

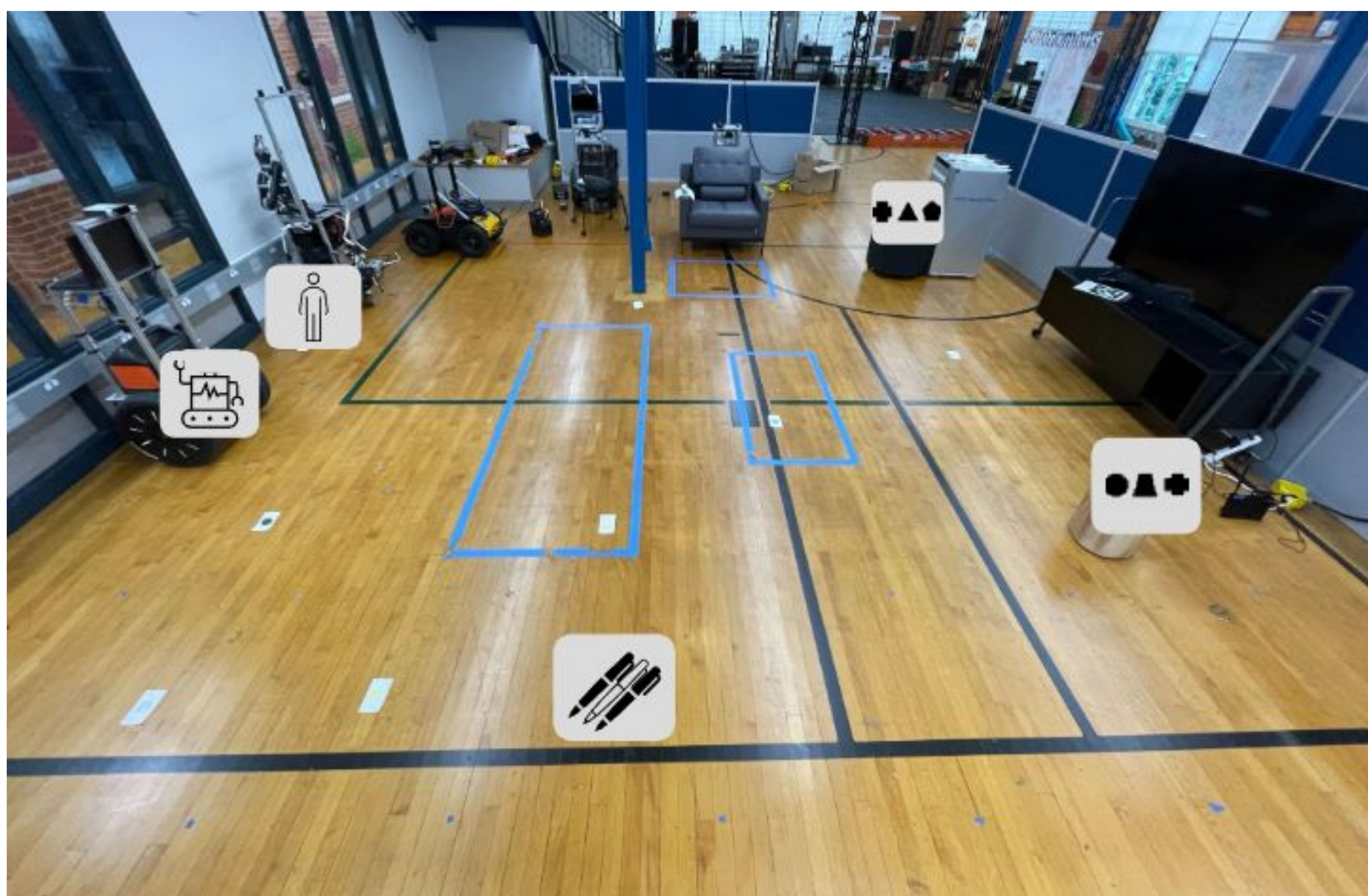
Exploring the Cost of Interruptions In Human-Robot Teaming

Swathi Mannem¹, William Macke¹, Peter Stone^{1,2}, Reuth Mirsky³

¹ Computer Science Department, The University of Texas at Austin, US

² Sony AI, ³ Computer Science Department, Bar Ilan University, Israel

Interruptions are sometimes needed in teamwork. We investigate **how** people perceive a robot that **interrupts** a shared task to get more information and be a better teammate.



Setup

An 8x8m room with 4 goals, represented by shapes. The team's shared goal is reaching one of the goals and writing down a sequence of 10 objects, using a specific pen that suits that goal. Both teammates are needed to complete the task: the robot does not know what the goal is, and the human needs the robot to fetch the pen.

Human

Main task: walk to the right goal.
Secondary task: memorize a sequence of objects and write them down at your goal using the pen from the robot.



Robot

Asks the teammate about the goal to reach.
Fetches the suitable pen for that goal.

Variables

- The robot asks from different distances (1.2m, 3m, 4.2m, 5m)
- The robot asks different questions (Q1: "are you going to the circle trapezoid plus?" Q2: "does your goal contain a square?" Q3: "what is your goal?")
- The robot asks either at the beginning of the trial or mid-way

Metrics

Objective retrieval of the sequence of objects from the secondary task, as well as a questionnaire measuring helpfulness, distraction, and comfort

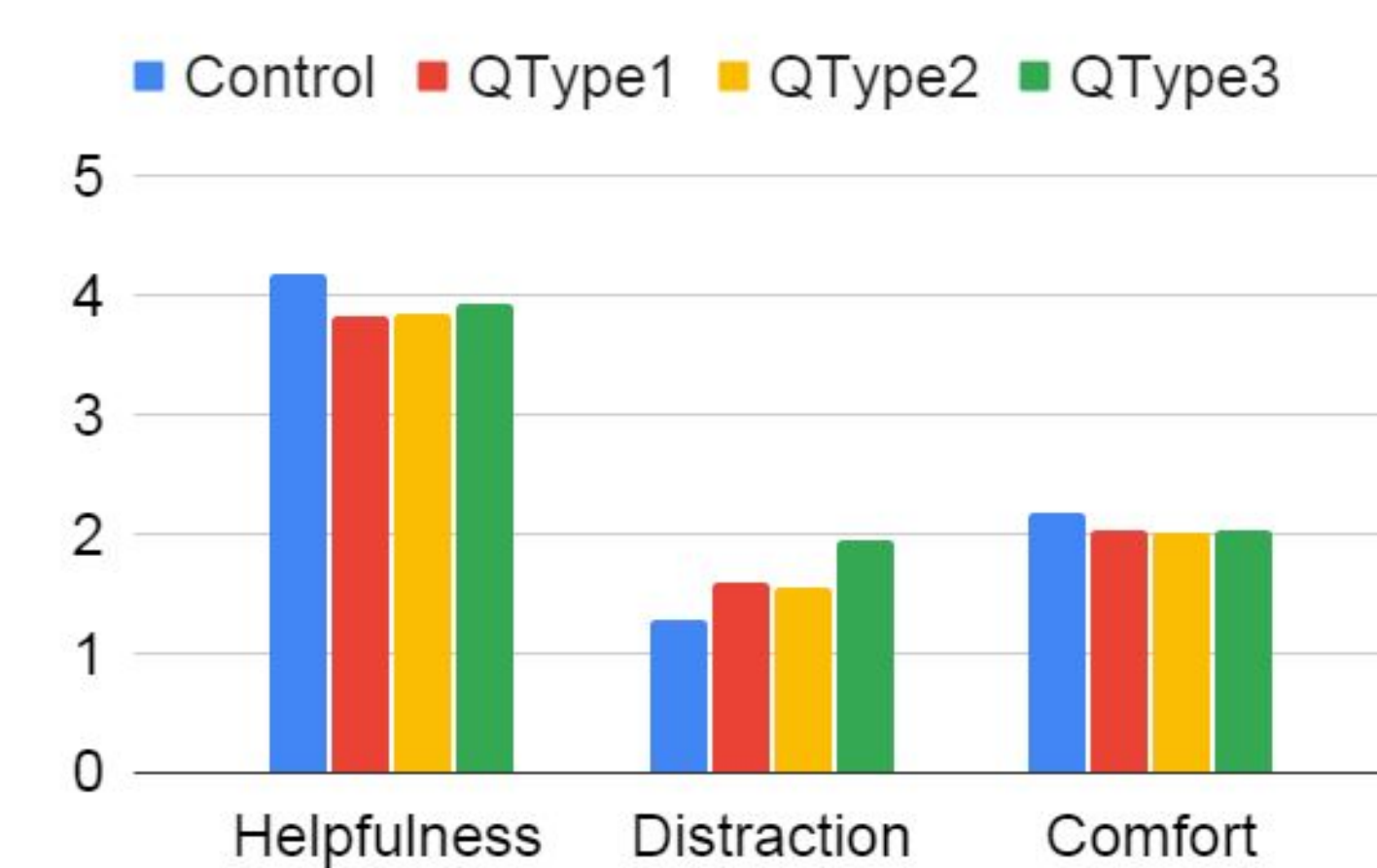
Study

Within-subject design with 30 participants, each participated in 15 trials with a different combination of the variables.

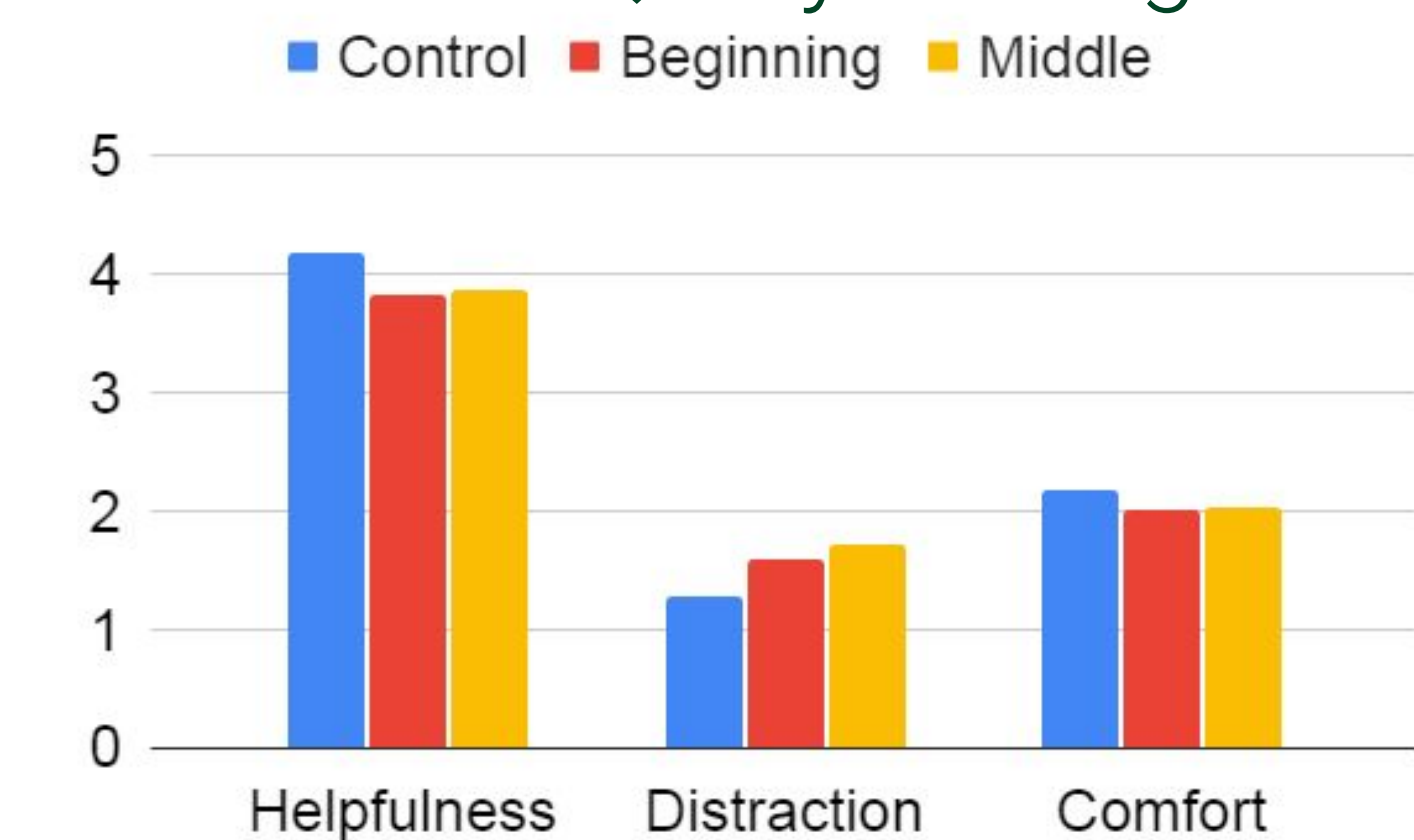
Effect of Query Distance



Effect of Query Type



Effect of Query Timing



Conclusion: This work provides a **new setup** to investigate interruptions. We saw no **objective** interruption, but still the robot was **perceived** as interruptive in some conditions.