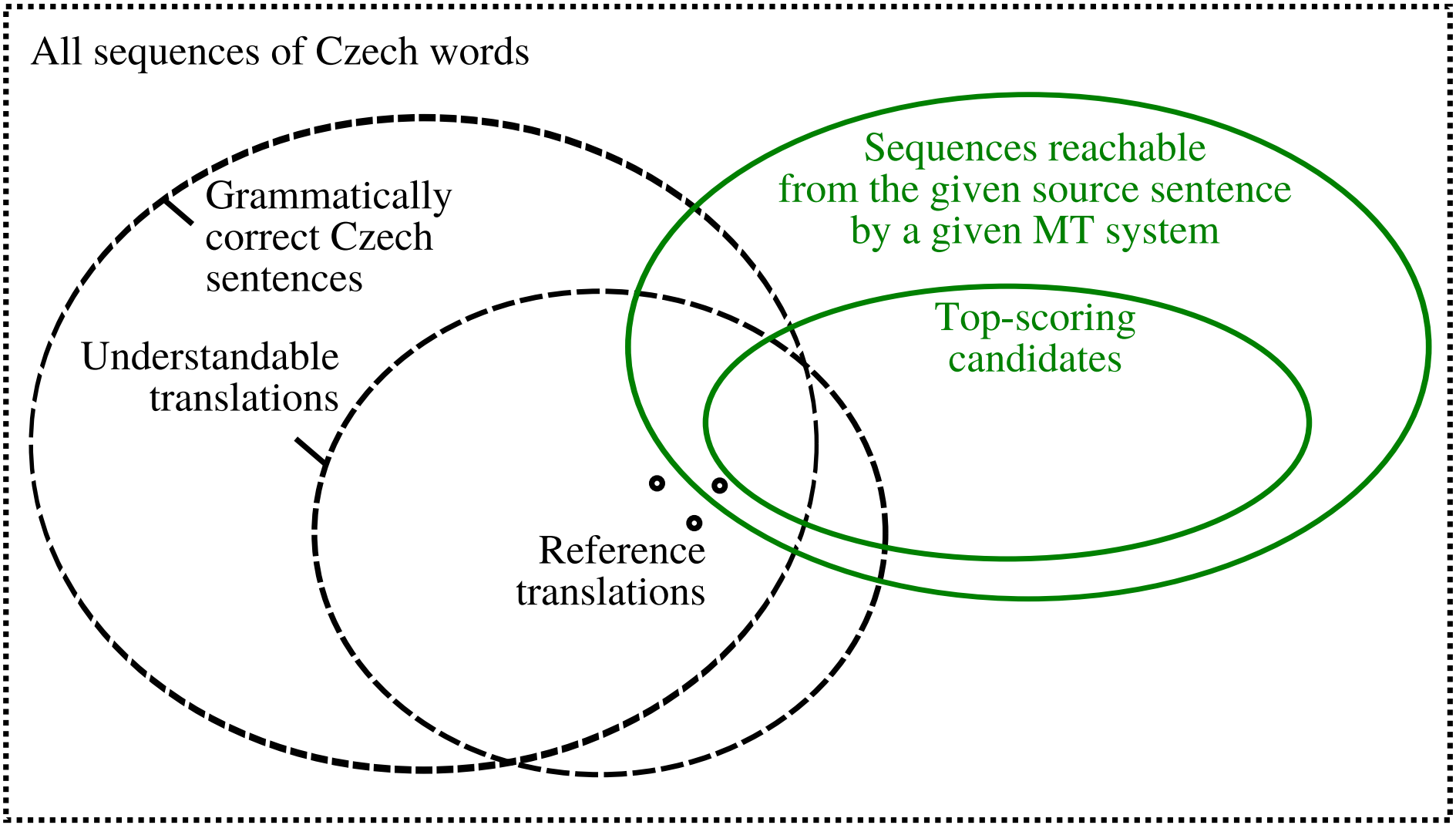

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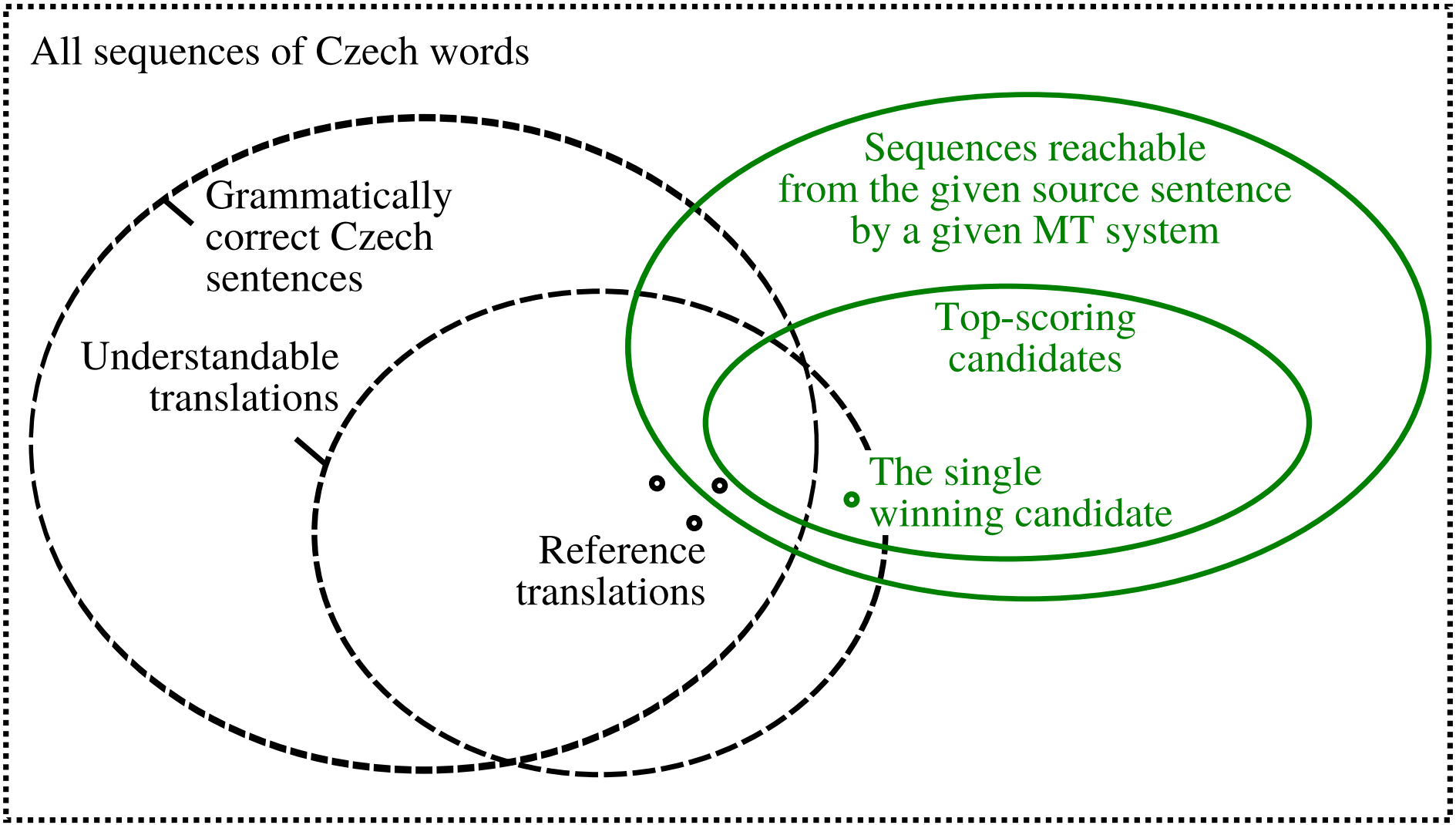

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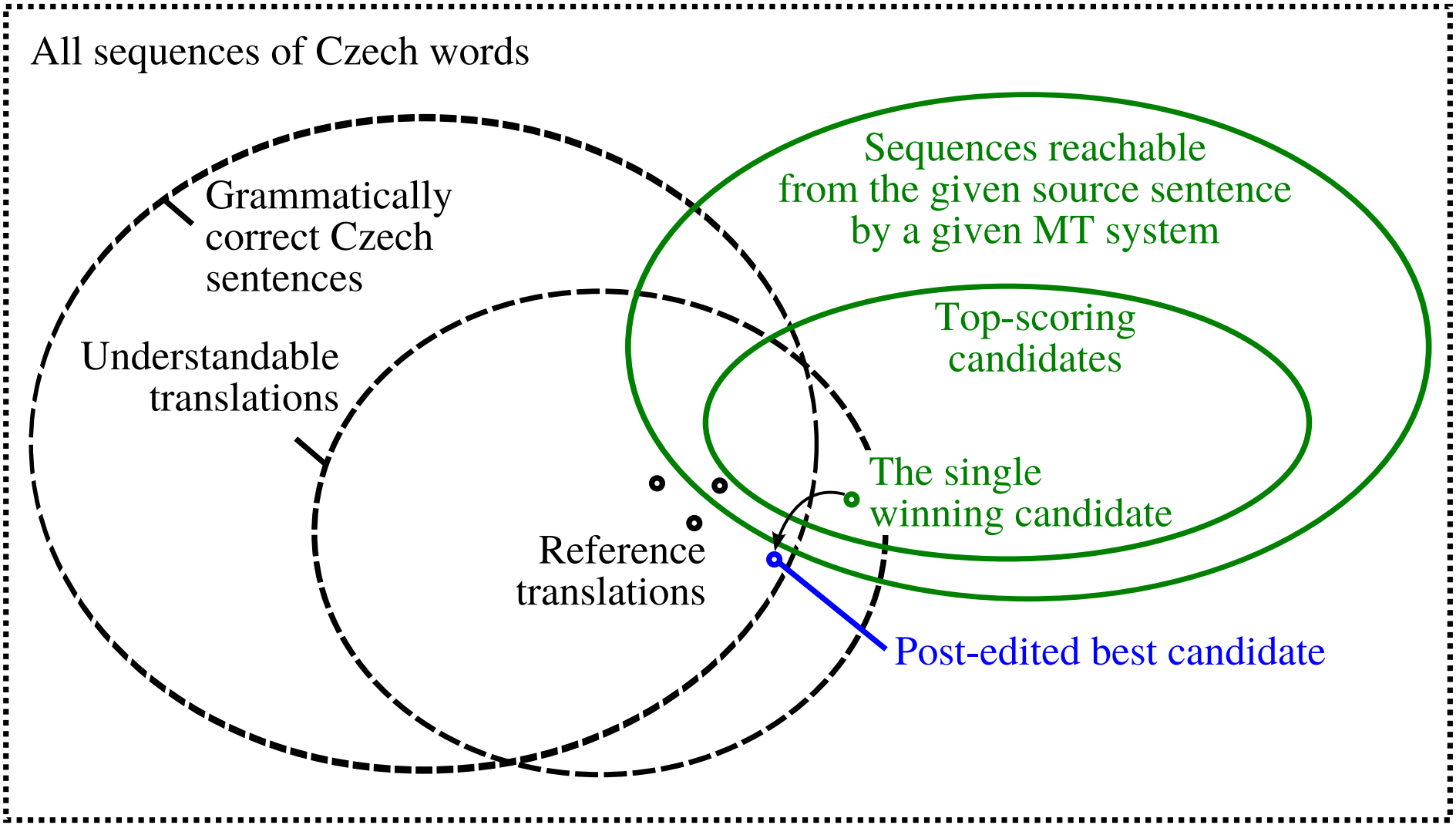

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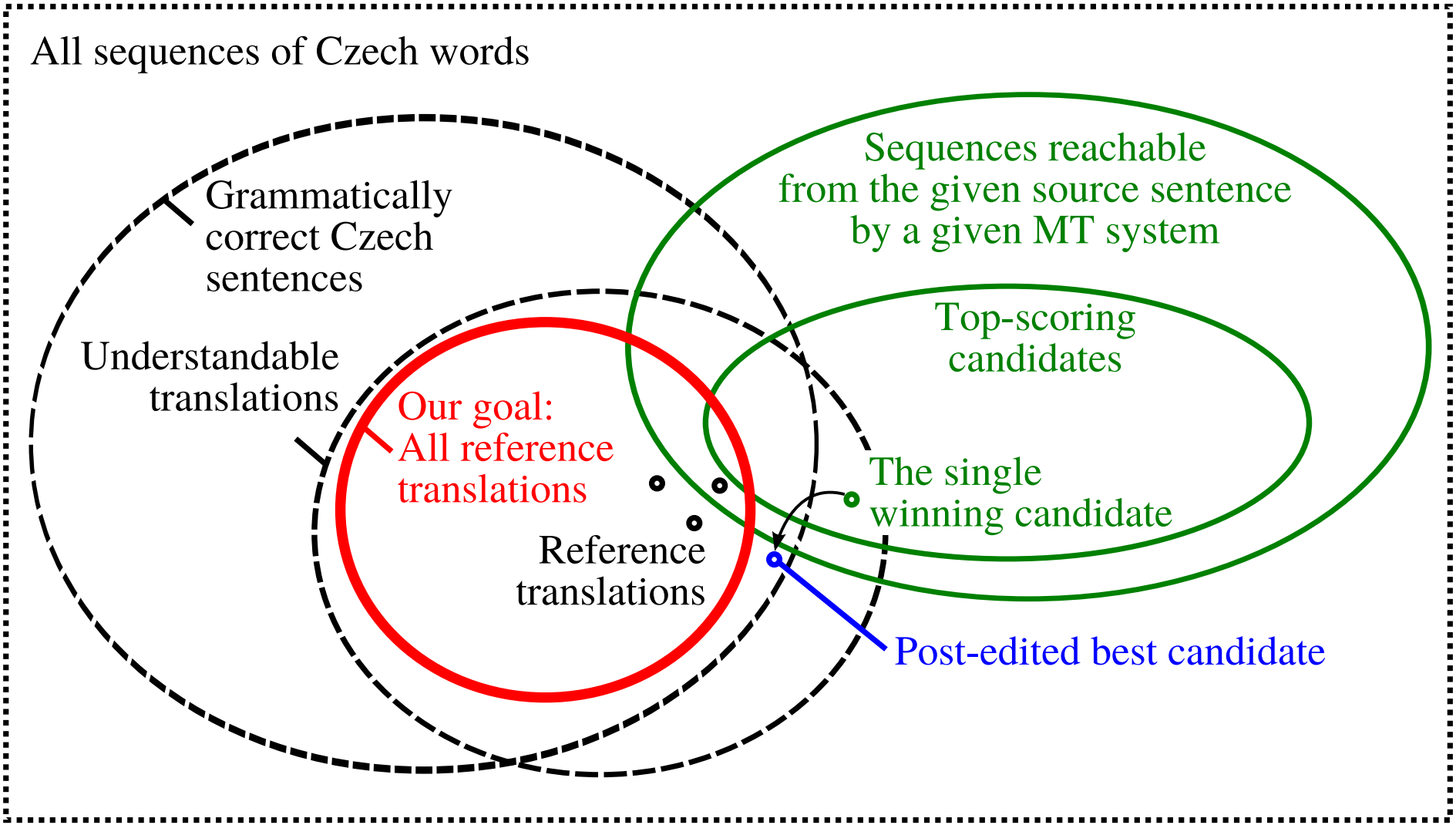

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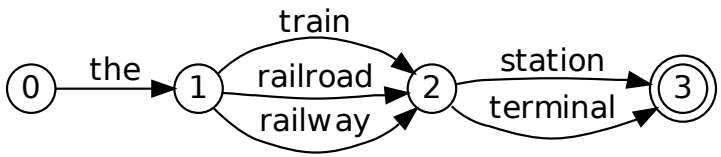

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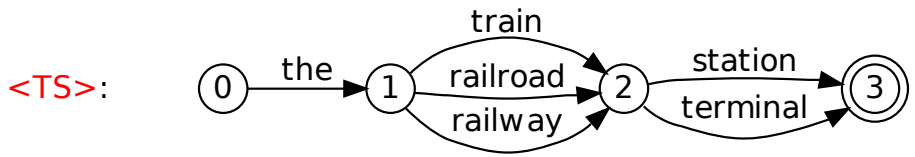
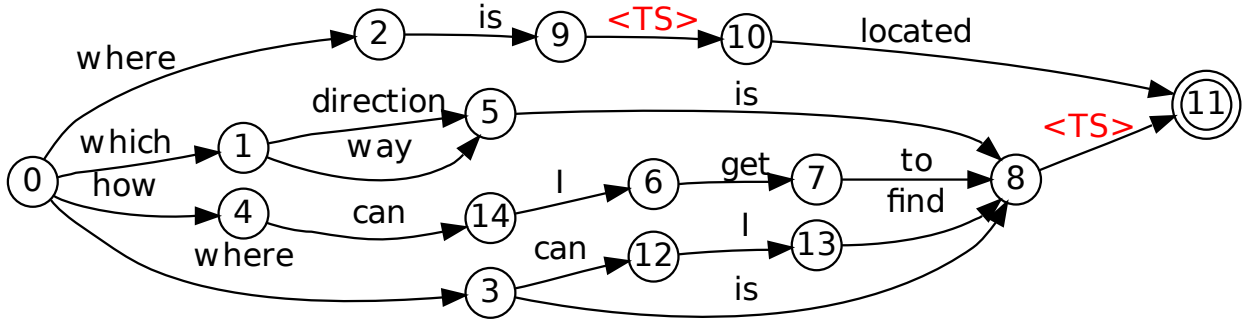


  - Cards are reused within other cards to built the sentence:



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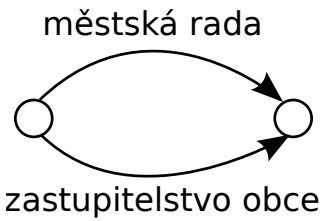

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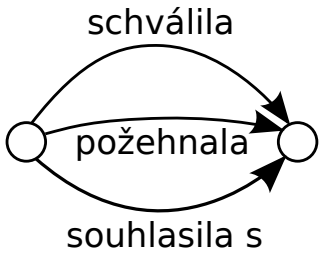

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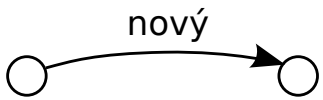

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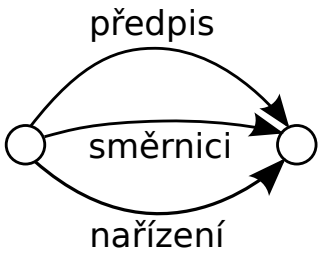

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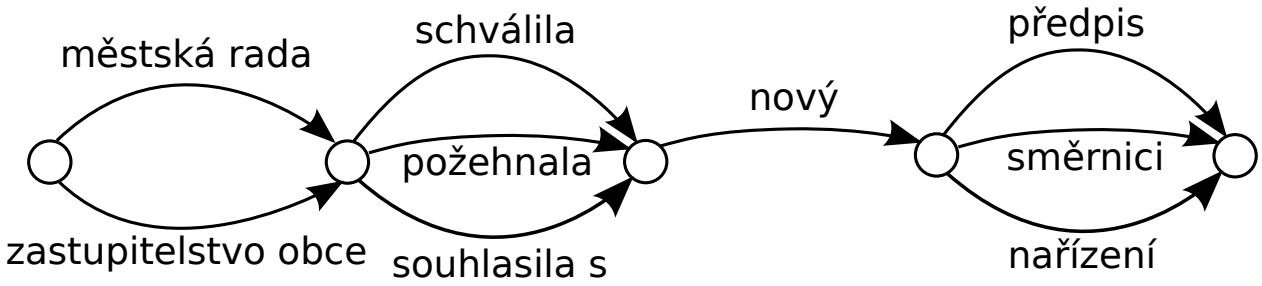

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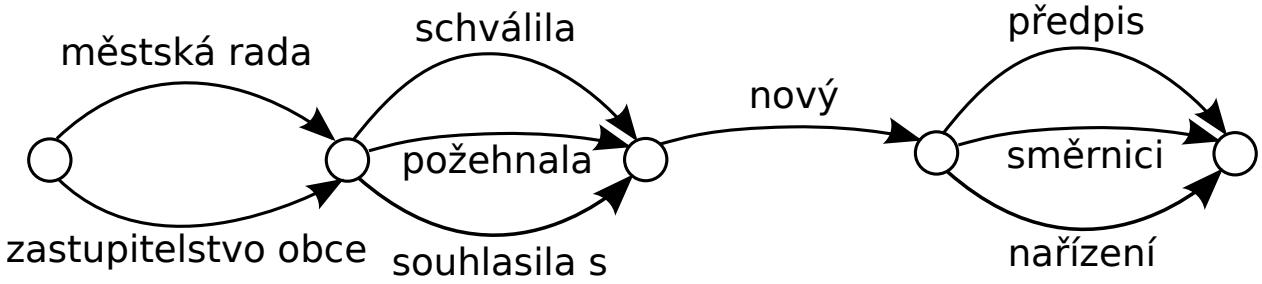

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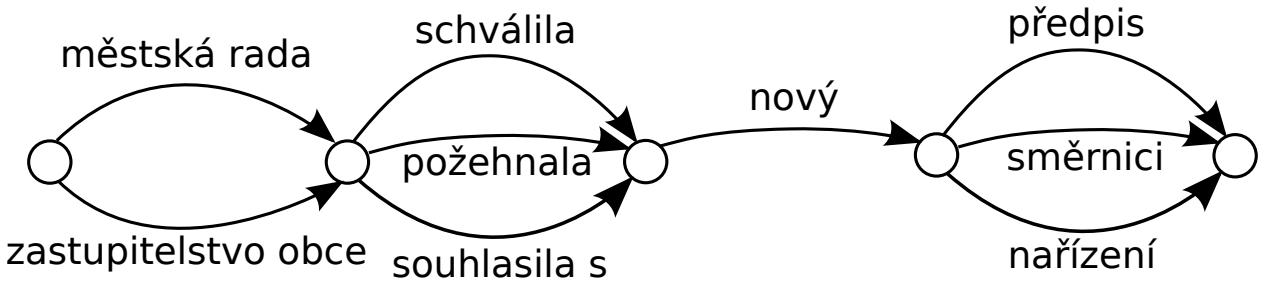

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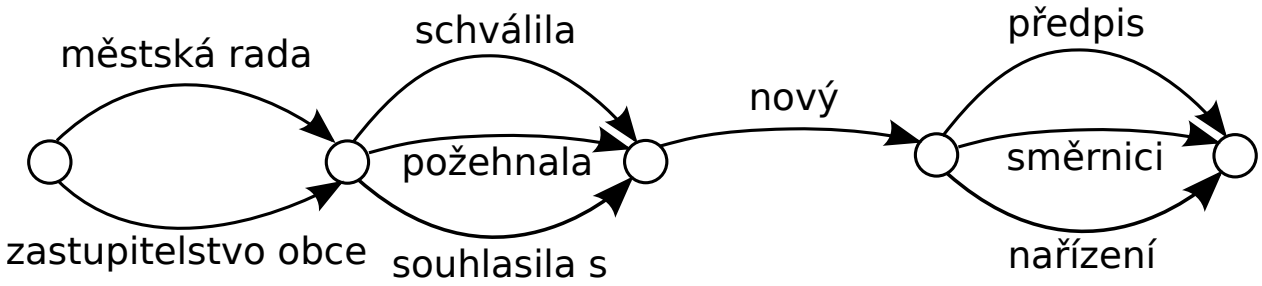

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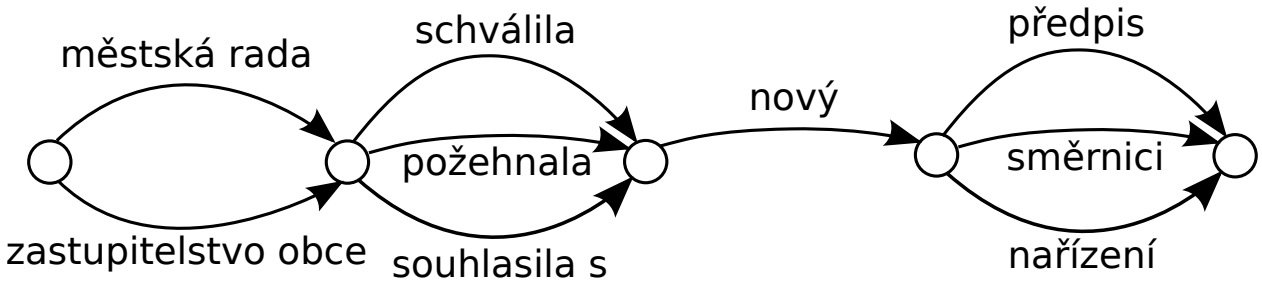

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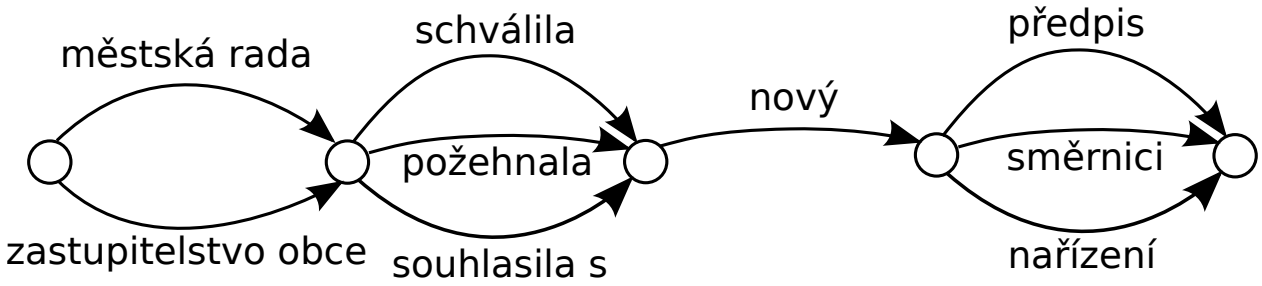

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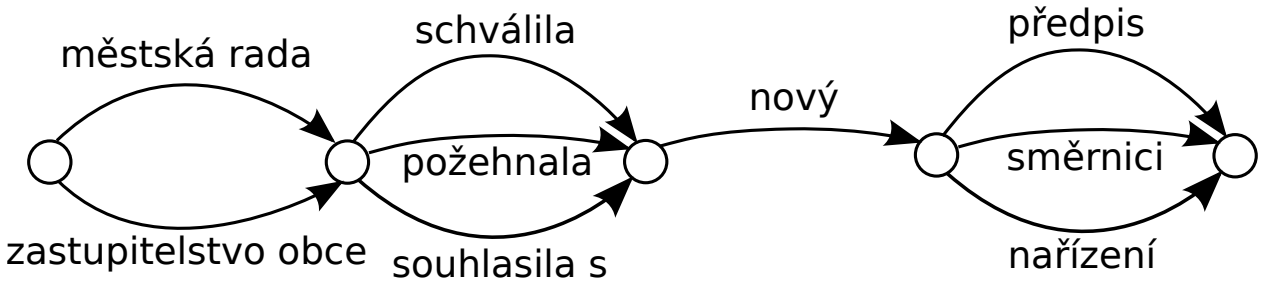

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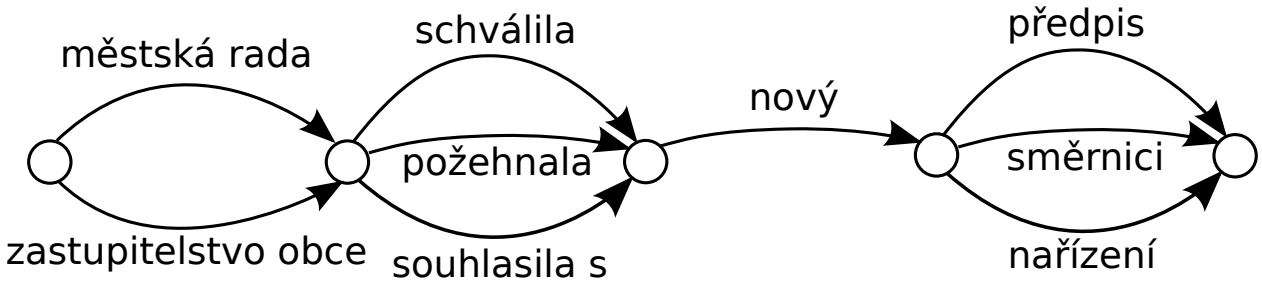

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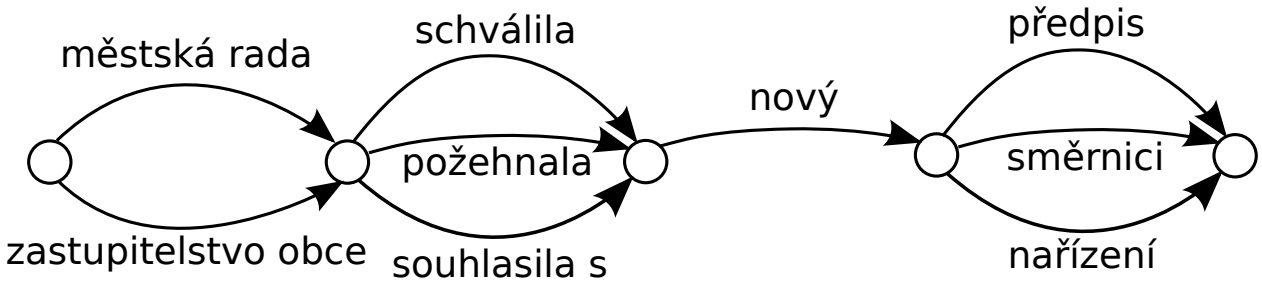

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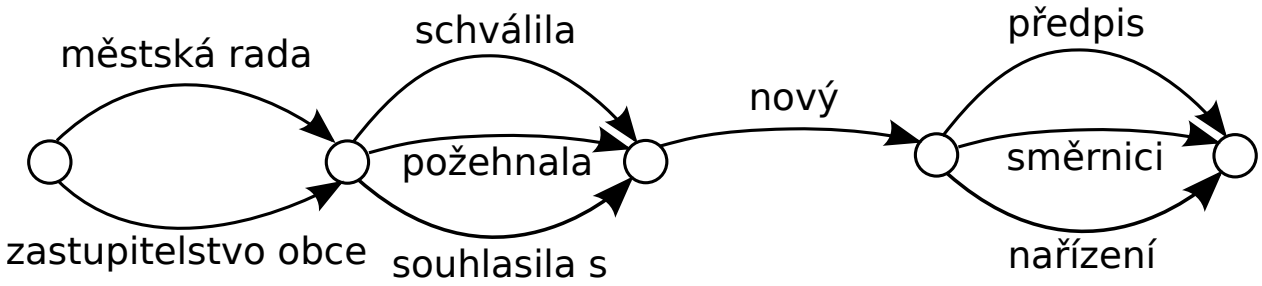

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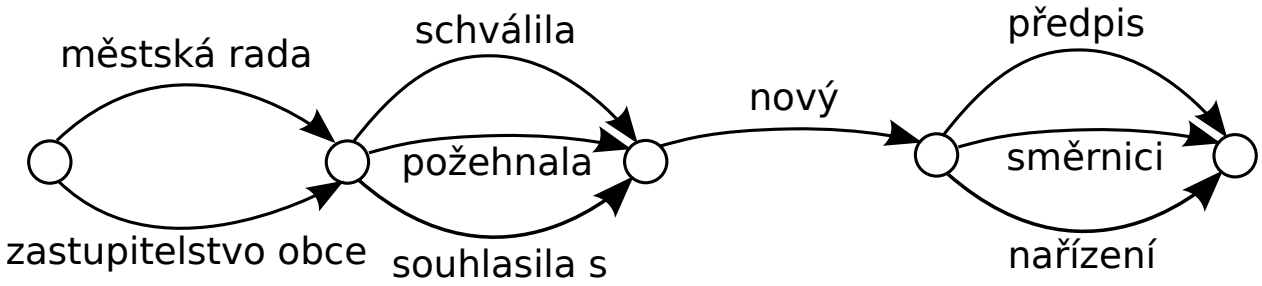

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- The workaround of using many card types would be cumbersome.

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- Main building block called bubble, defined by:
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  - A translation alternative, composed of:
    - atoms – tokens of the target language
    - slots – positions with given conditions which bubbles must fulfil to fill the slot

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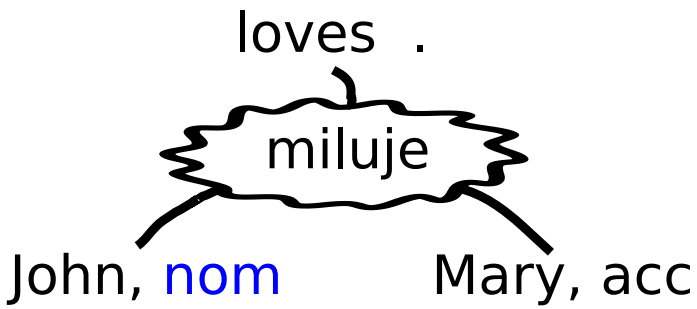
- Input: John loves Mary.
- Annotation = bubbles covering parts of input.



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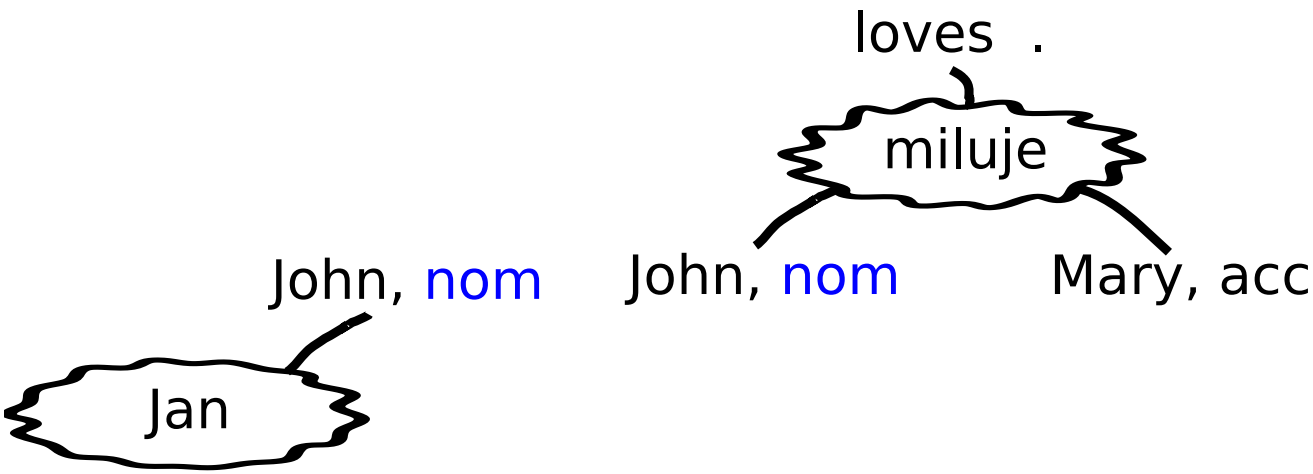

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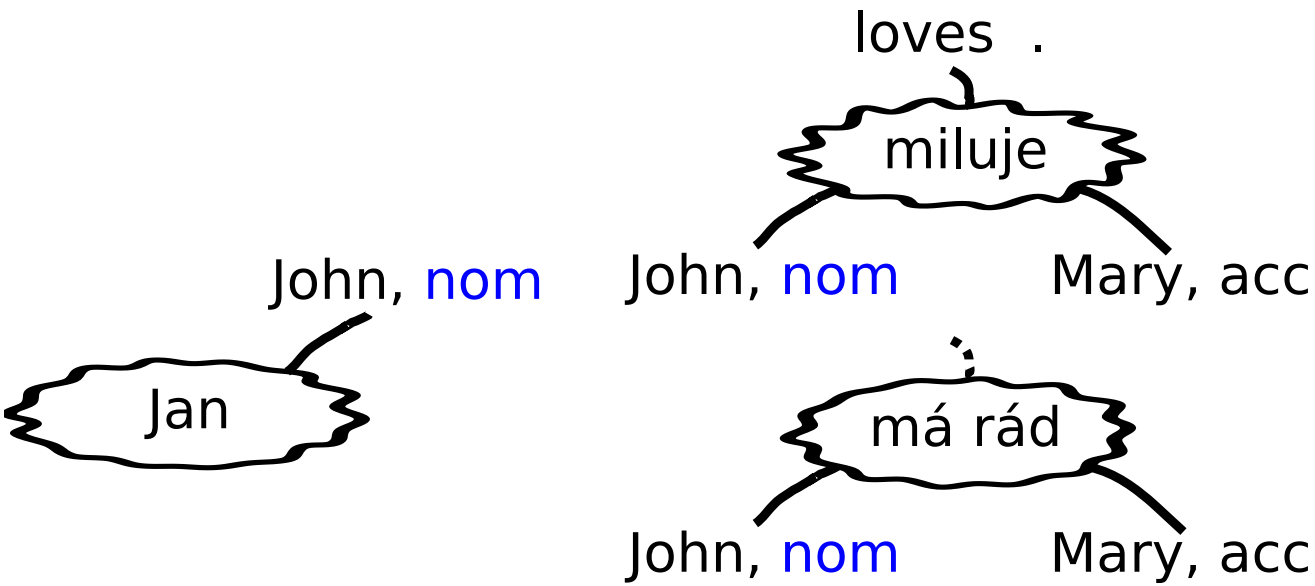

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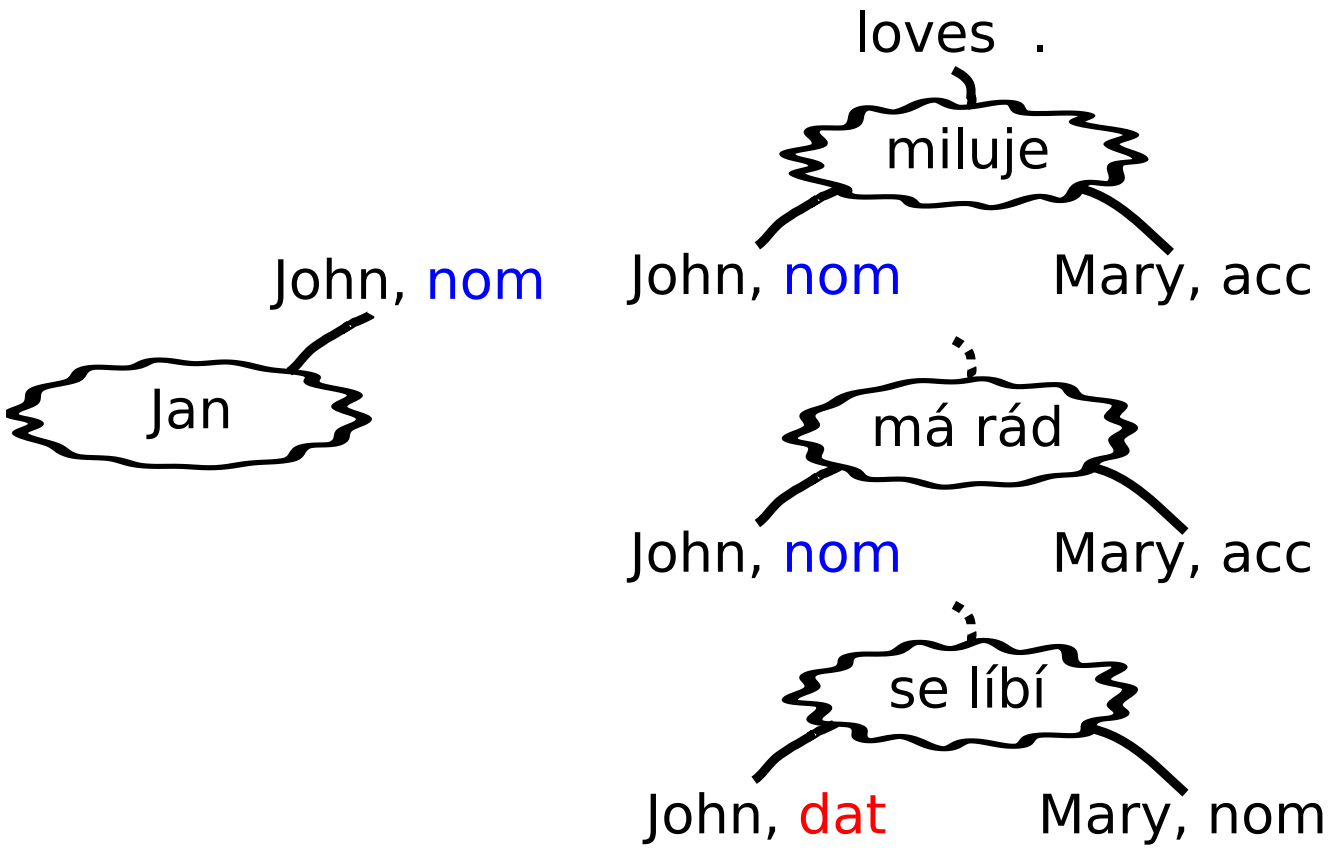

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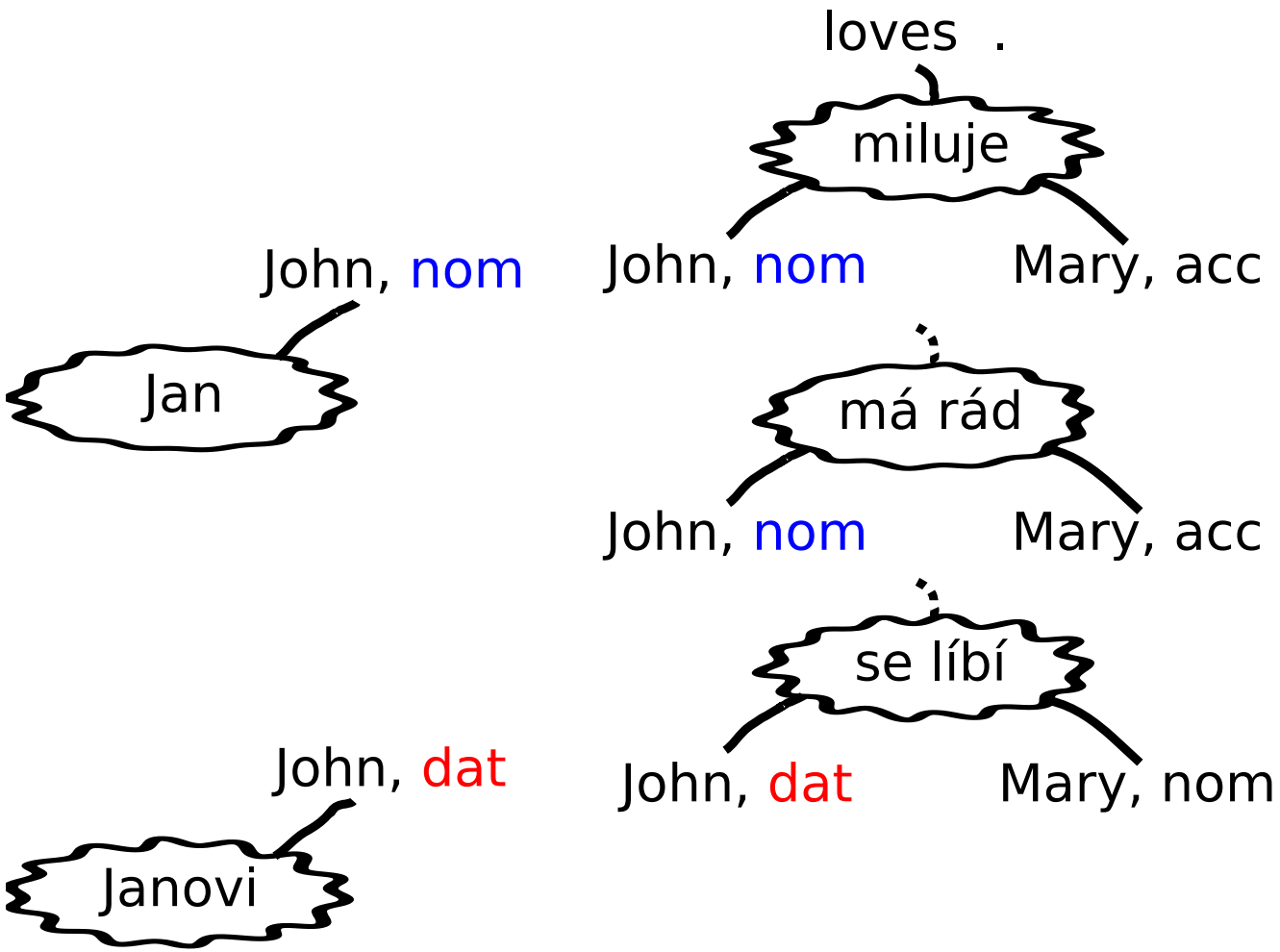

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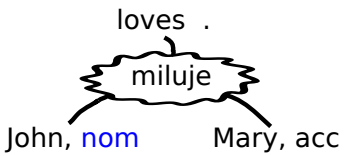

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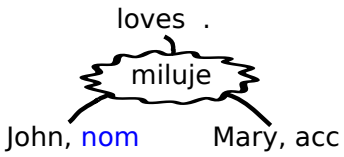


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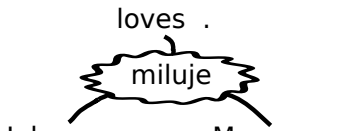


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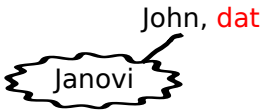

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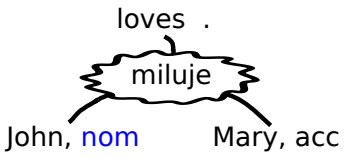


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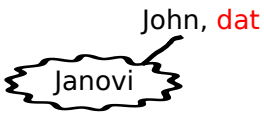


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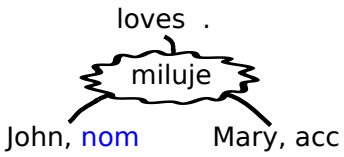


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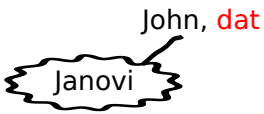


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- About 300 lines of a common code generates all possible sentences.

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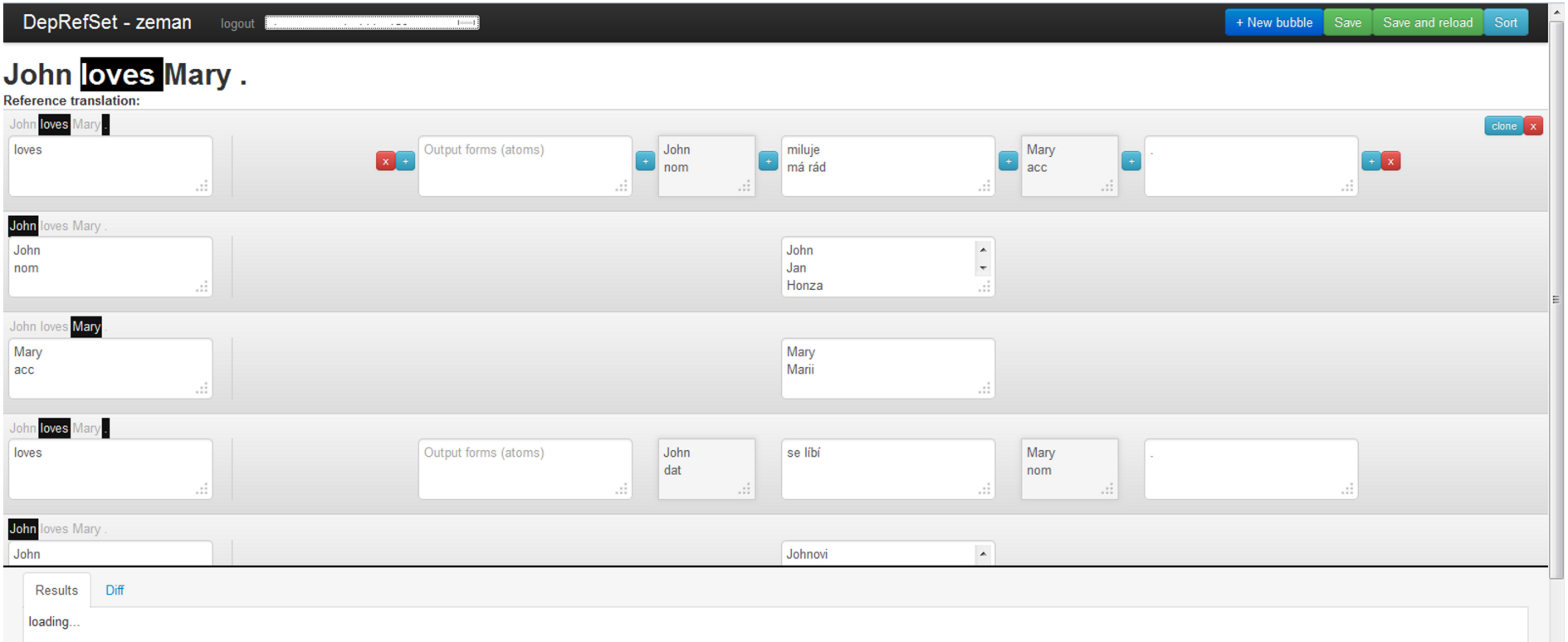

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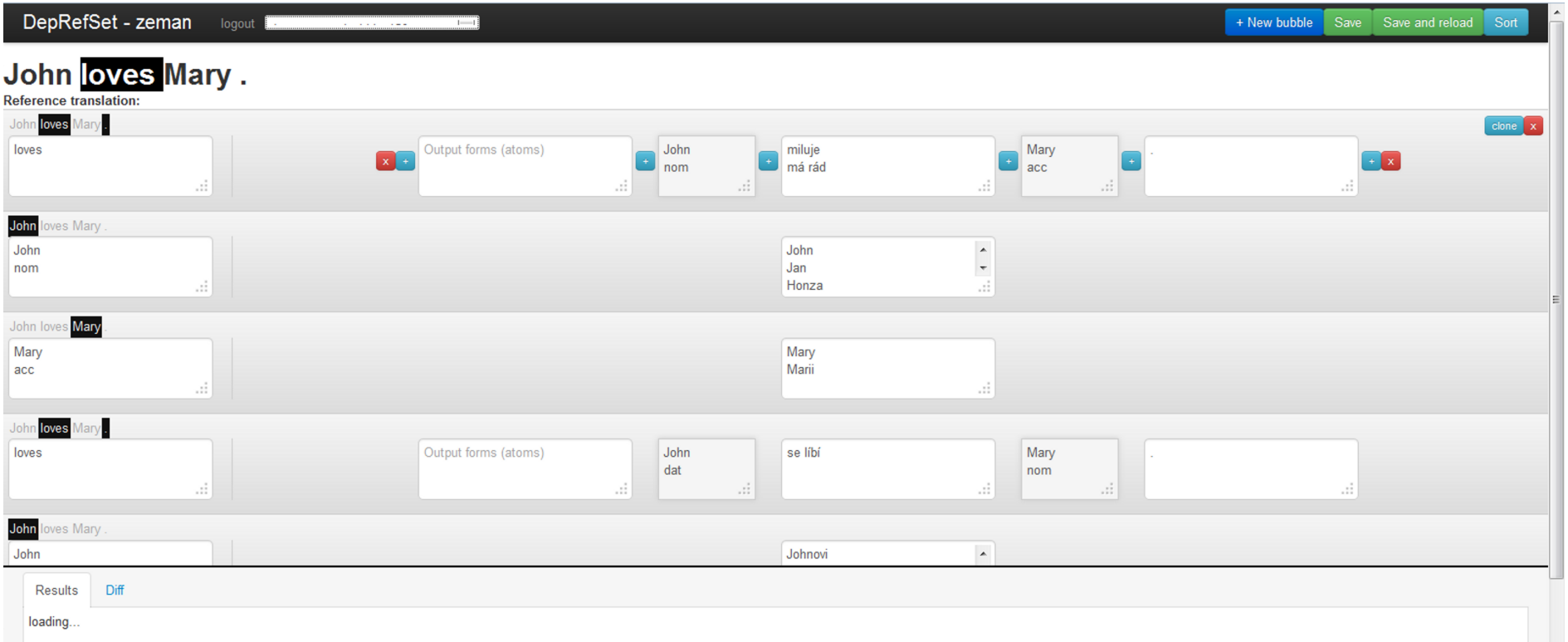

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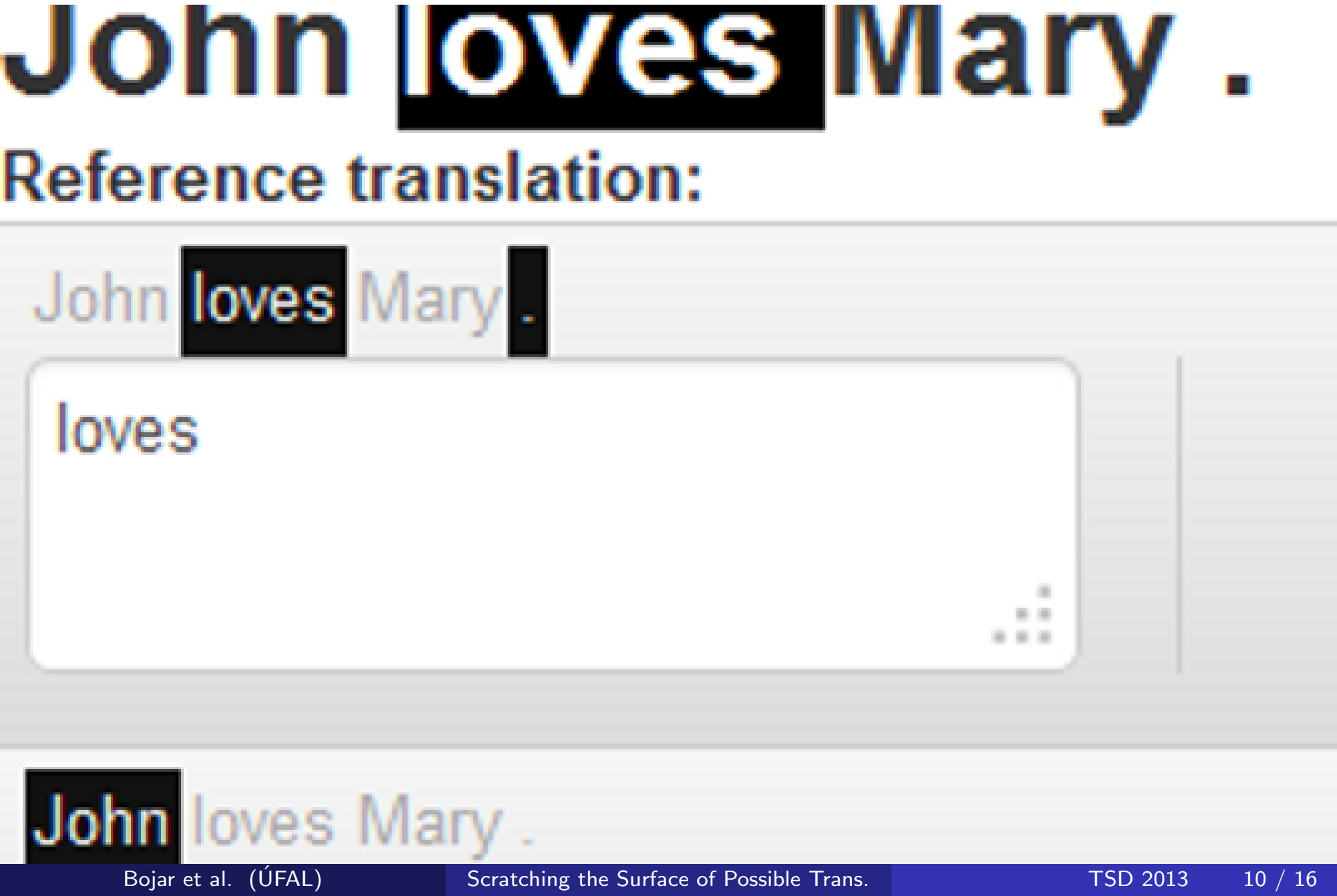

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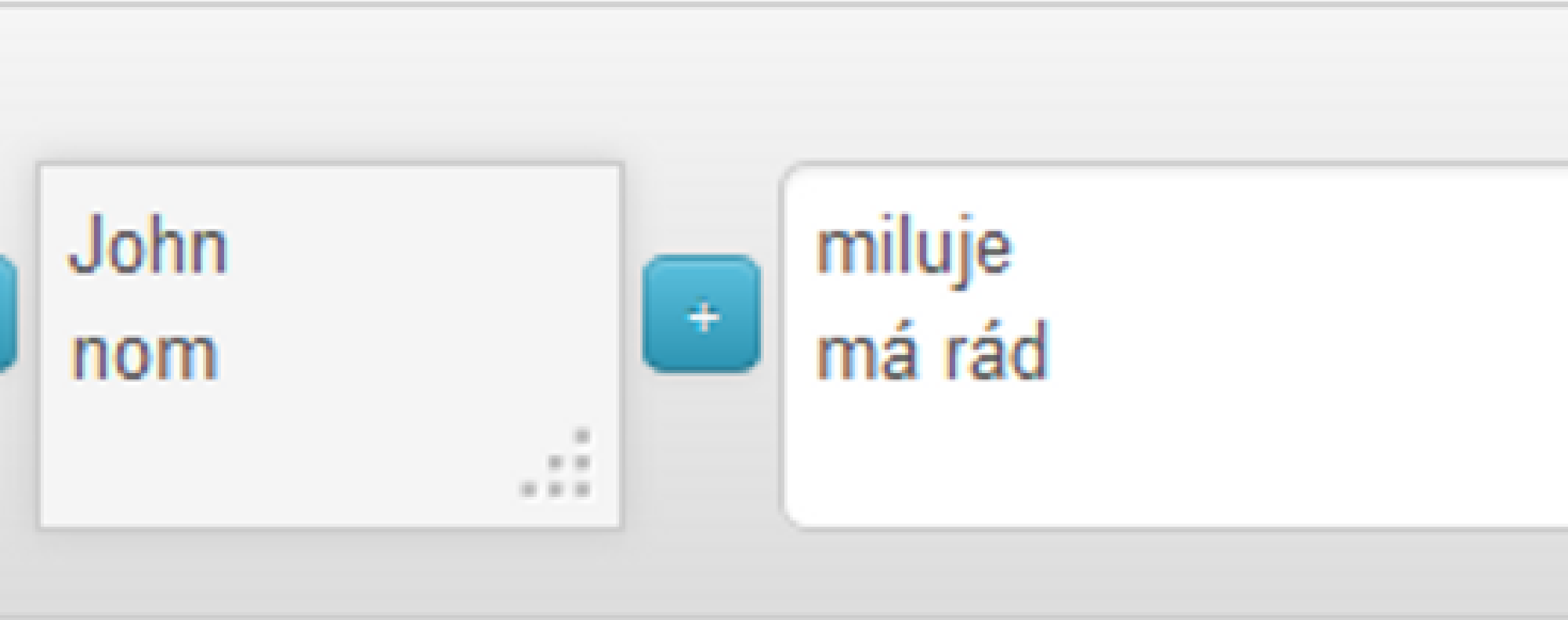

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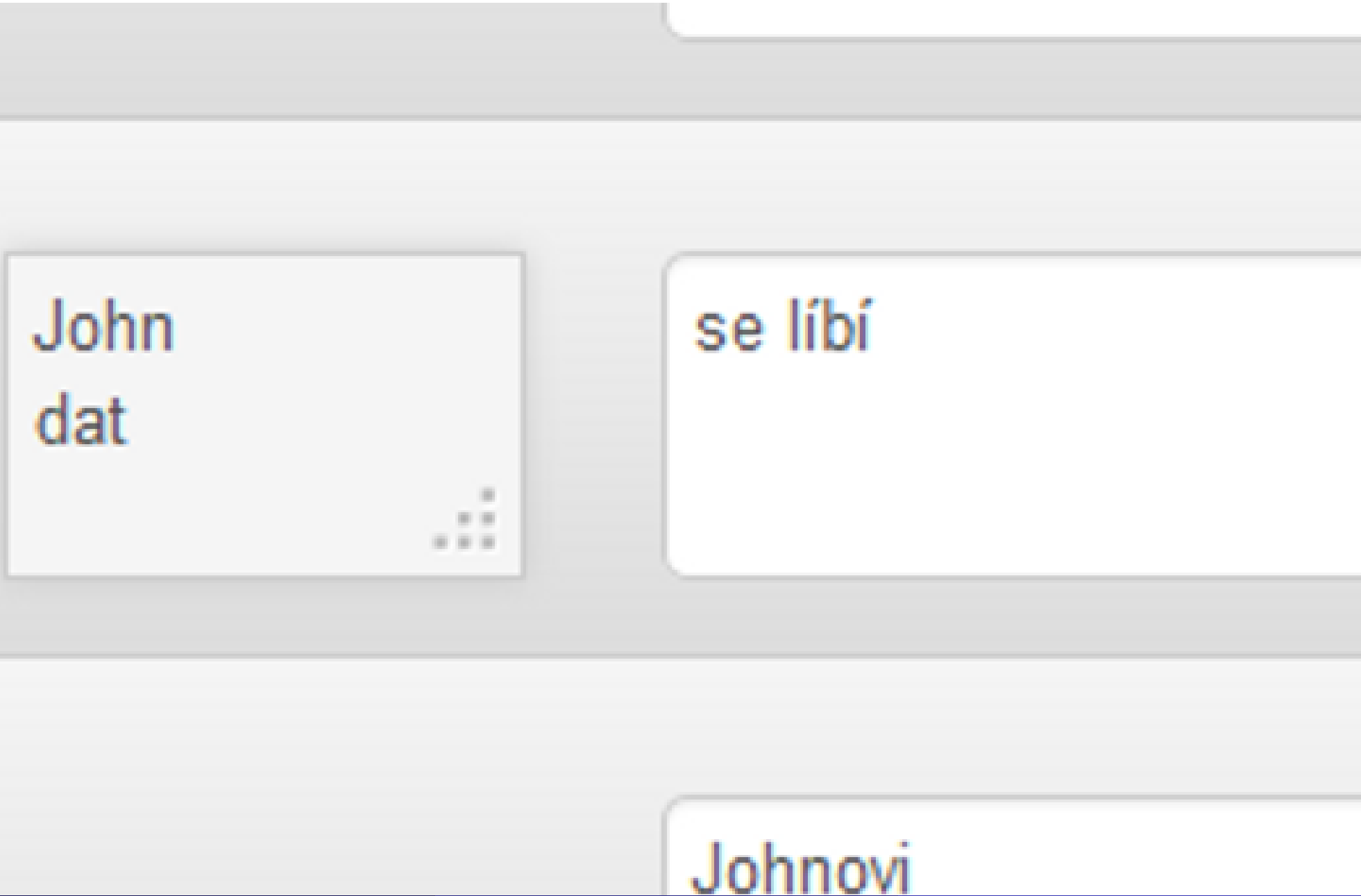

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- Combined with other translations of WMT11 test set, we have:

Label	Reference set	Sent.	Refs.
O	The single official reference translation of WMT11	3003	1
P	Manual post-edits of a phrase-based MT system	1997	2
D	Our many references	50	Avg. 123k

Number of Obtained References

Annotation Interface	Avg. Sent. Length	Avg. Number of Refs.
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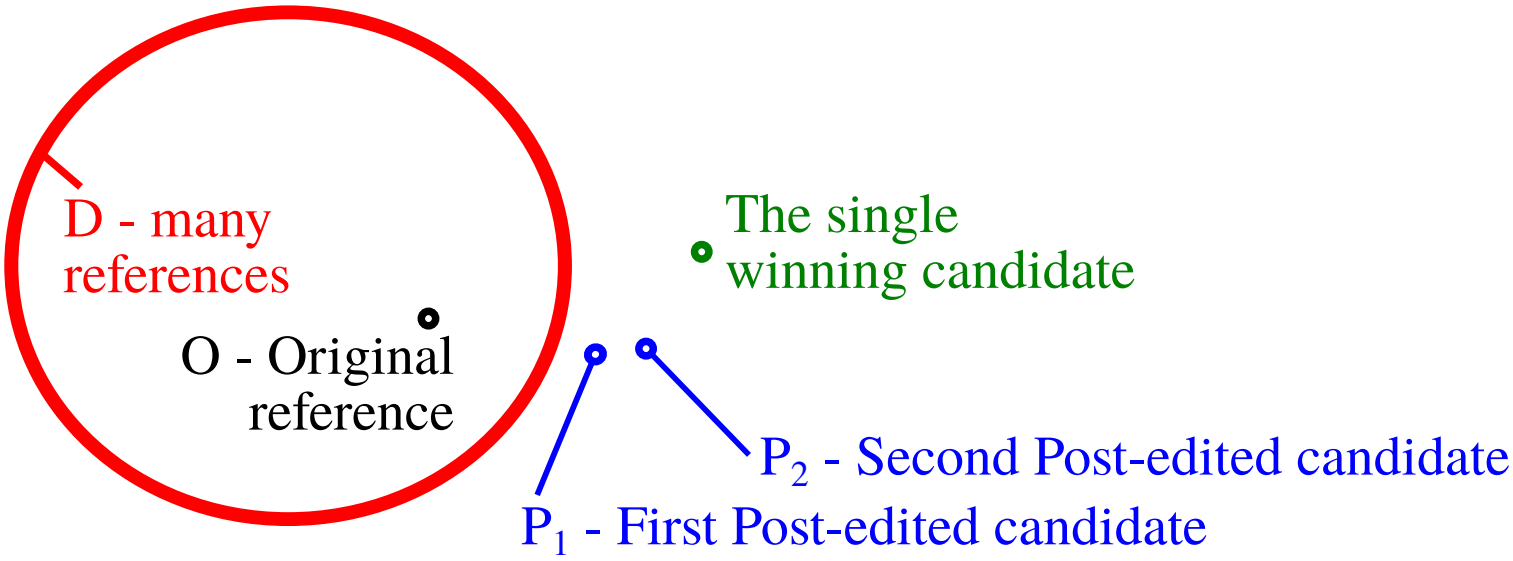

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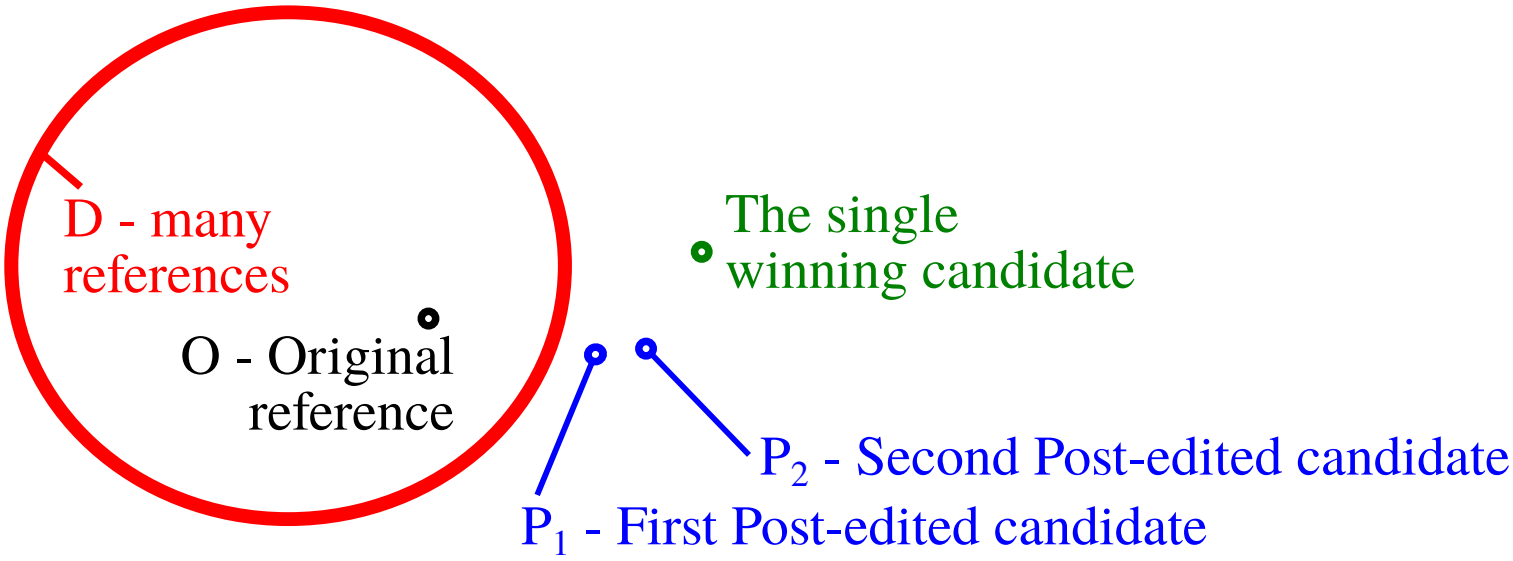

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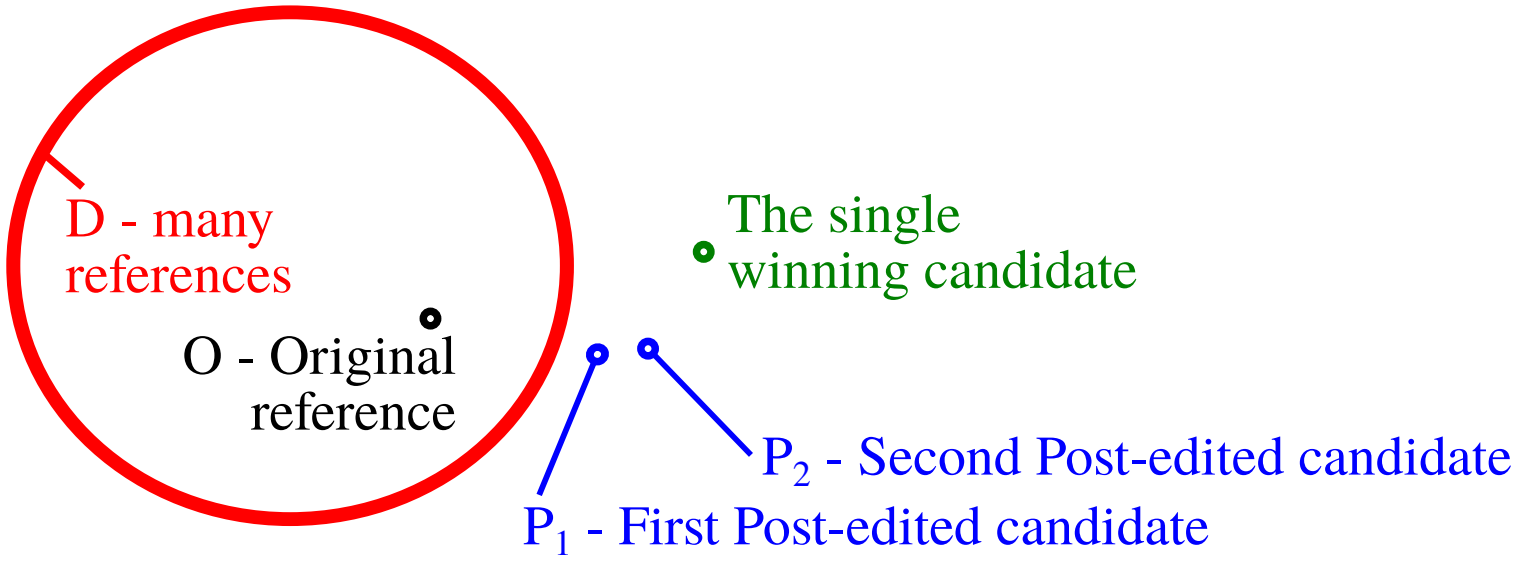

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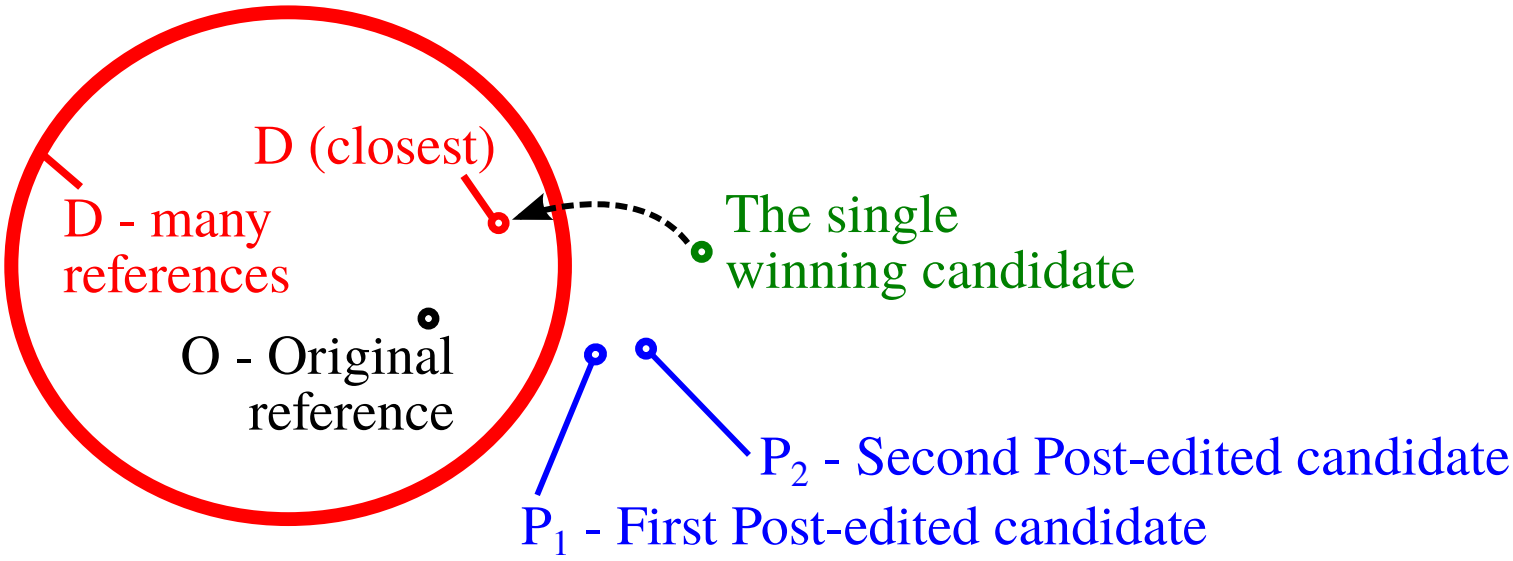

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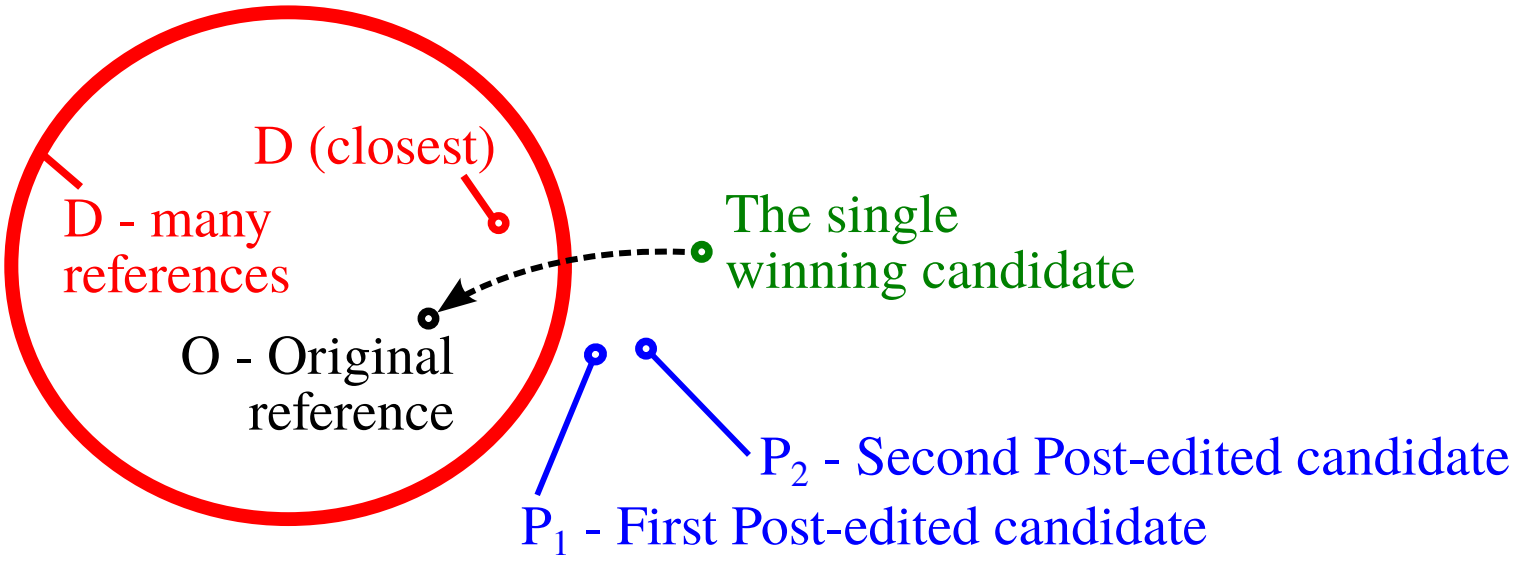

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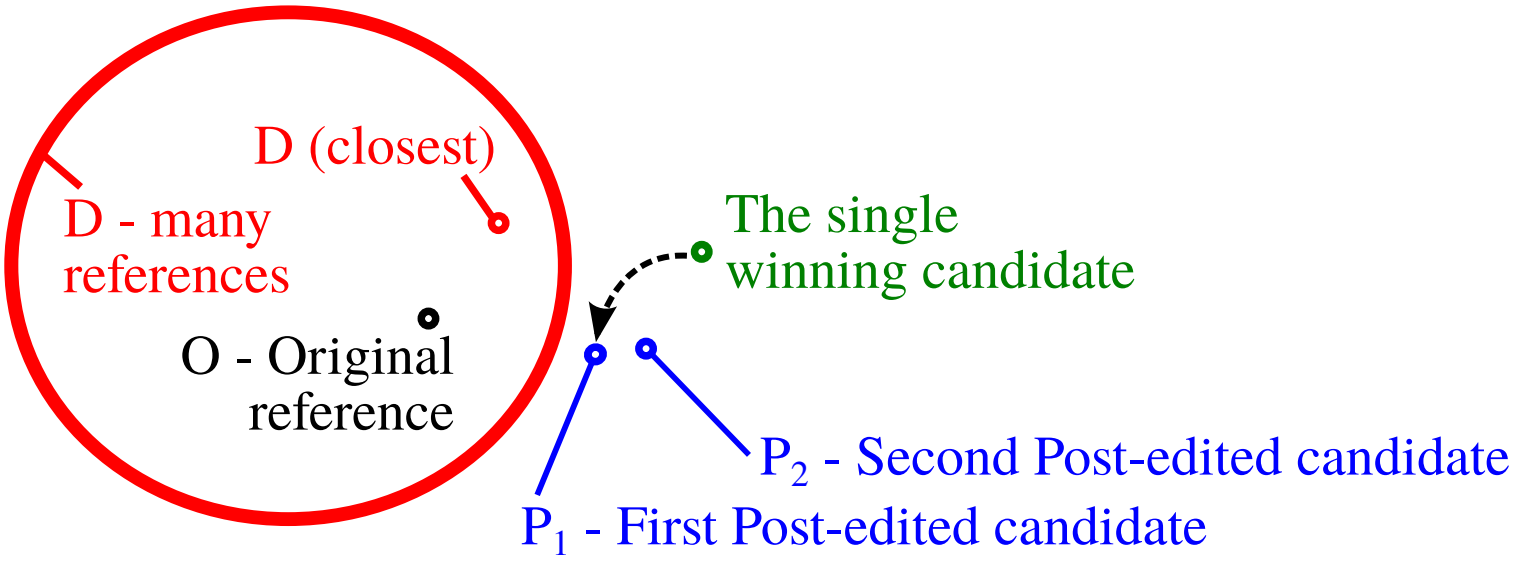

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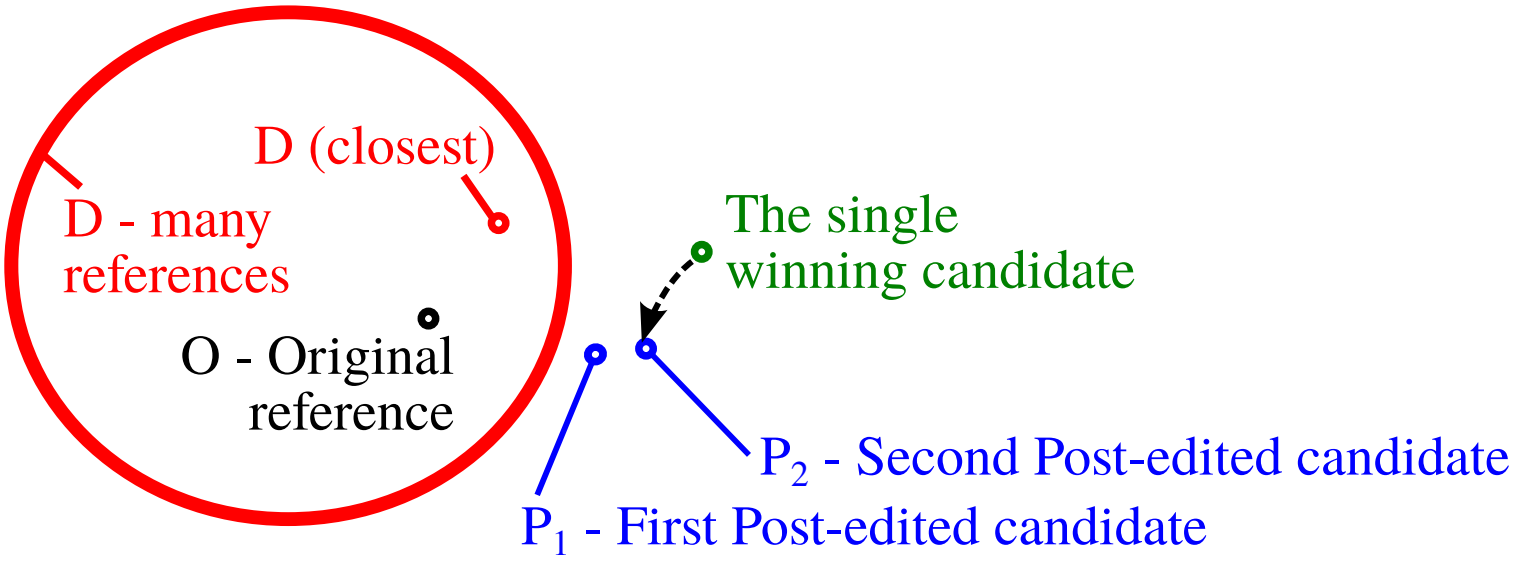

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Reference Set	**D (closest)**	**O**	**P_1**	**P_2**
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- **D(closest to Google):** Skvělé je, když film má několik cílových skupin, je ale škoda, když se tyto navzájem vylučují.
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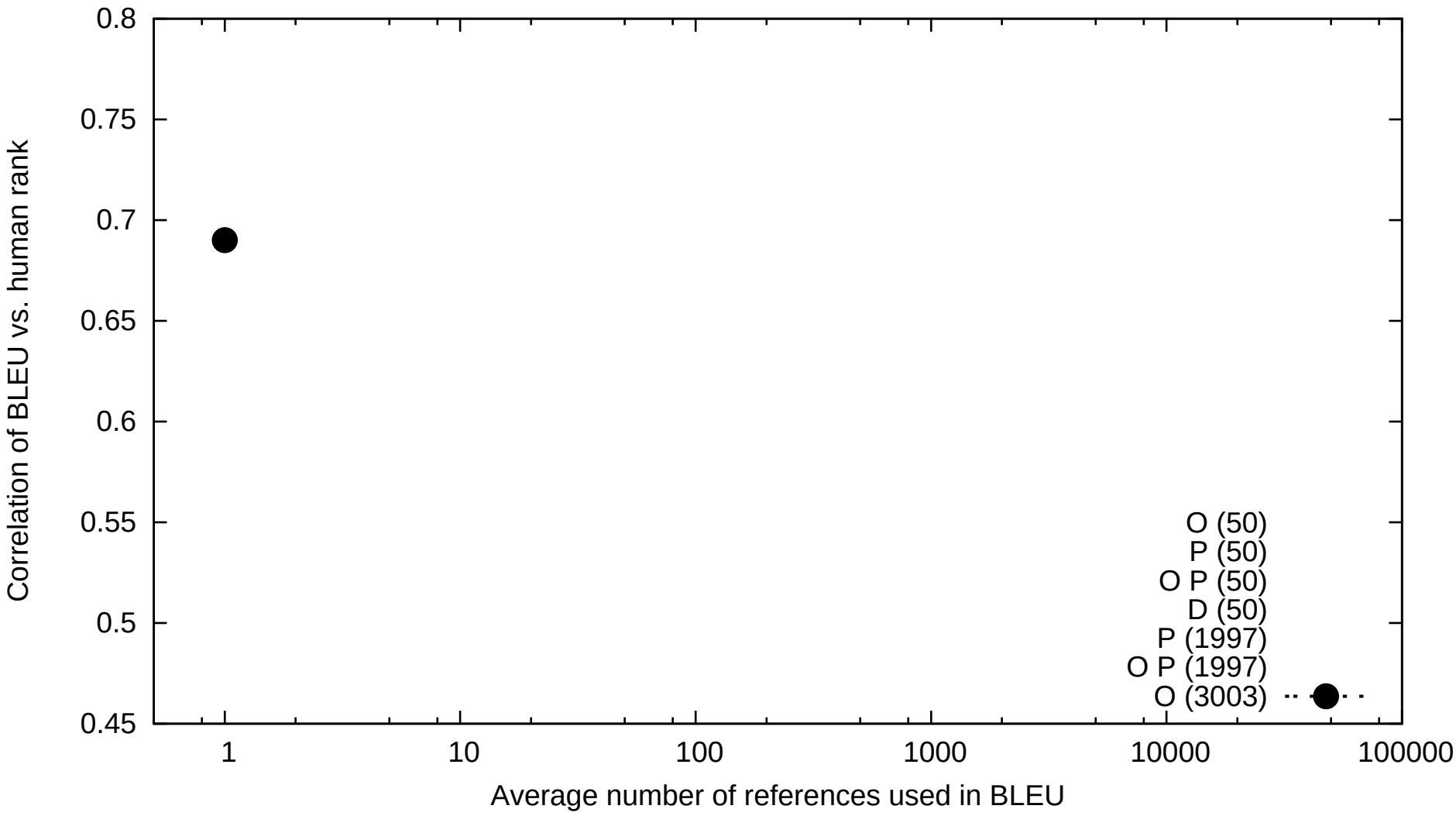
BLEU Correlations for Various Sets of References



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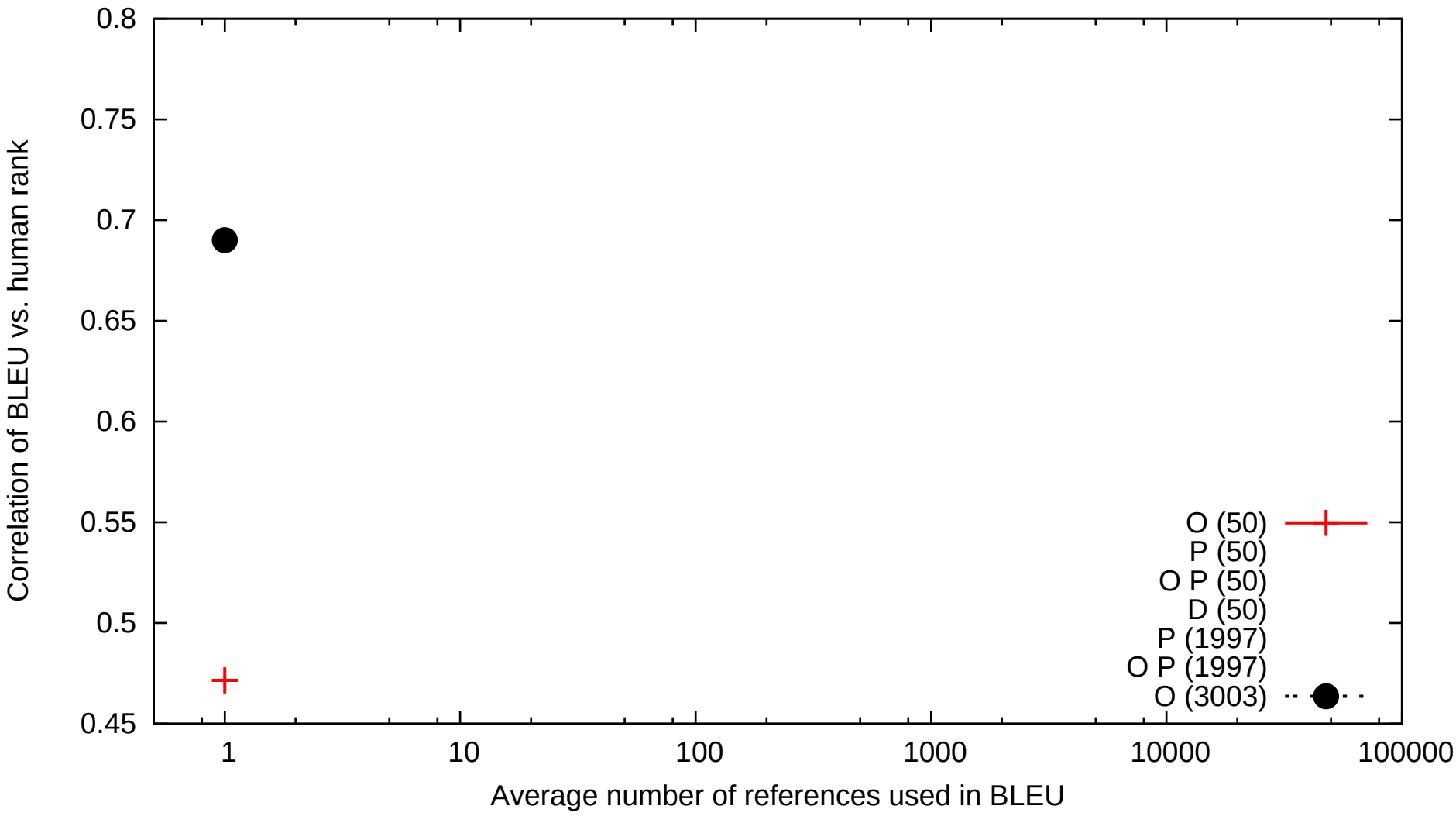

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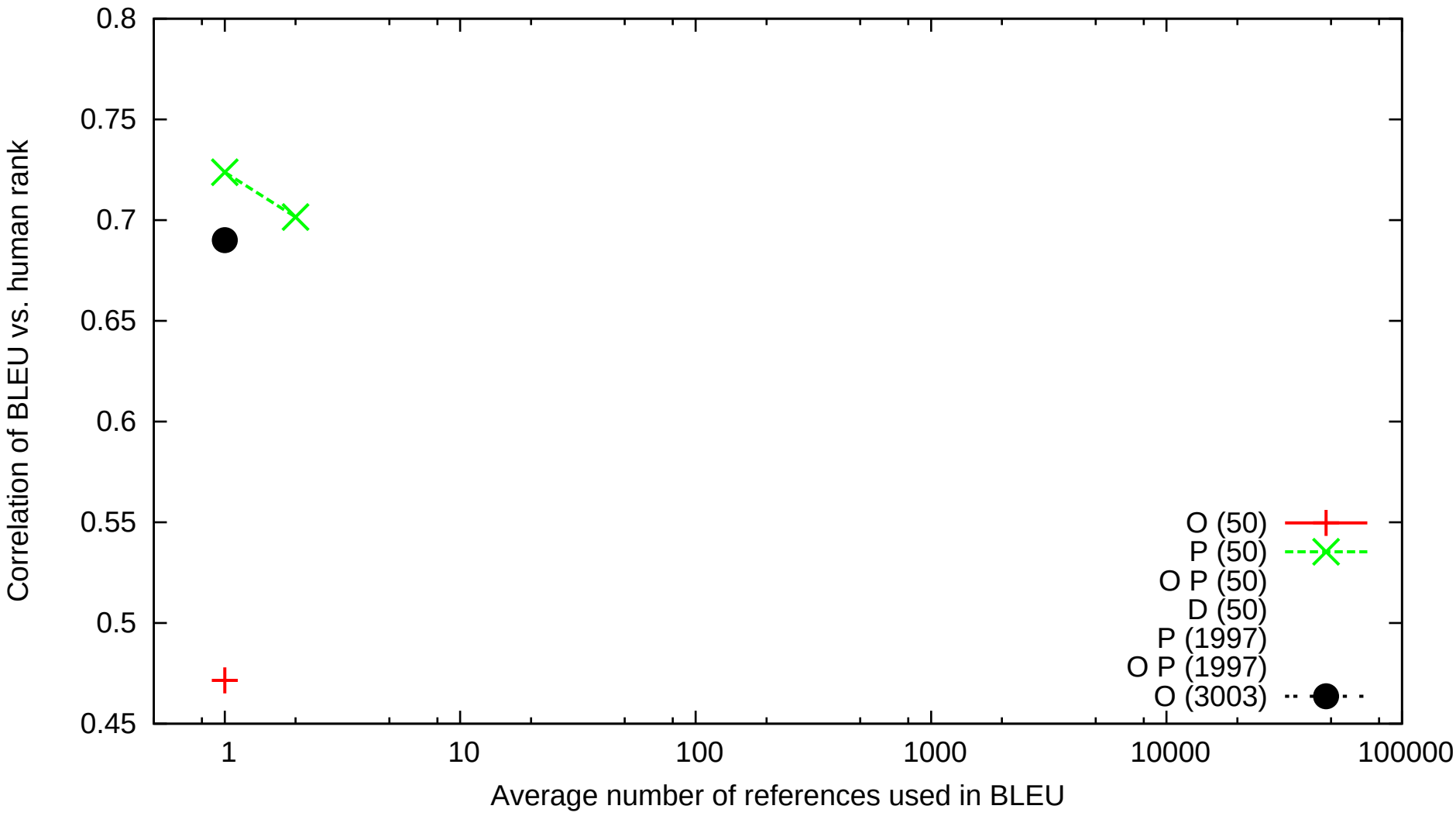

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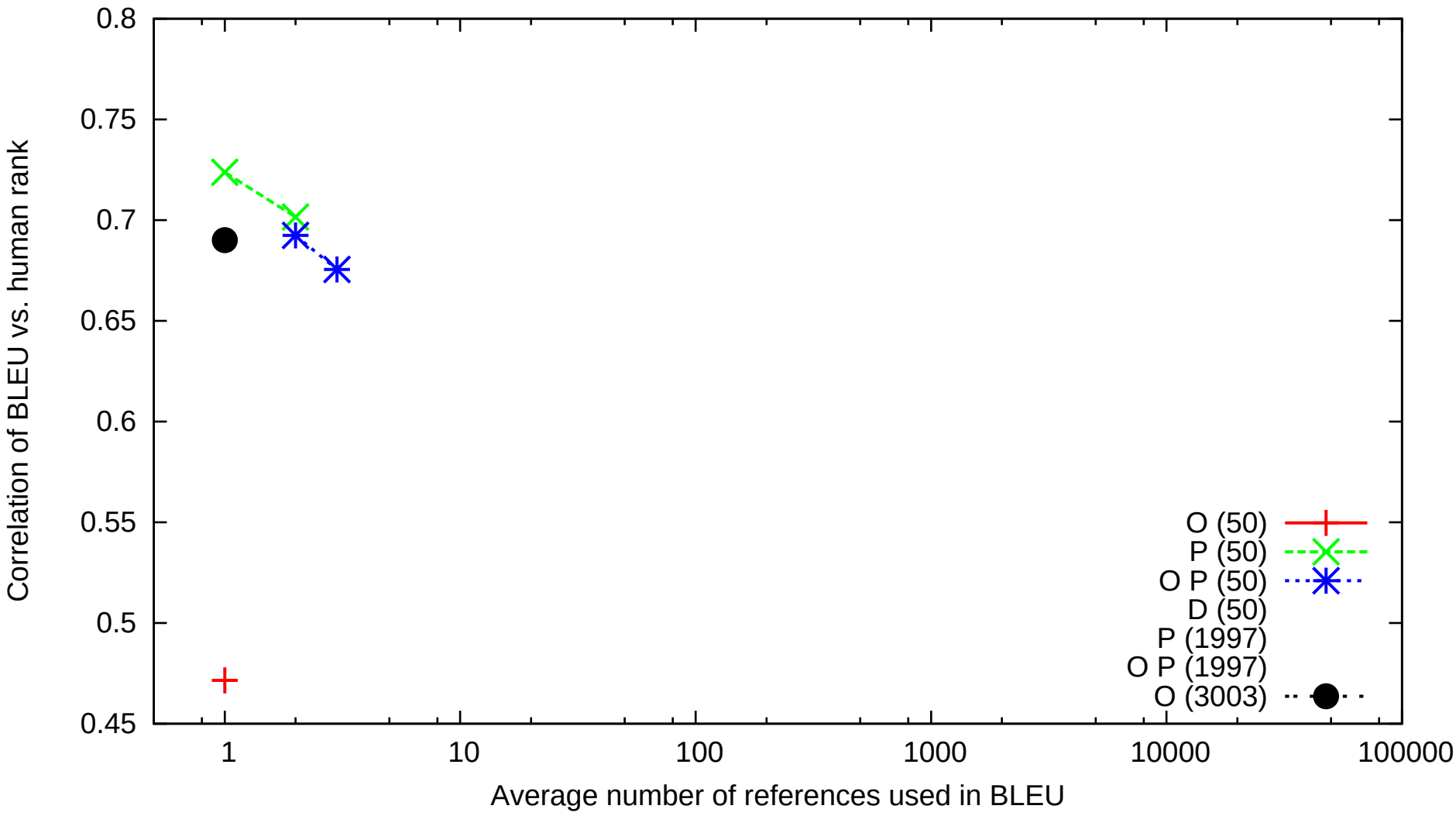

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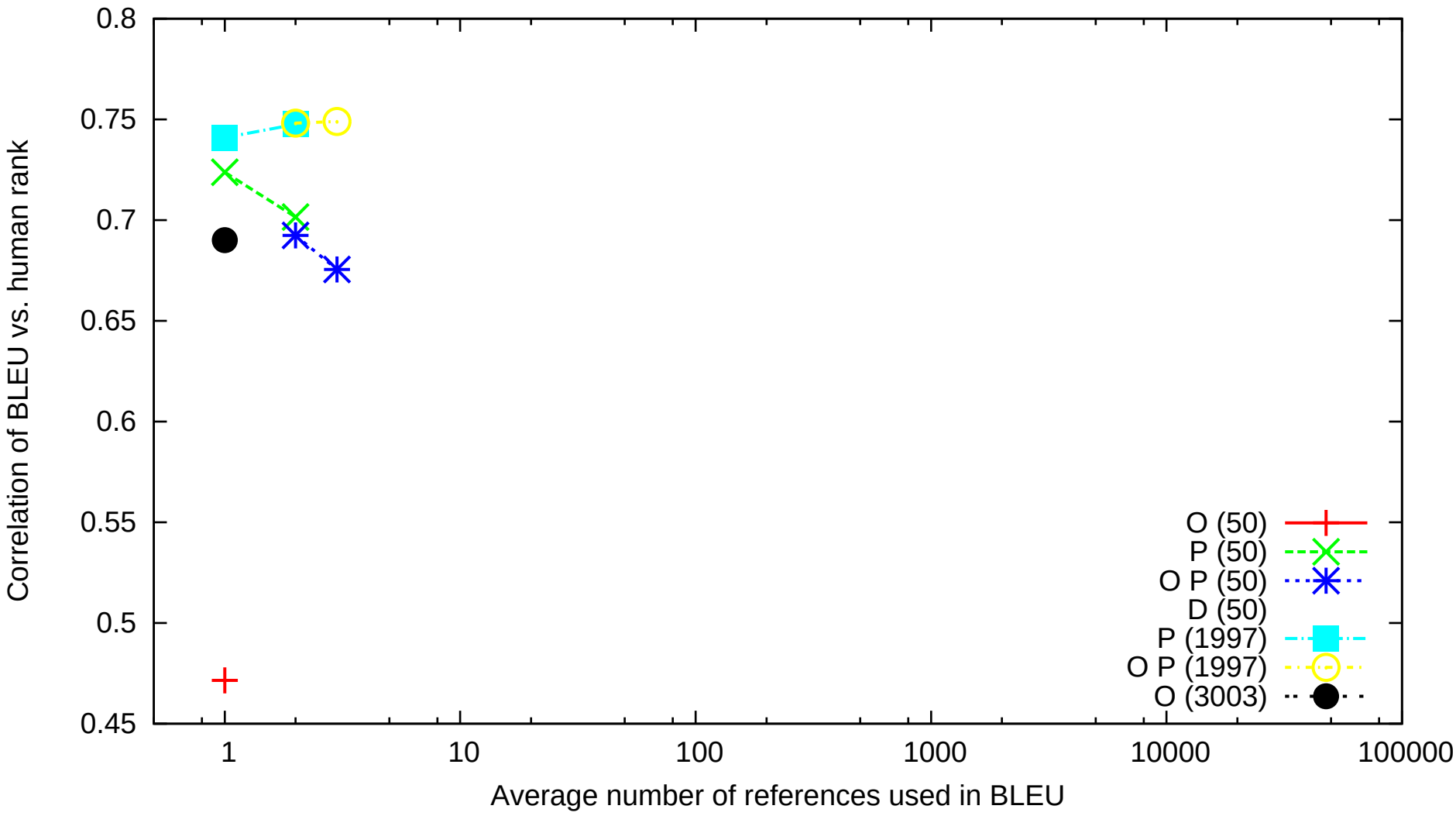

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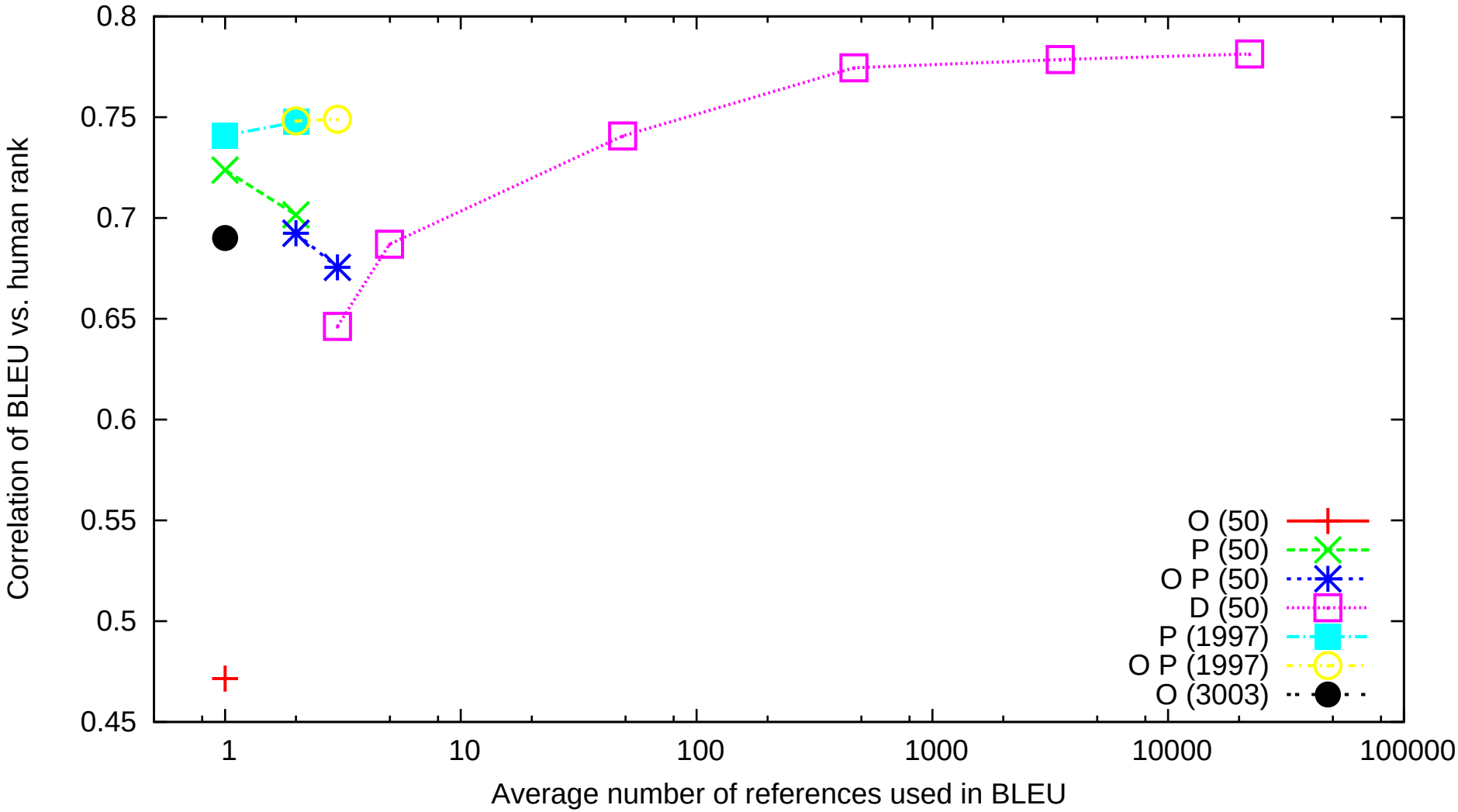

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- Our many references allow for a better correlation between manual and automatic MT evaluation techniques, despite the low number of sentences in the test set.