Purpose of Study

• What do you expect to get out of the study?
  • Do people react differently to a robot that:
    • Gives spoken responses as it follows instructions (the speaking case),
    • Follows instructions silently (the silent case)?
  • Whether the preferences and reactions differ when the robot makes mistakes.
  • Whether these conditions change how long the participant is willing to engage with the robot.

• What tasks will the participants perform?
  • They will give the robot a sequence of predefined instructions, such as “pick up the blue block.”
  • They will be offered a chance to stop after five instructions, and the task will end after ten instructions.

Hypotheses

• What are your hypotheses?
  • **Hypothesis 1:** Participants will be more comfortable with a robot that gives a sign that it has heard the instruction, e.g., “Okay, picking up the blue block.”
  • **Hypothesis 2:** Participants will find the “silent” case more acceptable when the robot misinterprets a command, because not being able to correct the robot will be more annoying.
  • **Hypothesis 3:** Participants will spend more time with the speaking robot.

Participants and Setup

• How many people do you need for the study?
  • We need fifteen participants total; 20 would be better.
• How will you get them?
  • Ask classmates; ask friends; post flyers.
  • We will start posting flyers and scheduling participants on April 10th, and will send our flyer to the professor by April 8th.
• How will you instruct the participants?
  • We will read them a short description of the task (drawn from this overview), then show a sample video of ourselves reading off two instructions, with the robot’s responses shown.
  • No familiarization tasks.

Metrics

• What are your dependent variables?
  • The participants’ level of comfort, level of frustration/impatience, and level of willingness to use the robot.
• What will you measure?
  • Participants’ self-reported levels of comfort and frustration.
  • Whether the user asks to stop after 5 trials.
• How will you measure that?
  • Questionnaires for emotional state reactions.
  • Experimenter tracking of when the user chooses to stop.

Instruments

• What will you ask in your questionnaire?
  • 5-point Likert scale agree/disagree questions for each of roughly 8 emotions, for example,
    • E.g.: I found the robot frustrating.
5-point Likert scale agree/disagree questions comparing the two cases.
- E.g.: I preferred it when the robot told me what it was going to do.
- Short (two-line) questions about the subjective experience.
  - E.g.: “What did you find most appealing?”
  - E.g.: “If you chose to stop after five interactions, why?”
- We will also track how often the robot crashes for each user.

* Will you have a pre, post, or per-task questionnaire?
  - (1) will be per-task; (2) and (3) will be post-task.

Materials
* Which robot platform and peripherals are you using?
  - Both Jaco arms; a (new) Kinect; a webcam for the “wizard” to use while observing from another room; computer speakers.
* What capabilities will be used for your study?
  - Text-to-speech, moving to an arbitrary point in space, manipulating (picking up) objects.
* What props (tables, objects, obstacles, etc.) do you need?
  - The arm, the table it’s attached to, brightly colored blocks.
* Will you use actors? What exactly will the actors do?
  - I will not use actors.

Autonomy
* What will be autonomous? Wizard-of-Oz?
  - The experiment will be part WoZ, part autonomous action.
  - The wizard (me) will generate speech by pressing keys for predefined phrases the robot will say and what block to pick up.
  - The robot will autonomously find colored blocks on the table, using the Kinect, and pick them up using the arm.
  - My partner will remain in the room, but not engage with the experiment except to restart the robot in case of crashes.

Study Conditions
* What kind of study is it?
  - This will be a comparative, within-participant study.
  - Each participant will be exposed to the silent and the speaking cases, in random order.
    - Randomizing the order will average out task fatigue effects.
  - They will be asked to comment on each case, then afterwards, to compare the two.
    - This will control for the timing frustration involved in any interaction with a robot.
* Where will you conduct the study?
  - The study will be carried out in ITE 343.

Example Interaction
* Intro: experimenter reads the instructions, gathers the signed consent form, shows the video of the sample interactions, and answers questions.
* Participant (reading from a whiteboard behind the robot): “Please pick up the red block.”
* <Wizard hits the key for response 1>
* Jaco arm: “Picking up the red block.”
  <moves to pick up the first block, drops red block in a bin, returns to resting state>
* Participant (reading): “Put away the blue block.”
* <Wizard hits the key for response 5>
- Jaco arm: “Picking up the green block.”
  <moves to pick up the wrong block, drops green block in a bin, returns to resting state>
  [participant goes through three more cases]

- Experimenter: “That’s five instructions. Would you be willing to do five more? Any answer is fine.”
- Participant: “I think I’ll stop now.”