

# Generalization and Representation in Multilingual Semantic Parsing

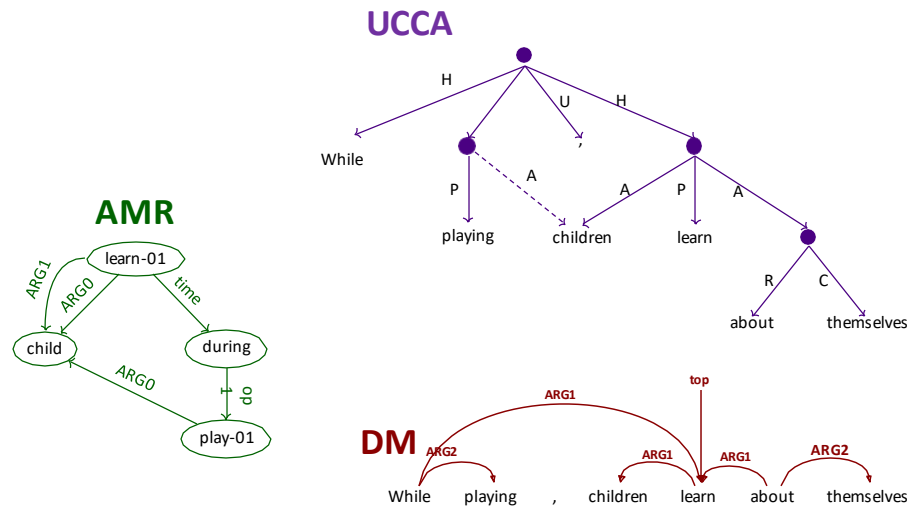
*Workshop on Ten Years of BabelNet and  
Multilingual Neurosymbolic  
Natural Language Understanding  
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# Meaning Representations

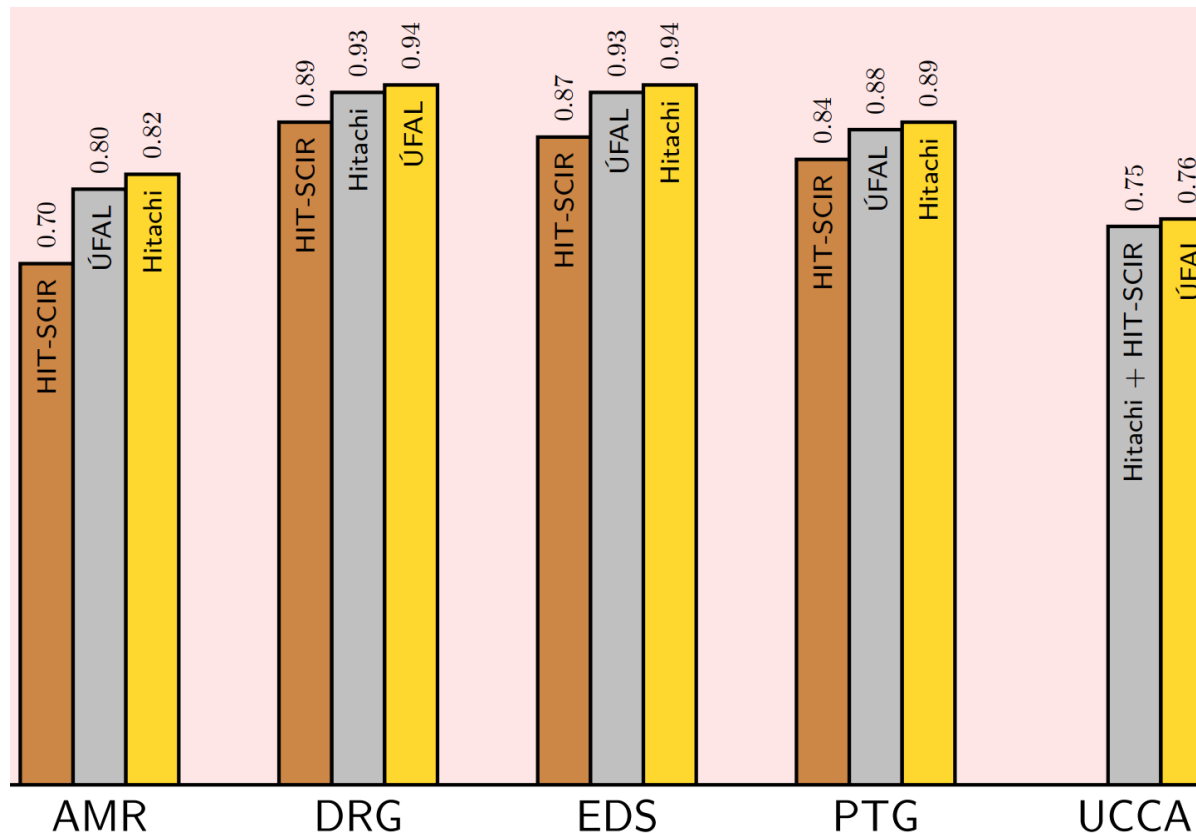


[A Transition-Based Directed Acyclic Graph Parser for UCCA](#) (Hershcovich et al., ACL 2017)

[Multitask Parsing Across Semantic Representations](#) (Hershcovich et al., ACL 2018)

# MRP Shared Tasks

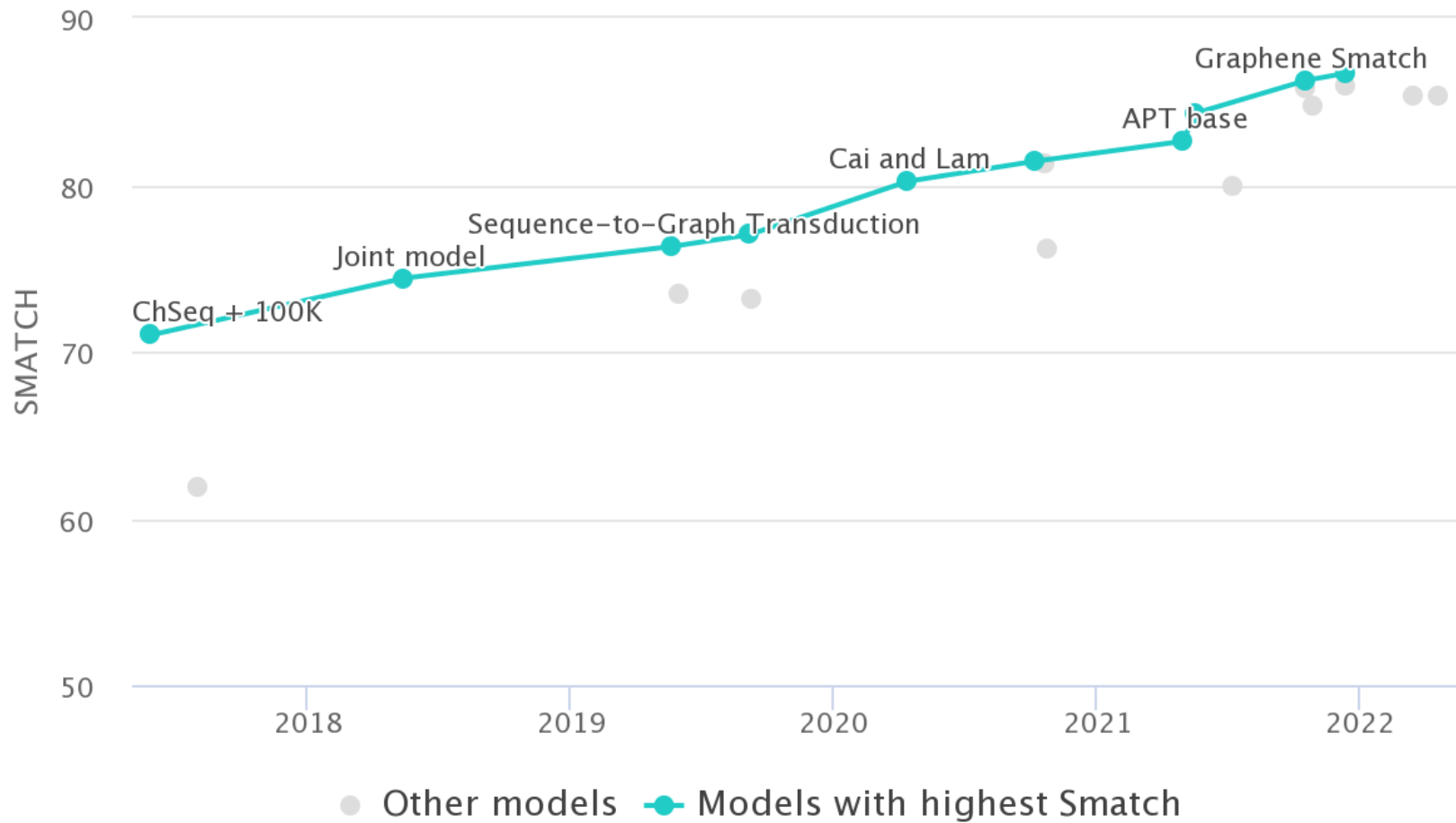
- English, German, Chinese, Czech



MRP 2019: Cross-Framework Meaning Representation Parsing (Oepen et al., CoNLL 2019)

MRP 2020: The Second Shared Task on Cross-Framework and Cross-Lingual Meaning Representation Parsing (Oepen et al., CoNLL 2020)

# Parsing Progress



# Universal Conceptual Cognitive Annotation (UCCA)

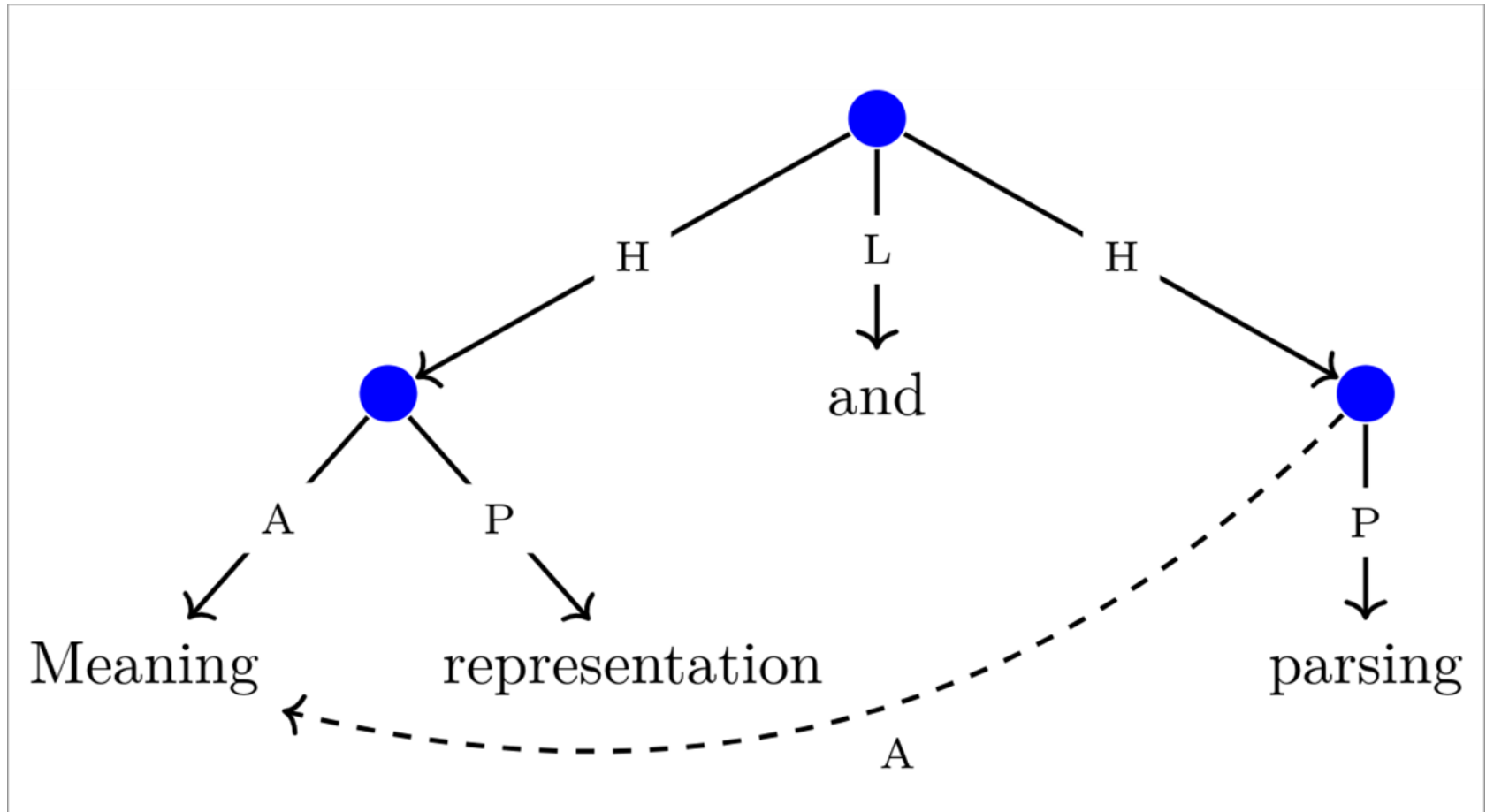
## Design principles

- Cross-linguistic applicability and stability
- Accessibility to non-expert annotators
- Modularity

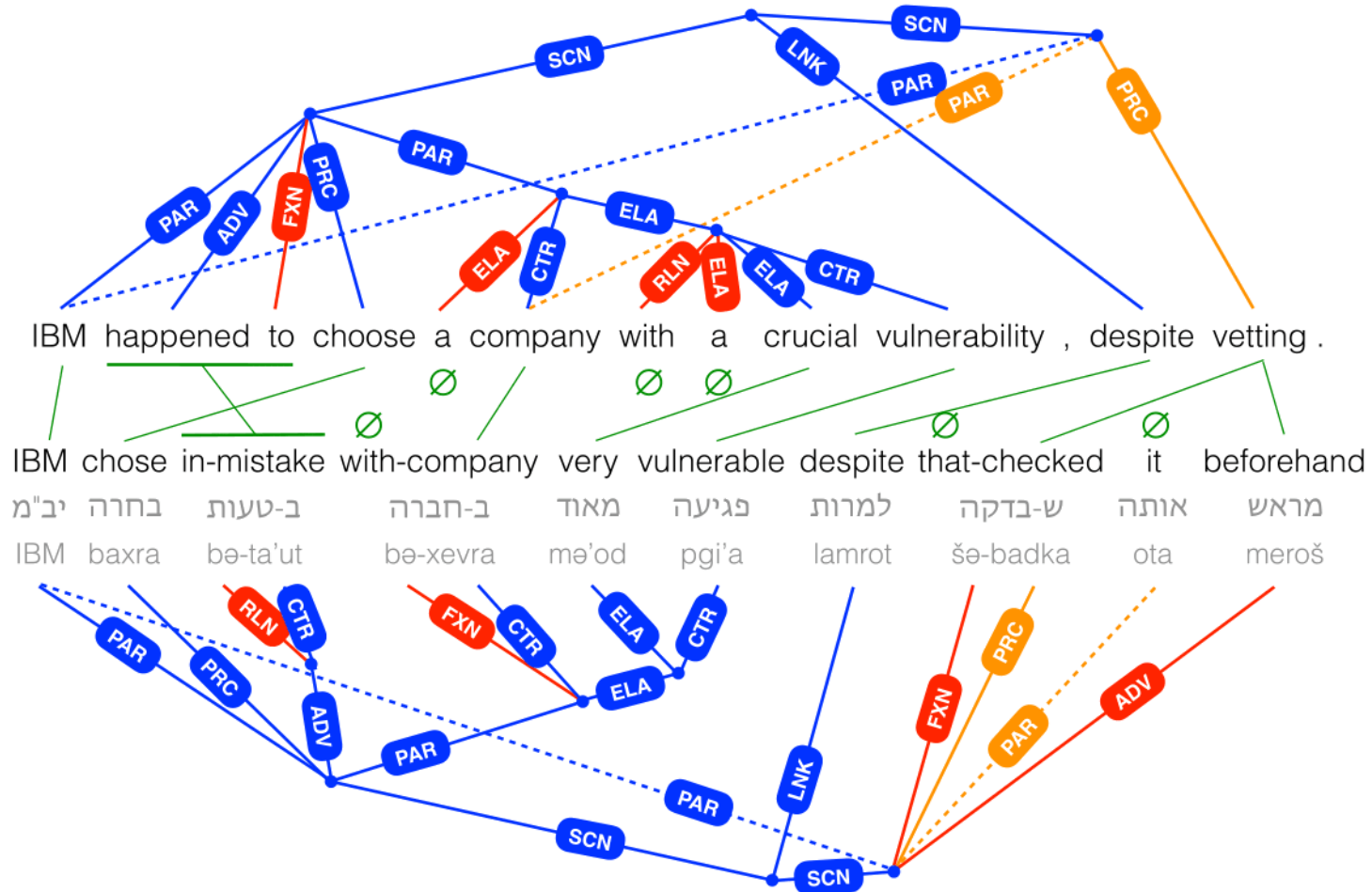
## Corpora

- English, German, French, Russian, Hebrew & Turkish

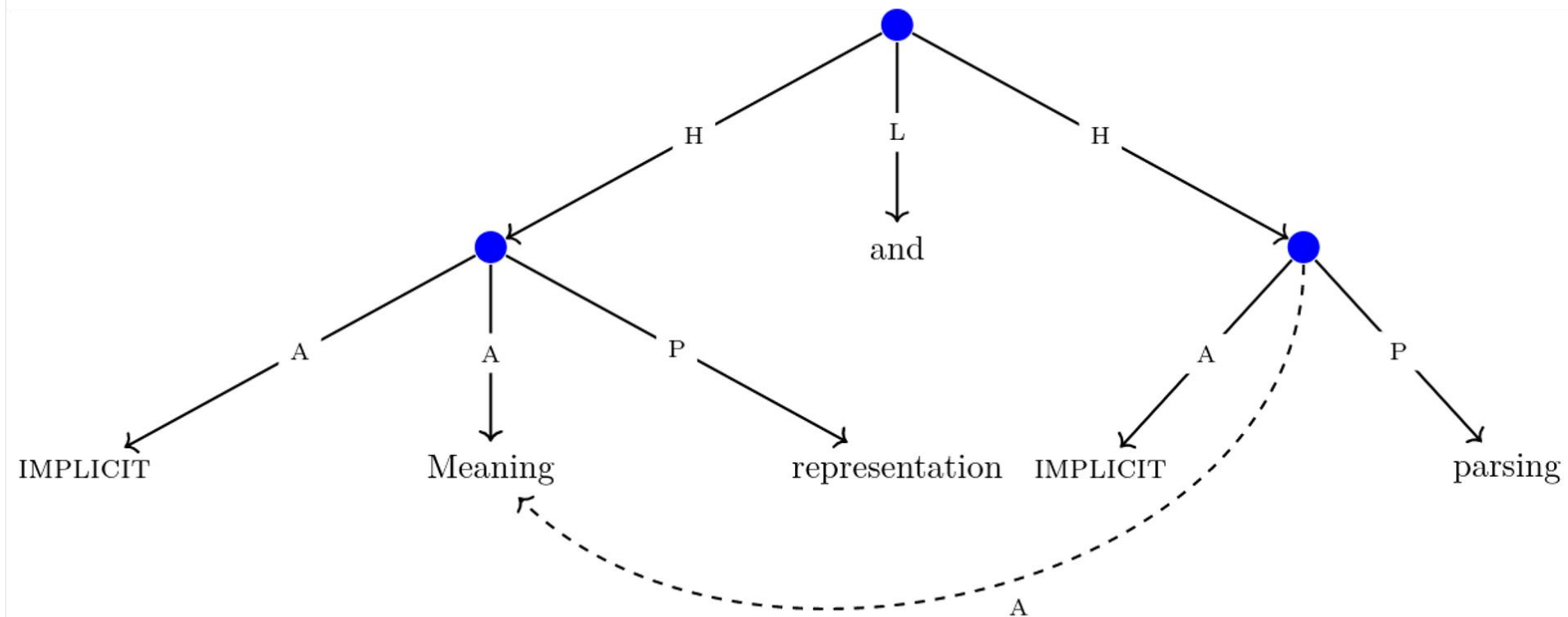
# UCCA



# UCCA



# Remaining Challenges



Refining Implicit Argument Annotation for UCCA (Cui & Hershcovich, DMR 2020)

Great Service! Fine-grained Parsing of Implicit Arguments (Cui & Hershcovich, IWPT 2021)



# Why Meaning Representation?



## Performance

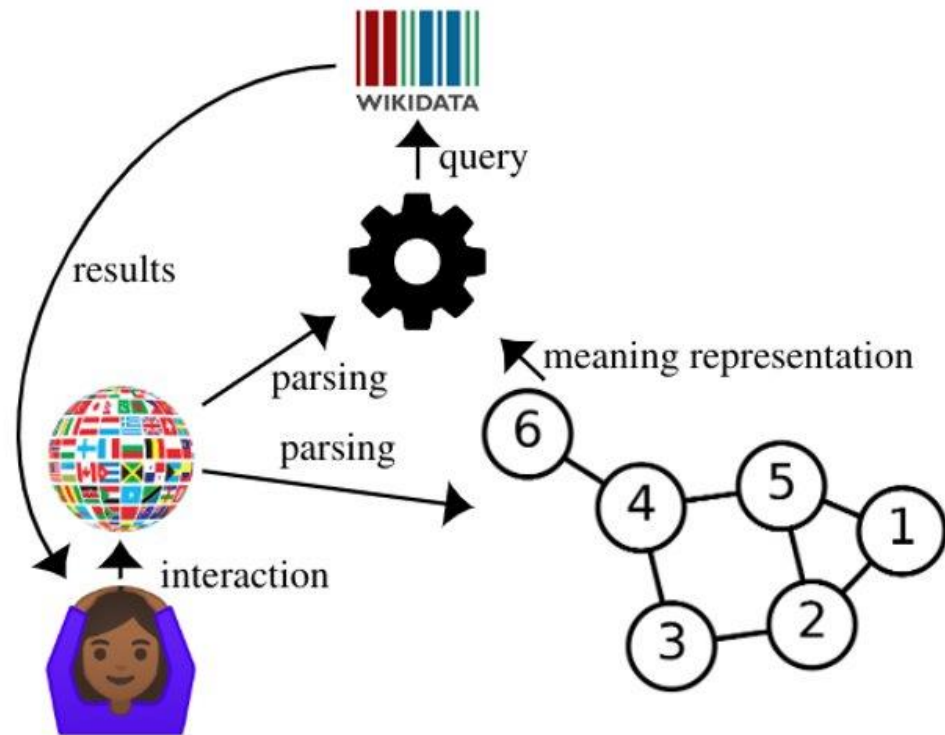
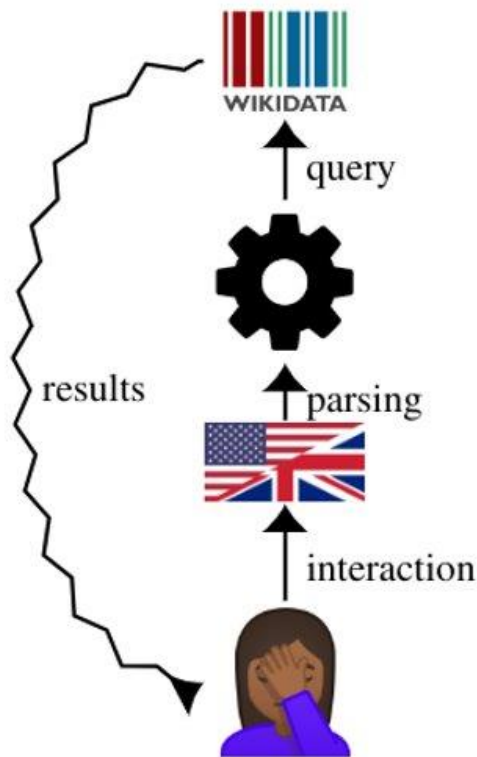
Inductive bias  
Neurosymbolic systems



## Understanding

Interpretability  
Theoretical analysis

# Multilingual Semantic Parsing to SPARQL



# Multilingual Compositional Wikidata Questions

Lang. Question

En	Did Lohengrin 's male actor marry Margarete Joswig
He	האם ה שחקן הגברי של לוחגרין עמ המרגרט יוסוויג נשוא
Kn	ಲೋಹೆಂಗ್ರಿನ್ ಅವರ ಪುರುಷ ನಟ ವಿವಾಹವಾದರು ಮಾರ್ಗರೇಟ್ ಜೋಸ್ವಿಗ್
Zh	Lohengrin 的男 演员 嫁给了 Margarete Joswig 吗

SPARQL Query:

```
ASK WHERE { ?x0 wdt:P453 wd:Q50807639 . ?x0
wdt:P21 wd:Q6581097 . ?x0 wdt:P26 wd:Q1560129 .
FILTER ( ?x0 != wd:Q1560129 ) }
```

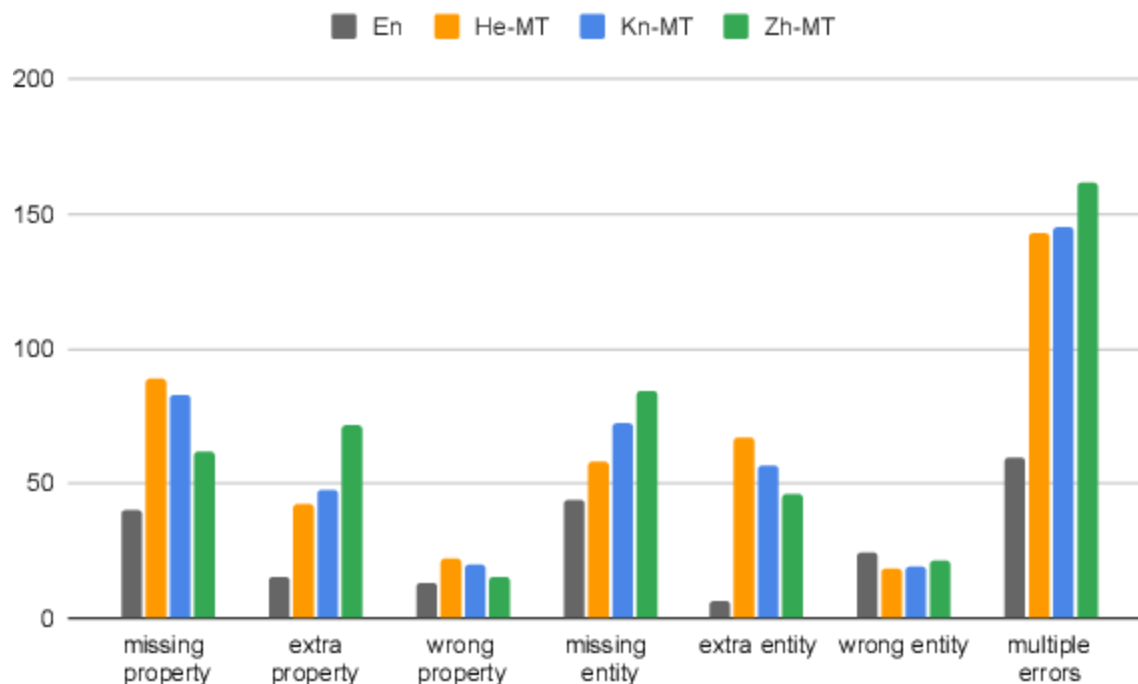
# Multilingual Compositional Wikidata Questions

<b>Monolingual</b> <b>Exact Match (%)</b>	<b>MCD<sub>mean</sub></b>			
	En	He	Kn	Zh
LSTM+Attention	19.4	15.5	17.6	16.2
E. Transformer	29.3	18.9	20.2	18.9
mBERT	26.6	22.7	21.6	23.4
T5-base+RIR	28.1	-	-	-
mT5-small+RIR	<b>38.3</b>	29.3	31.5	<b>36.3</b>
mT5-base+RIR	33.8	<b>33.2</b>	<b>32.1</b>	29.6

## Cross-lingual

mT5-small+RIR	38.3	0.2	0.3	0.2
mT5-base+RIR	33.8	0.4	0.7	1.5

# Multilingual Compositional Wikidata Questions



**Cross-lingual prediction errors**

# Summary



Multilingual benchmark for compositional generalization



Similar within-language generalization across languages



Zero-shot cross-lingual generalization fails

# Thanks!

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