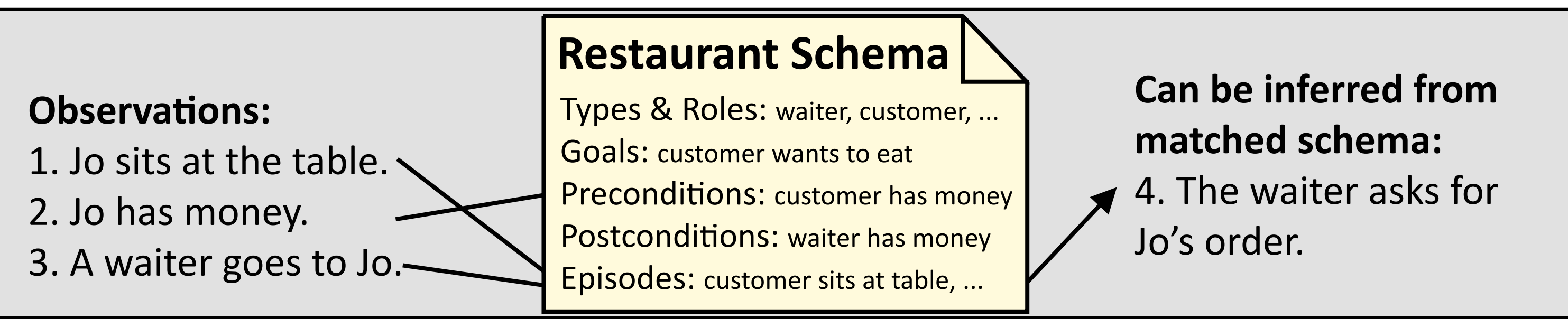


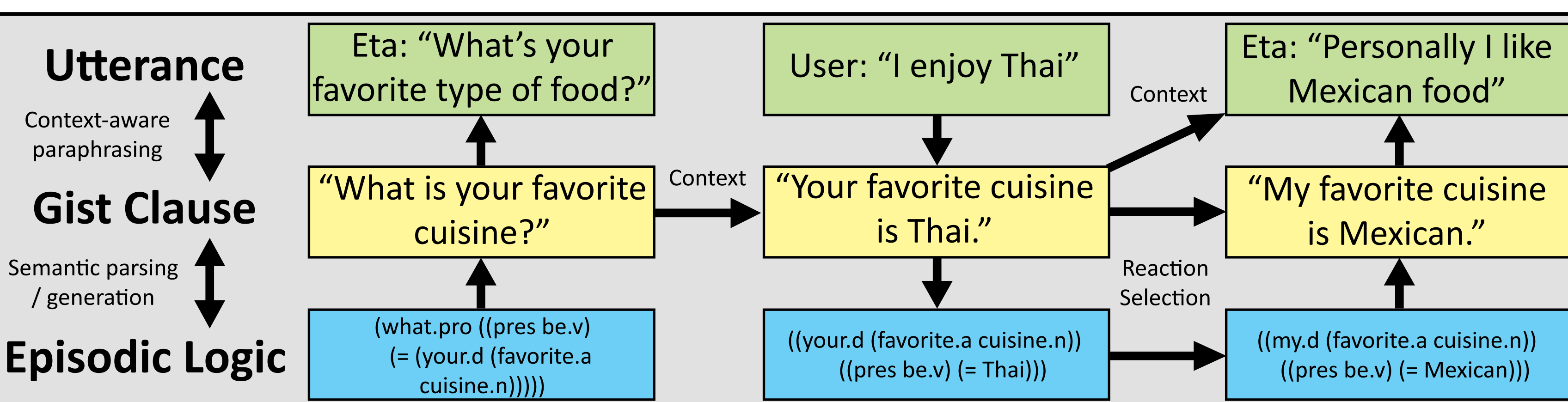
1. Motivation

- Problem: how to create modifiable SDS with deep understanding and goal-driven behavior, but also robust and topically broad?
- Approach: leverage **dialogue schemas** — extension of dialogue plans that allow for statistical, expectation-driven behavior.
- Schemas can be used for abductive inference or goal planning, and can possibly be learned from story or dialogue corpora.



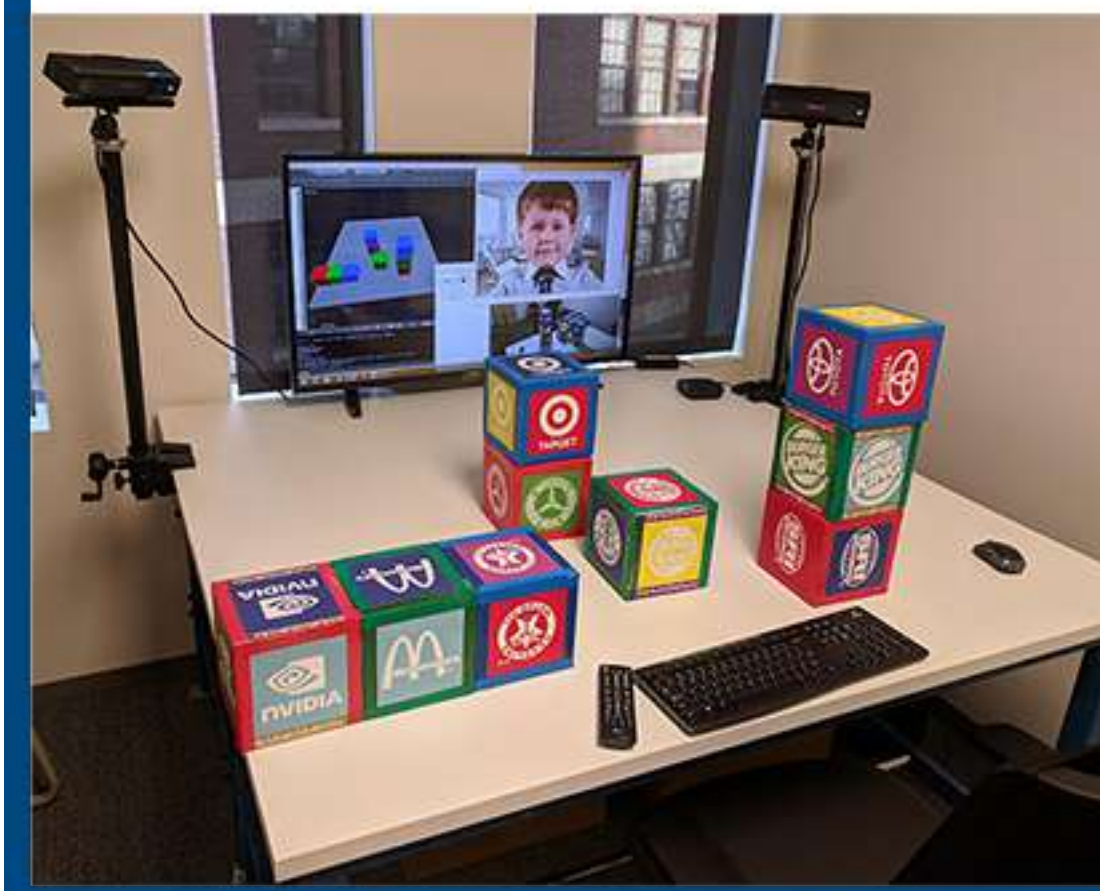
2. Eta Dialogue Manager

- Interleaved perception, interpretation, planning, inference, and execution.
- Support for multi-modal interaction through various perceptual subsystems.
- Two-stage semantic parsing pipeline using intermediate “gist clauses”.
- Stores symbolic facts — context, episodic memory, and general knowledge.
- Dynamically creates plan by matching selected **dialogue schema** with facts.
- Specialist reasoner subsystems (spatial, temporal, etc.) aid with inference.
- Output produced using reaction module and mapping episodic logic to text.



3. Blocks World Virtual Agent

- A SDS for spatially-aware Q/A and collaborative construction.
- Uses generic specialist models for spatial & temporal reasoning.
- Can teach user concept through interactive building of examples.
- Evaluated Q/A in user study involving free-form spatial questions.

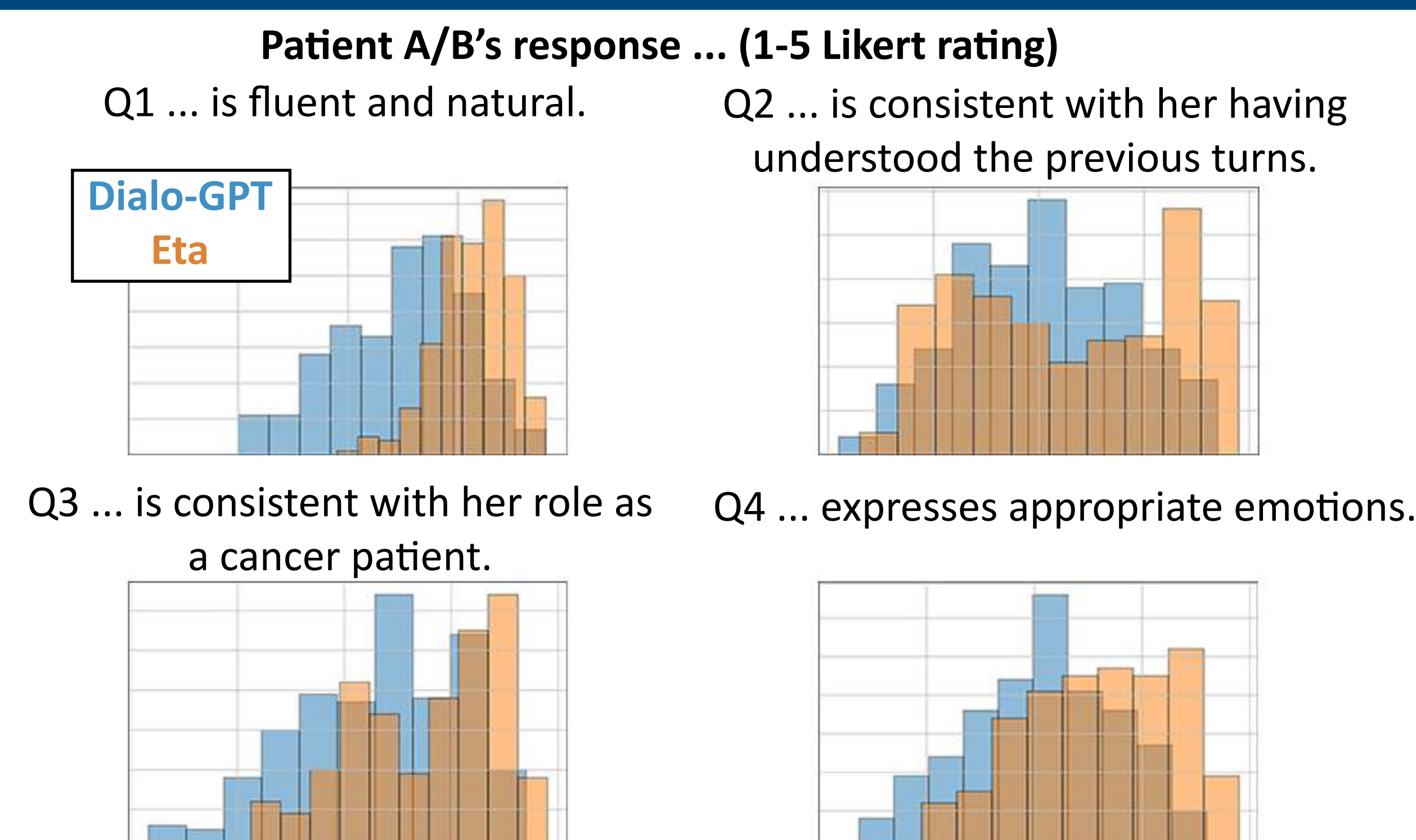
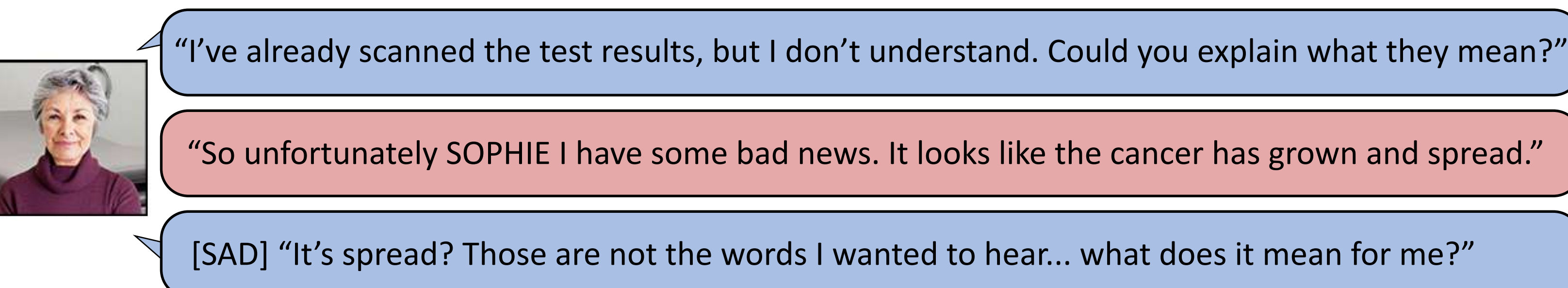


	Spatial Q/A	Temporal Q/A
Correct	66.6%	77%
Partially Correct	13.7%	3%
Incorrect	18.8%	20%
Parser Accuracy	74%	94%*

* Obtained using text-based simulated system due to Covid lockdown.

4. SOPHIE Standardized Virtual Patient

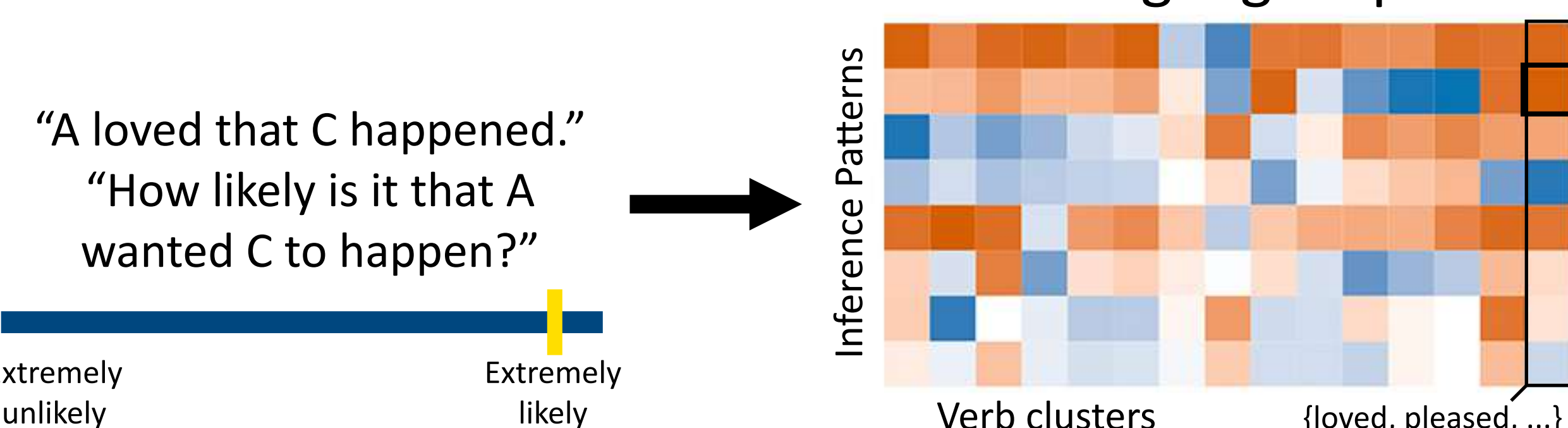
- Simulated patient to allow medical students to practice difficult conversations.
- Users receive automated feedback during dialogue with virtual agent.
- Challenges include mixed-initiative dialogue, open-ended/unexpected questions.
- Crowdsourced evaluation gave promising results for Eta vs. fine-tuned DialoGPT.
- More robust methods of interpretation necessary for better understanding.



5. Ongoing and Future Research

Modelling Belief, Desire, and Intention (BDI)

- Collect lexicon-scale dataset of crowdsourced BDI inferences across verbs in various frames.
- Use mixture model to discover inference patterns.
- Allow DM to infer BDIs from natural language inputs.



Improving Eta's Understanding & Reasoning Abilities

- Experiment with contextualized embeddings and language models for gist clause & semantic parsing.
- Statistical retrieval model for selecting reactions from system's knowledge base and memory.
- Bottom-up inferences from stored facts and memory using generic episodic logic reasoner (EPILOG).
- More robust dialogue planning using statistical schema matching and alignment.

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