

# Typedthinker: Diversify Large Language Model Reasoning With Typed Thinking

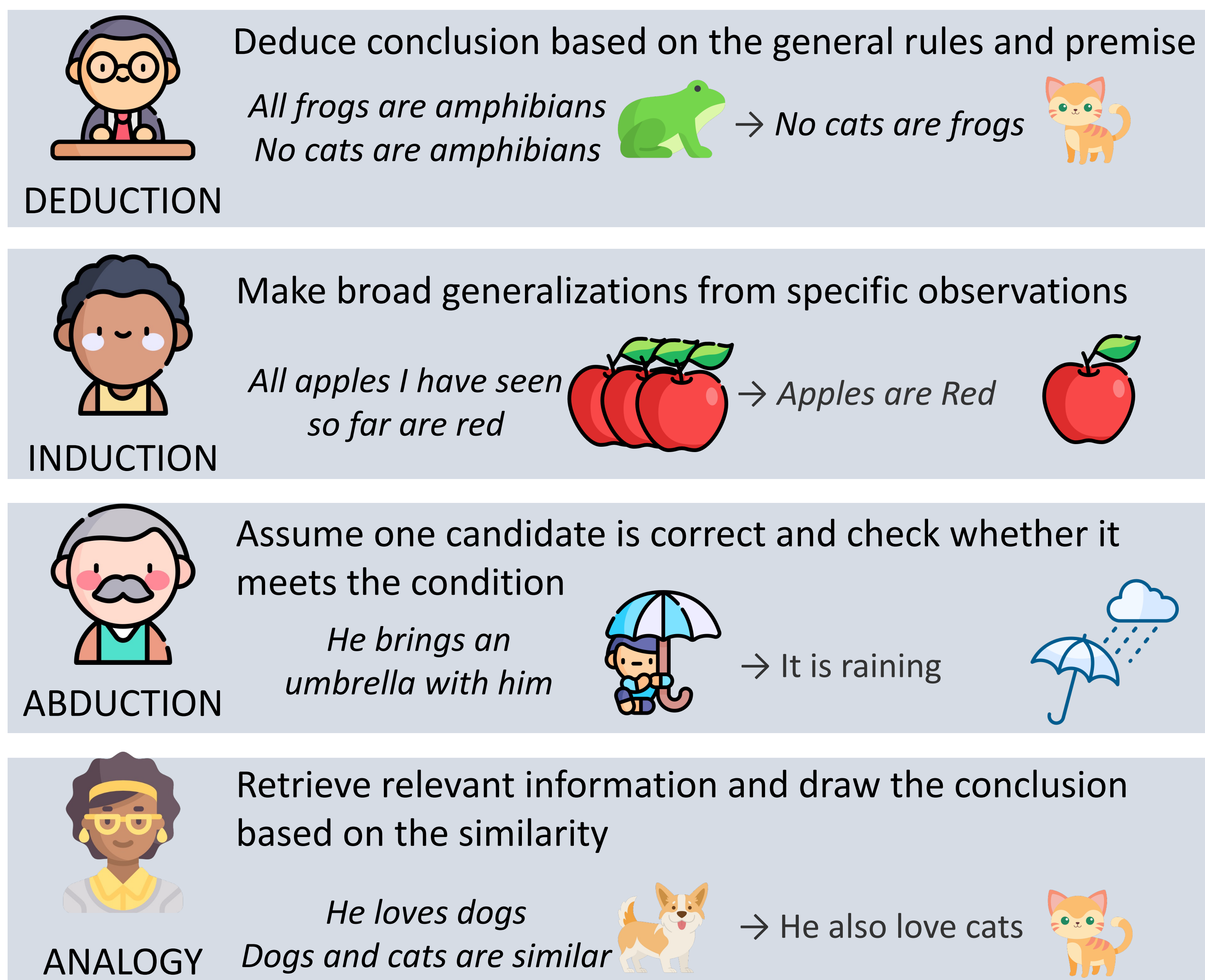


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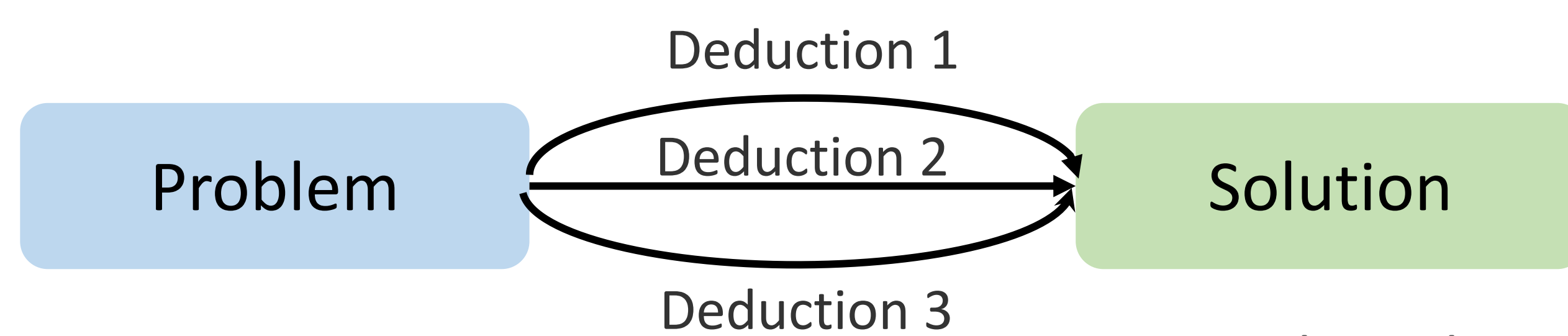


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## Human Reasoning: Diverse Types

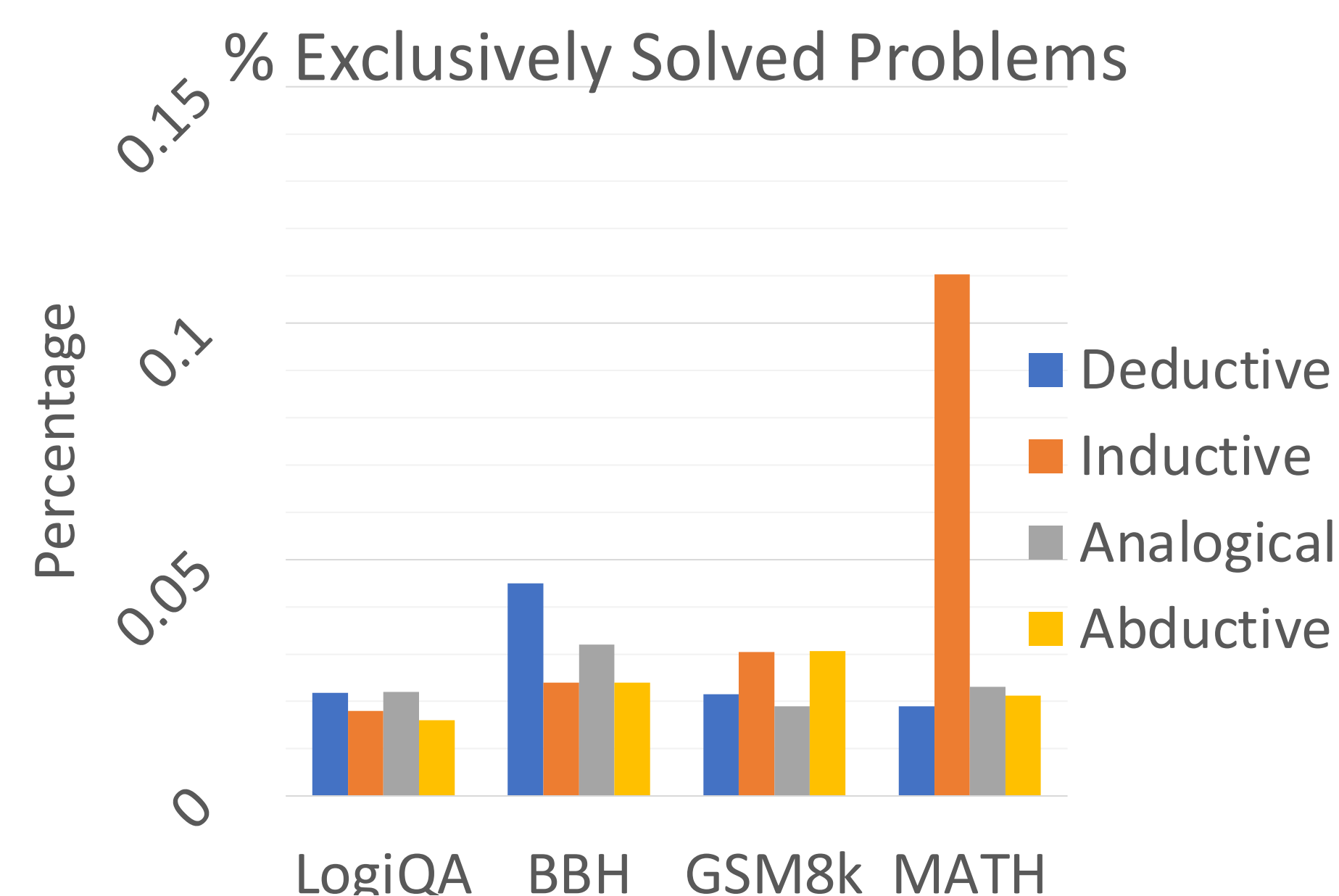


## LLM reasoning: Deduce Solution from Problem Step by Step

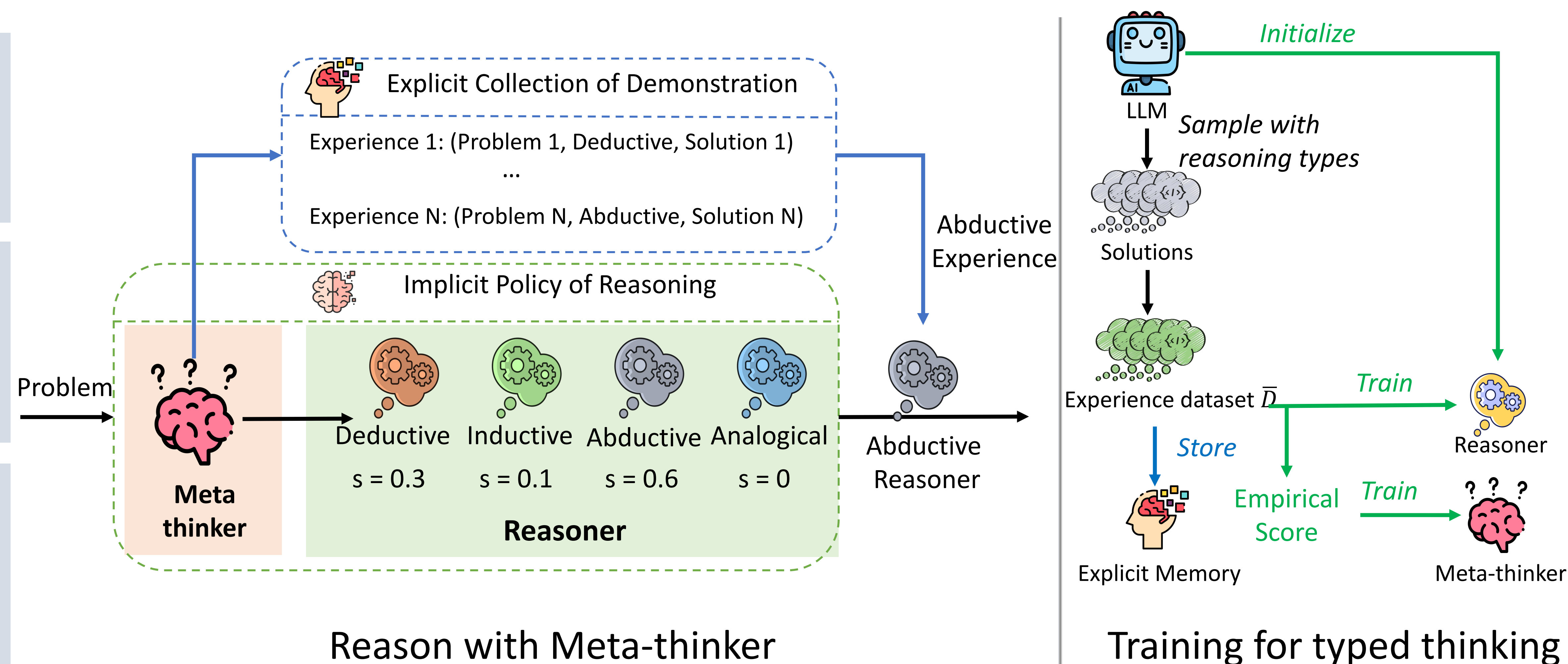


Is deduction always the best way to solve the problem?

Absolutely Not!  
Some problems can only be solved by **one specific reasoning type** (within limited trials)



## Specify and Diversify LLMs with Meta thinker



- Meta-thinker:** Trained from experience to identify the suitable reasoning types
- Demonstration:** Explicitly retrieval previous traces for reasoning, e.g. analogy
- Reasoner:** Implicitly learn how to reason with types

## Experimental Results

Prompted Selection can't identify the reasoning type  
=> choose deduction for more than 50% problems, but only 34% can be solved with deduction

Simply Mix all reasoning types will harm  
=> none of Mixture of Reasoning (MoR) methods stands out

Meta-thinker's predictions correlate with empirical scores  
=> Easier to predict logic reasoning problems, and this can be transferred to math reasoning

Average Accuracy over Four benchmarks

