

COPA-SSE

Semi-Structured Explanations for COPA

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Q:

I cut my foot on the floor. Cause?

a) ***The tile was cracked.*** ✓

b) The tile was wet.

Why a)?

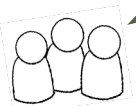
Cutting is capable of cutting foot.

Cracking is capable of cutting.

Tile is capable of cracking.

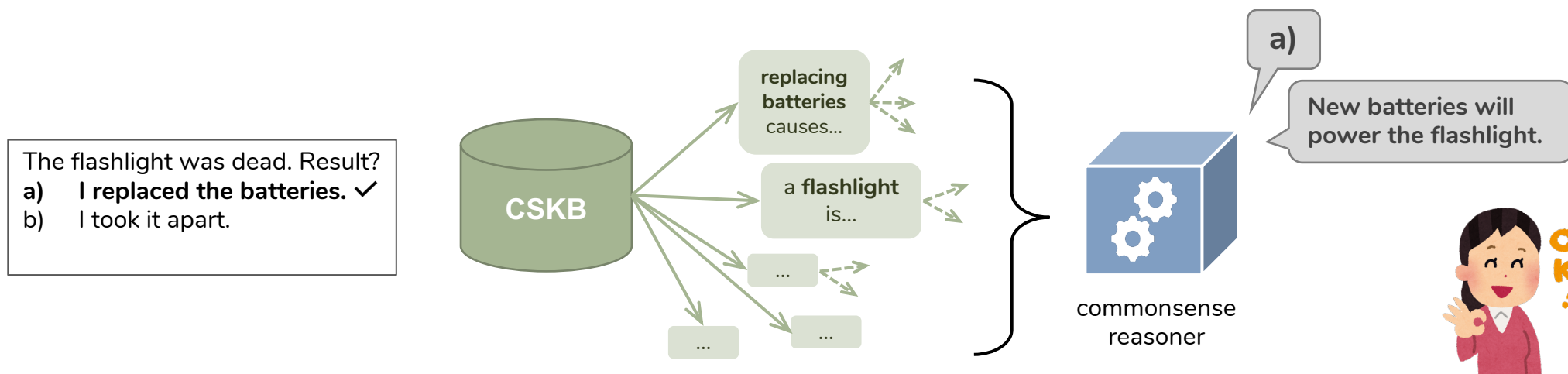
TL;DR:

← We collected a bunch of these



Explanations in commonsense reasoning

- **Reasoning paths** can serve as justifications for answers
 - Improve trustworthiness, interpretability, counter superficial cues...
- E.g., in graph-based systems such as KagNet¹, (Lv et. al, 2020)²



¹Lin, Bill Yuchen, et al. "KagNet: Knowledge-Aware Graph Networks for Commonsense Reasoning." *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing and the 9th International Joint Conference on Natural Language Processing (EMNLP-IJCNLP)*. 2019.

²Lv, Shangwen, et al. "Graph-based reasoning over heterogeneous external knowledge for commonsense question answering." *Proceedings of the AAAI Conference on Artificial Intelligence*. Vol. 34. No. 05. 2020.

Collecting explanations

a) Free-form approach

→ Have humans write explanations given a question and its answer?

✓ **coverage:** humans will give relevant knowledge

✗ **quality:** free-form crowdsourcing is *very* hard to quality-control...



b) Structured approach

→ Extract explanations from an existing resource?

- e.g., create reasoning chains by extracting ConceptNet³ triples

✗ **coverage:** key knowledge can be missing

✓ **quality:** CSKB data is generally clean

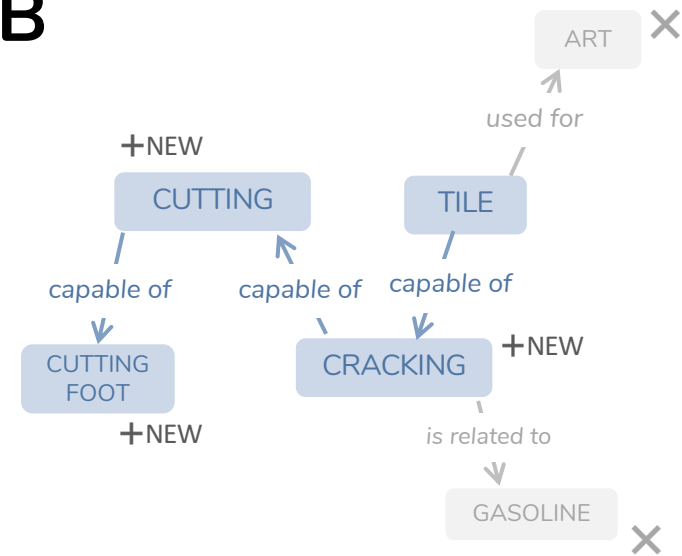
³ Robyn Speer, Joshua Chin, and Catherine Havasi. 2017. "ConceptNet 5.5: An Open Multilingual Graph of General Knowledge." In proceedings of AAAI 31.

Our solution: semi-structured approach

- Human-written explanations, but CSKB format
 - ✓ Higher quality than free-form writing
 - ✓ No coverage issues
- Essentially: **relevant subsets of a CSKB**

I cut my foot on the floor. Cause?
a) **The tile was cracked. (correct)**
b) The tile was wet.

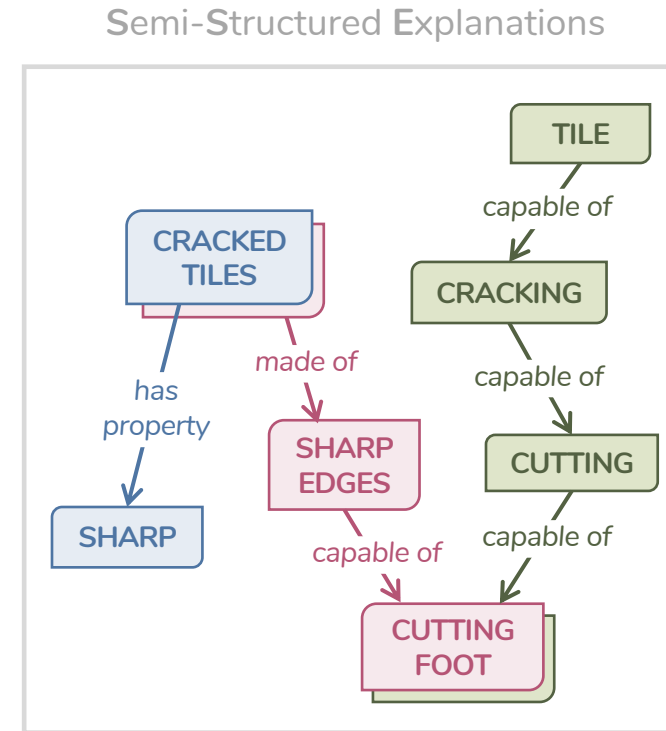
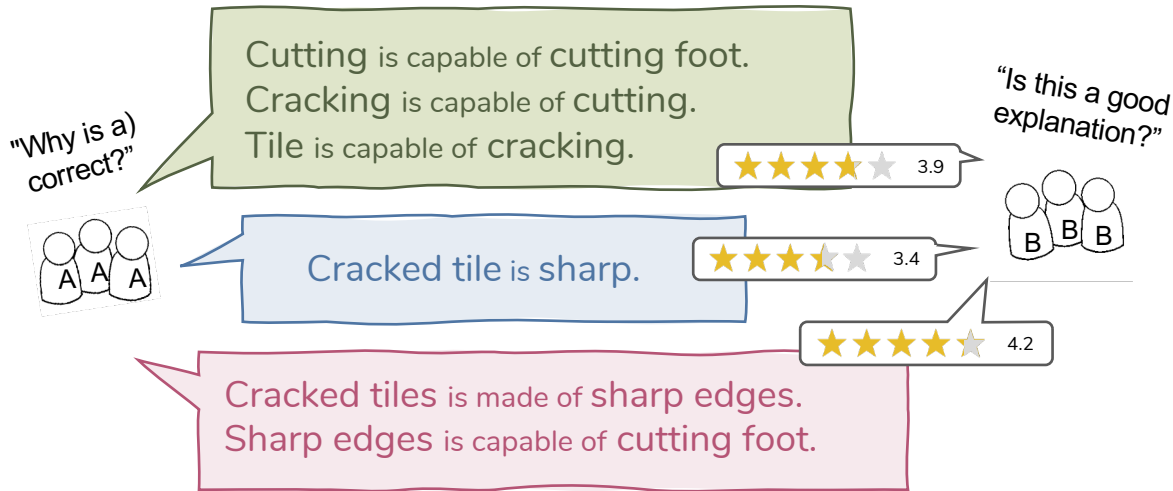
cutting	is capable of	cutting foot	
cracking	is capable of	cutting	x
tile	is capable of	cracking	x
<input type="button" value="+add"/>			



COPA-SSE Semi-Structured Explanations for COPA

COPA question:

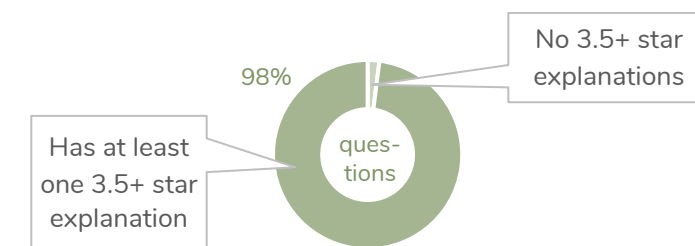
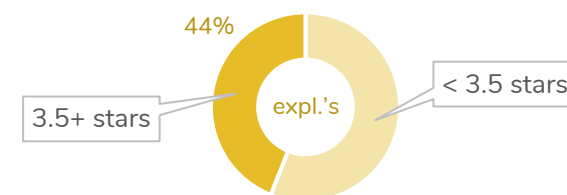
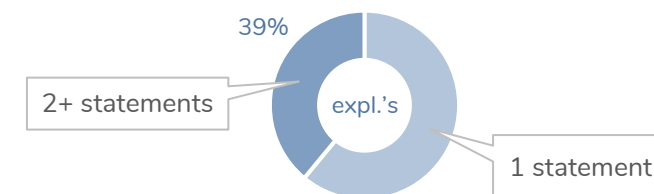
I cut my foot on the floor. What was the cause of this?
 a) The tile was cracked. (correct)
 b) The tile was wet.



1. Collection → 2. Rating → 3. Aggregation

Quick stats

- **9,747** explanations for 1,500 Balanced COPA⁴ questions
- 44% of all explanations are rated 3.5 stars or more
 - 98% of questions have at least one such explanation
 - "bad ones" are kept in as negative samples
 - interesting samples: seem relevant, thorough but actually not a good explanation
- 39% of explanations are multi-statement
- Format: full sentences & triple-form
(see [github readme](#) for details)



⁴ Kavumba, P., Inoue, N., Heinzerling, B., Singh, K., Reisert, P., & Inui, K. (2019). When Choosing Plausible Alternatives, Clever Hans can be Clever. EMNLP 2019, 33.