

What happens when a robot favors someone?

How a Tour Guide Robot Uses Gaze Behavior to Address Multiple Persons While Storytelling about Art

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FROG (Fun Robotic Outdoor Guide) is an indoor/outdoor guide robot intended for guiding people in outdoor cultural heritage sites, exhibitions and zoos. The main aim of FROG is to facilitate information while providing an engaging and social experience to the touristic site.

In order to gain insights into the reactions of a small group of visitors to a robot presenting information about artworks, we performed a controlled laboratory study. We investigated the visitors' reactions and their recall of the story told by a robot that was gazing at the artworks (or not) and that 'favored' one of the participants or looked at all of them equally often.

Hypotheses

- H1:** A distributed gaze pattern (robot looks at the exhibit and then at the user) compared to a participant-exclusive gaze pattern leads a more positive interaction experience, a more positive attitude toward the robot, and increased recall of details.
- H2:** A participant who is gazed at more frequently and longer will feel more personally addressed by the robot and have a more positive interaction experience (more present if participant is male), a more positive attitude toward the robot, and better recall of details.

Manipulations

Gaze: the robot alternated gaze at the participants that it is explaining to and looked to the artwork (distributed gaze), or the robot only alternated gaze between the participants (participant exclusive gaze).

Favoring: the robot spent more time looking at the left-most person of each group of participants and looked at this participant more frequently.

Participants

Participants were interacting with the robot in groups of 3. The research involved 57 students and staff (19 groups) from the University of Twente. Average age was 26 (Range [19-57], SD=7.6), 41 of the participants were male and 16 were female.

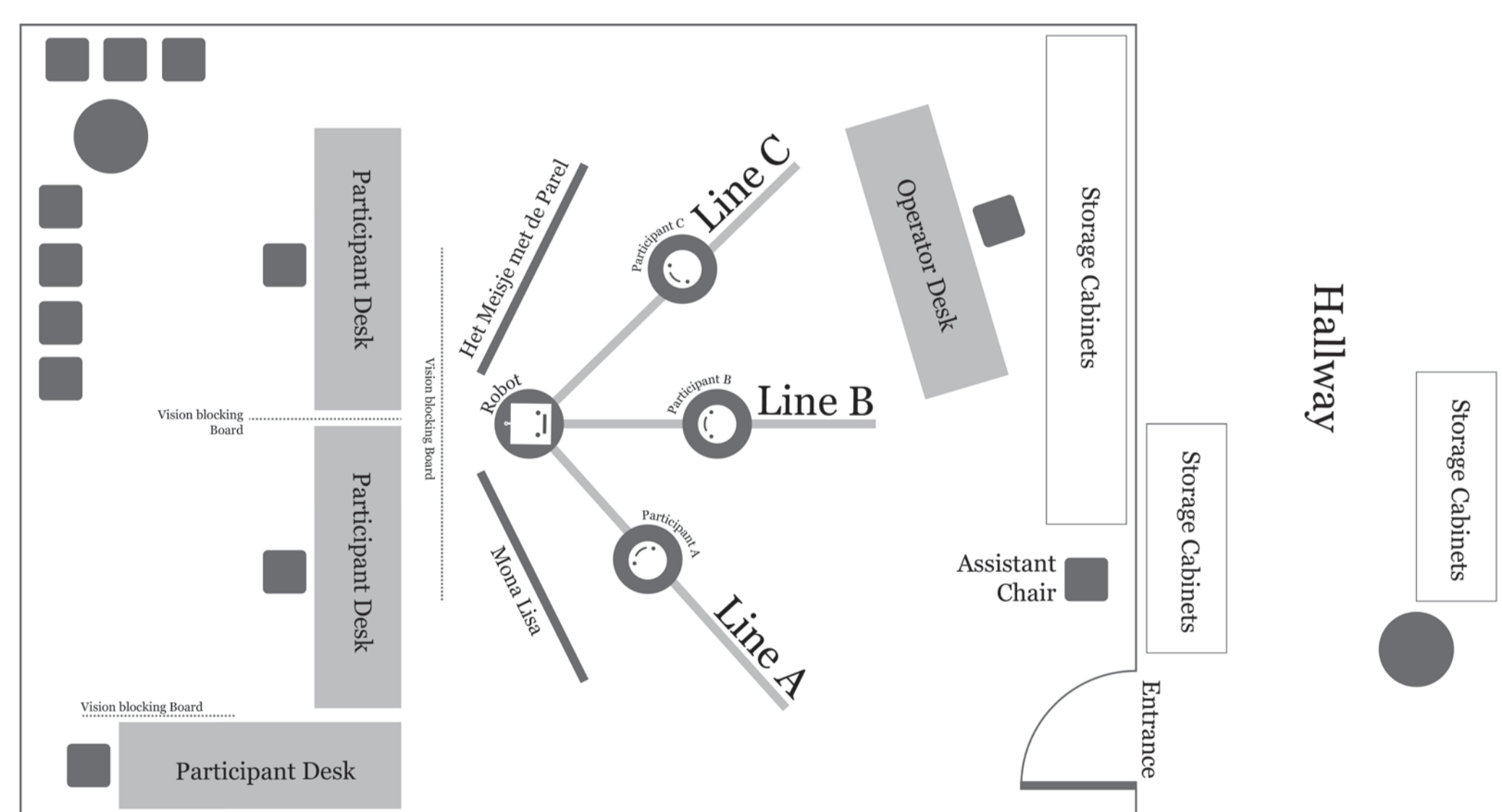


Figure 1: Setup of the experiment

Experiment setup

The robot stood in front of two artworks. The three participants were asked to stand on one of the three lines. The participants were able to chose the distance to the robot. The robot was operated by one of the researchers in a Wizard-of-Oz-setting.

Future work

Early findings from observations that will be evaluated by analyzing the video data, point toward group-controlled proximity behaviors (subjects would look at the others before moving toward or away from the robot). Further analysis of our data will offer more insights into whether this also affects recall and proximity behaviors.

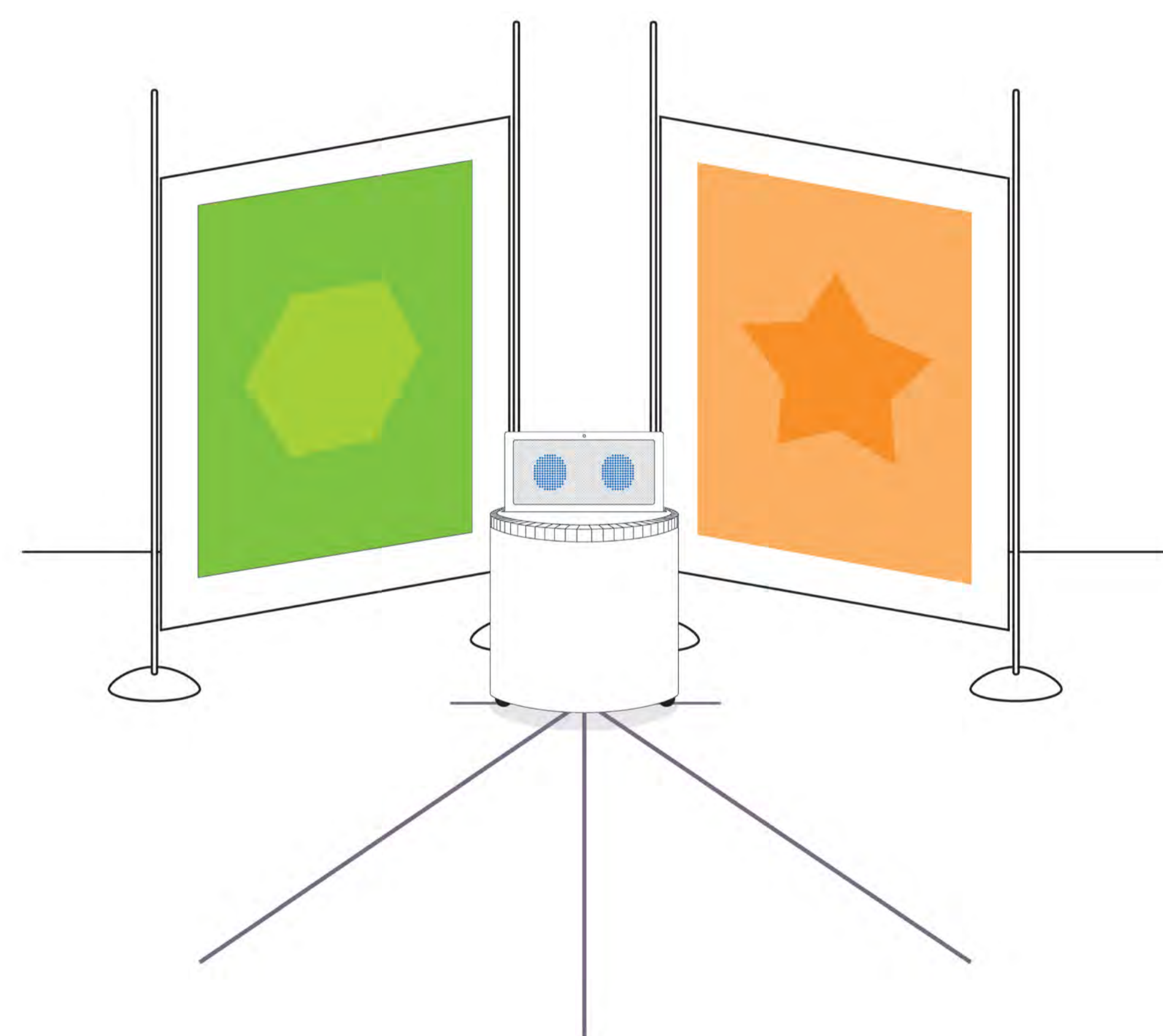


Figure 2: The robot in front of the artworks

Results

Results indicate that 'favored' users rate the robot more positively. The hypotheses were tested one-tailed, because from literature we had strong expectations that the distributed gaze pattern would be superior to the participant exclusive gaze pattern. Also, we expected that 'favored' participants would be more positive towards the robot than 'non-favored' participants.

Participants in the distributed-gaze condition found the robot more humanlike compared to the robot that only looked at the participants (Anthropomorphism $F(1,53) = 3.84, p = .028$). (Supports H1)

'Favored' participants in the distributed-gaze condition liked the robot better than non-favored participants (Likeability $F(1, 53) = 3.74, p=.030$). (Supports H2)

For Recall, we found a non-significant trend where 'favored' participants had better recall in the participant exclusive gaze mode while 'non-favored' participants had better recall in the distributed condition. (Supports H2)

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Fun Robotic Outdoor Guide
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