

Can Humans use a Robot's eye gaze to Distinguish Between Similar Objects?

Introduction

- Nonverbal cues are essential in human-human communication (eg: eye gaze, gestures, body language)
- I want to study the impact of adding eye gaze to a robot
- Hanna and Brennan 2007 study found that participants were able to use their partner's eye gaze to distinguish ambiguity between same-color targets [1]
- There have been mixed results when it comes to human-robot interaction when the robot is exhibiting human-like eye gaze behavior

My experiment

- Study based off Hanna and Brennan (2007)
- Will having a robot look toward a target increase the speed at which participants identify the correct target?

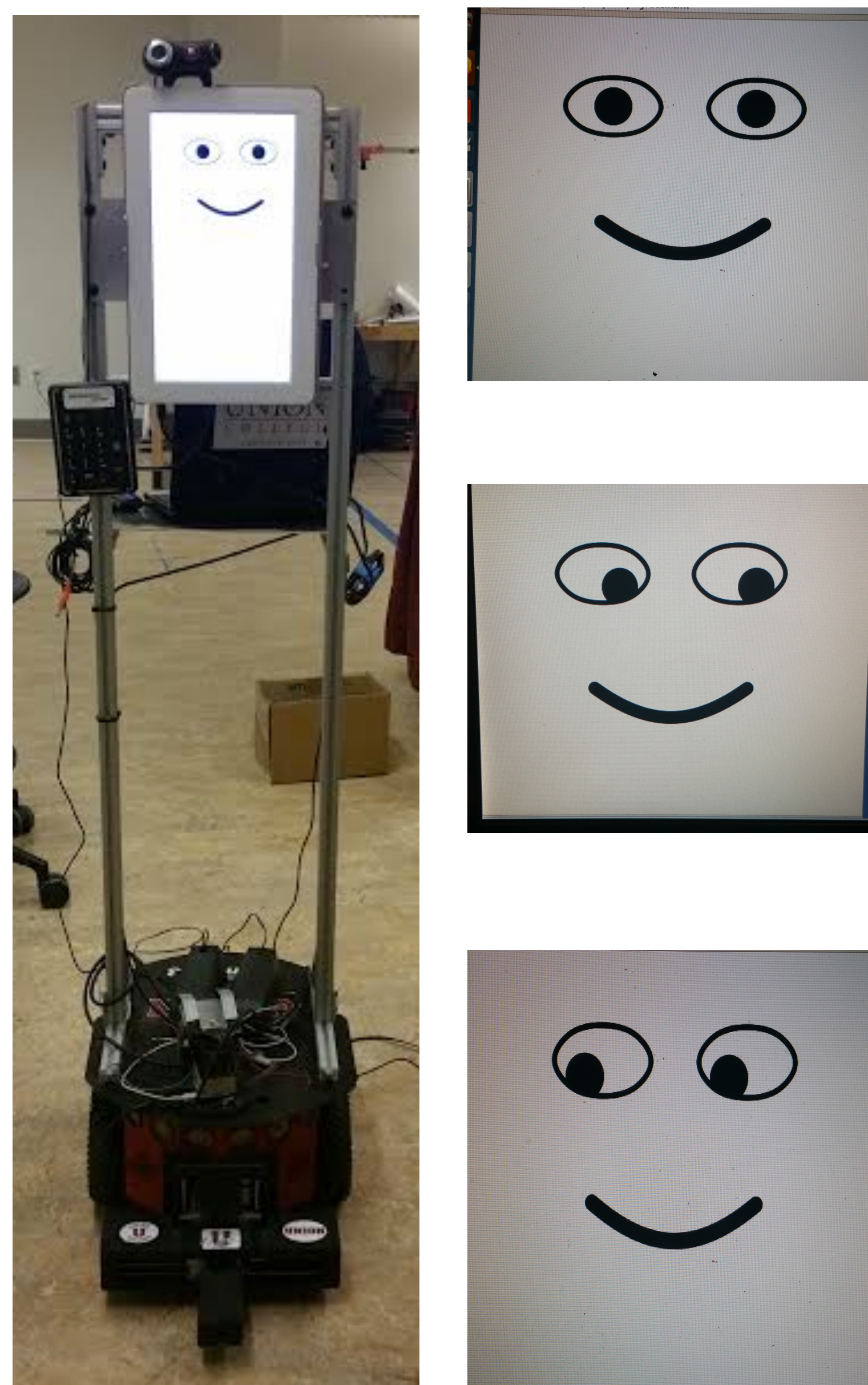


Figure 1. SARAH, Socially Appropriate Robot that Approaches for Help. Displays a face on the screen with eyes that shift their gaze, can move, and plays audio through MaryTTS .

Experiment Design

Generalized setup:

- SARAH and the participant will be standing across from one another with a table between them (see Figure 2).
- Table: 8 shapes with diverse colors and number of dots (see Figure 3).

Task: Told to press button corresponding with target object

3x2 Design:

- (1)No eye gaze or moving, (2)shifting eyes toward target object only, (3)shifting eyes and body toward target object
- Told either SARAH is acting autonomously or that she is being controlled by human experimenter

Shapes layout (see figure 3):

3 types of targets:

- No Competitor targets, - no same shape and color object on board
- Near Competitor targets, - target is next to same shape and color object
- Far Competitor targets - there is a same shape and color object on board and not next to target

Data Collection

- Anticipated 72 participants: 36 male and 36 female
- Collecting time data from task instruction to participant pressing the button
- Survey at the end: comfort, engagement levels and how natural they felt SARAH was

References (Calibri, 40 points, bold)

- [1] Hanna, Joy E. and Brennan, Susan E. 2007. Speakers' eye Gaze Disambiguates Referring Expressions Early During Face-To-Face Conversation. *Journal of Memory and Language* , 57, 596—615.
- [2] Kleinke, Chris L.(1986). Gaze and eye contact: a research review. *Psychological Bulletin*, 100(1), 78-100. doi:10.1037/0033-2909.100.1.78
- [3] Mandal, Fatik B. (2014). Nonverbal communication in humans. *Journal Of Human Behavior In The Social Environment*, 24(4), 417-421. doi:10.1080/10911359.2013.831288

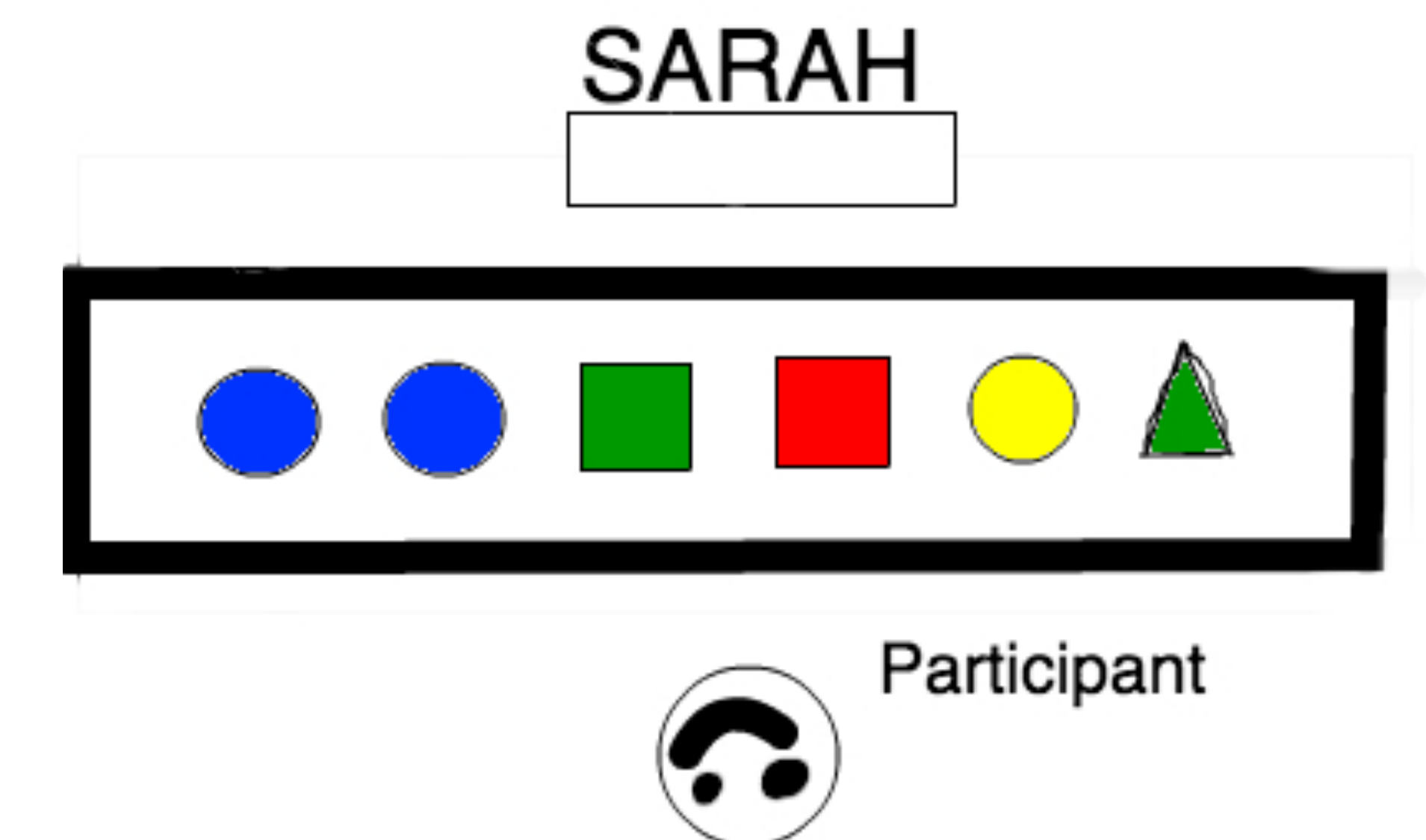


Figure 2. Experiment setup, robot and participant location

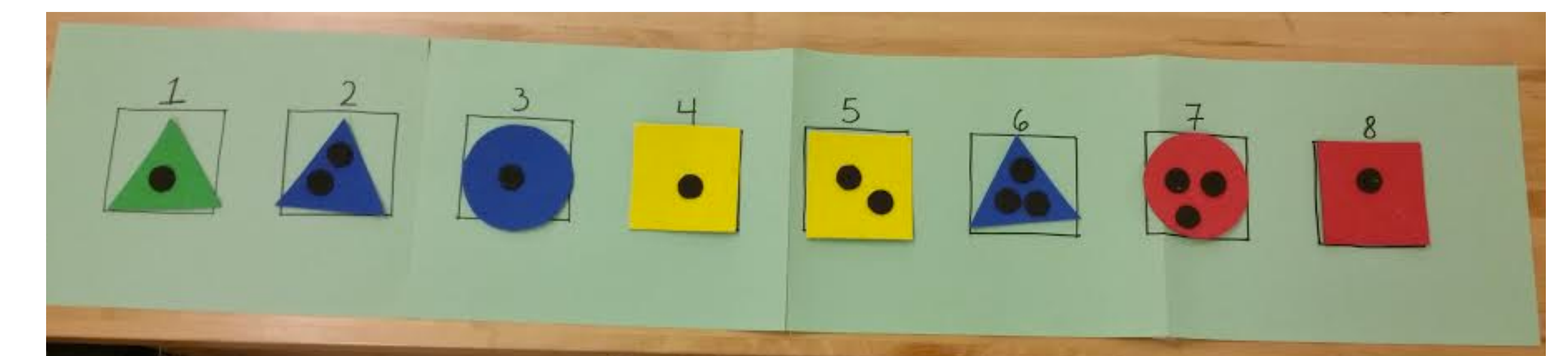
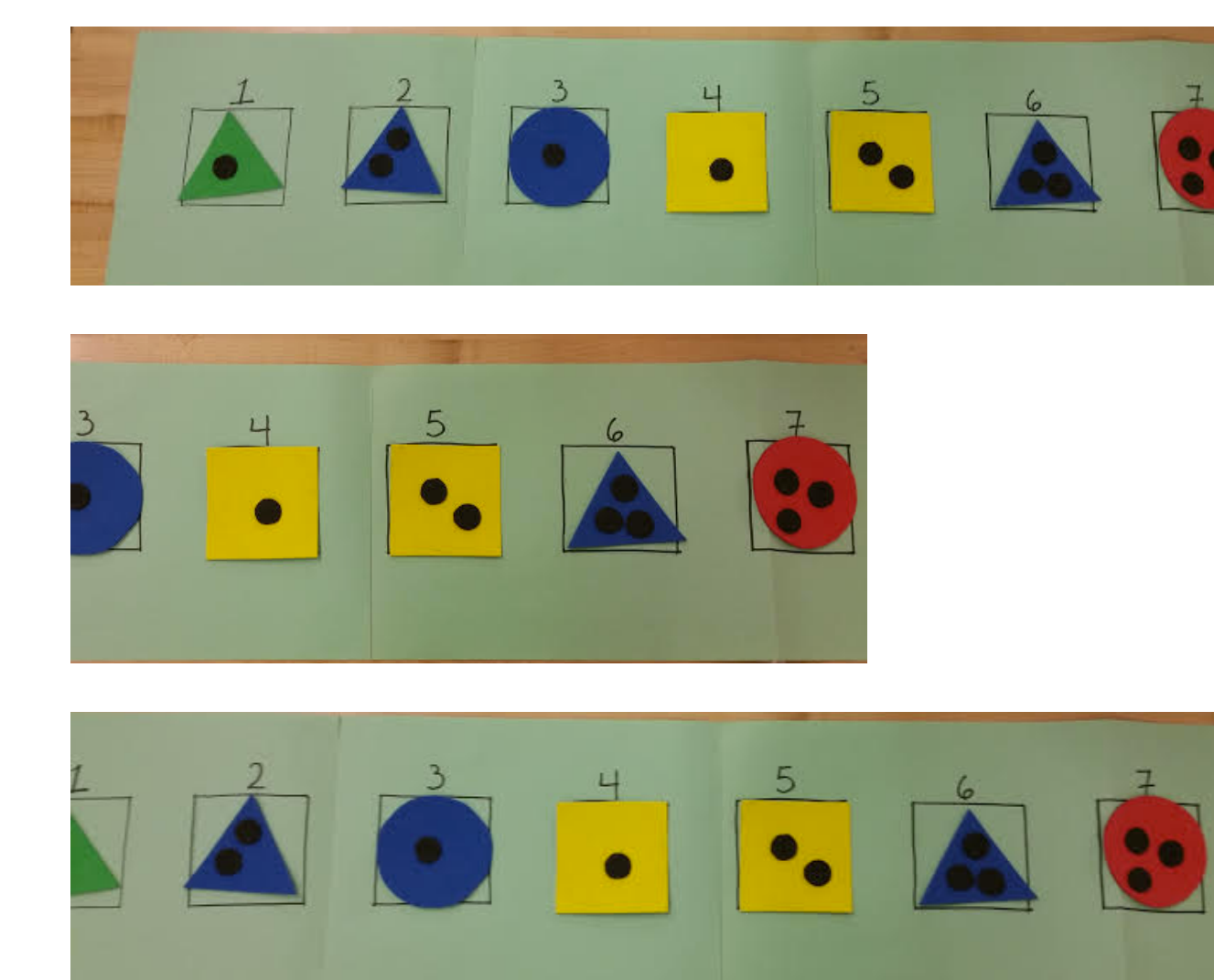


Figure 3. Shapes setup



Shape 1: no competitor target

Shape 4/5 : near competitor target

Shape 2/6: far competitor target

Anticipated Results

- Robot eye gaze will lead to participants responding faster and reporting higher on comfort, engagement and naturalness
- When told SARAH is not autonomous, participants will respond faster and report higher comfort and engagement