

Gender Stereotypes in Cultures

Experimental Investigation of a Possibility of Reproduction by Robots in Japan

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Abstract— To investigate the possibility of reproduction of gender stereotypes by robots, the research conducted a psychological experiment in which participants had a short-term interaction with a small-sized humanoid robot playing a role of guide. The results suggested that the female robot was preferred in this specific type of role in comparison with the male robot, and female persons preferred to the female robot in comparison with males.

Keywords- gender; robot; stereotypes; experiment

I. INTRODUCTION

The recent research of interaction between humans and robots (human-robot interaction: HRI) has focused on gender as one of influential factors. Some studies suggested the effects of gender assignment to robots on humans (e.g., [1]). Other studies found differences due to human gender on the feelings and behaviors toward agents (e.g., [2]), and interaction effects between human gender and other factors such as gender assigned to artificial agents (e.g., [3]).

On the other hand, some researchers of social sciences critically argued that adoption of gender in HRI was done by technologists' arbitrary choice based on their common senses [4] and had the possibility of reproduction of gender stereotypes [5]. Except for the study on people's acceptance of a security robot in Singapore [6], however, it has sufficiently not been investigated whether gender stereotypes can be reflected in robotics applications.

It is estimated that the reproduction of gender stereotypes by robots may be caused in specific types of roles associated with gender in the society. To investigate the above possibility, the research conducted a psychological experiment in which participants had a short-term interaction with a small-sized humanoid robot playing a role with a gender stereotype.

II. METHOD

The experiment was conducted in Japan, from November to December, 2014. All the procedures were conducted with the Japanese. A total of twenty Japanese university students in the western part of Japan participated to the study (male: 10, female: 10, mean age: 20.4). They received one-thousand yen as compensation.

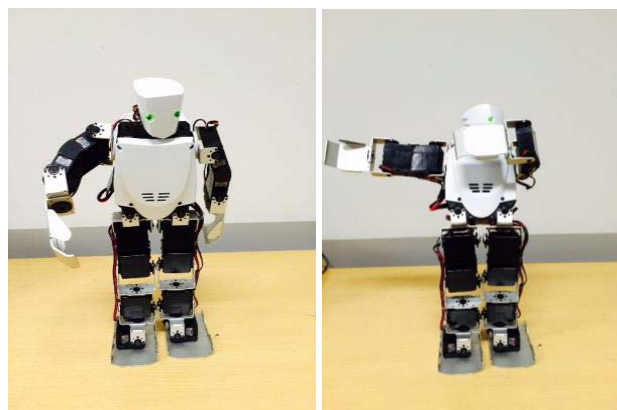


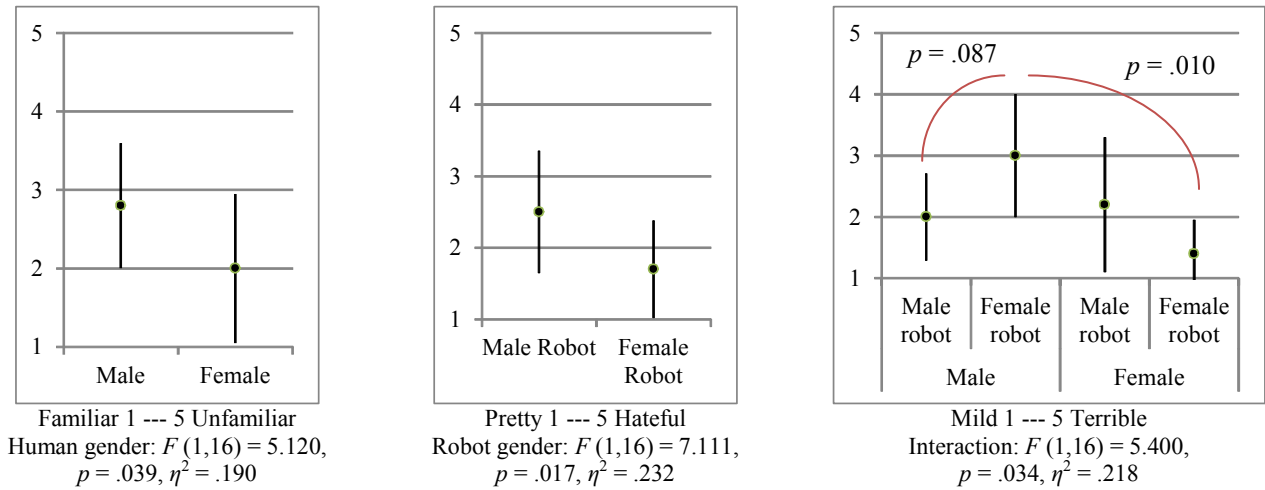
Figure 1. The Robot Used in the Experiment

The small-sized humanoid robot used in the experiment was “Robovie-SX,” which was developed by Vstone Corporation. This robot stands 34.3 cm tall and weighs approximately 1.3 kg. As shown in Figure.1, the robot can execute various gestures such as walking, bowing, and even a handstand, by using a total of 17 DOFs in its feet, arms, and head. The utterances of the robot in the experiment was made with a free application on iPhone and directly played through a Bluetooth speaker while synchronizing the robot's motion.

In the experiment, the robot played a role of guide. Although not validated in statistically strict sense, it is generally said that this job in Japan is mainly dominated by female persons. To investigate influences of this connection between gender and the role, the experiment was conducted with a between-participant design consisting of two conditions: 1) male-robot condition in which the robot had a male-like name (“Taro” in Japan) and uttered with male voices, and 2) female-robot condition in which the robot had a female-like name (“Hanako” in Japan) and uttered with female voices. Five male and five female participants were assigned with each of the robot gender conditions.

In each session of the experiment, the robot explained for one participant about a commercial building which has recently been constructed in Kansai area of Japan, while performing the utterance and some gestures in front of a poster put on a wall. The contents of the utterances were based on the explanation sentences written on the poster, and

Figure 2. Means and Standard Deviations of Scores of the Representative Adjective Items and Results of ANOVAs



were common in the two gender conditions except for the robot's name.

After the explanation by the robot, each participant completed a questionnaire measuring her/his impressions of the robot, consisting of twenty-one pairs of adjectives, such as "pleasant – unpleasant". Participants were asked to respond to each pair of adjectives to present degrees to which they felt the impression of the robot. Each item had a score for rating with five intervals (1-5).

III. RESULTS

The item scores of impression adjective pairs were coded as higher scores meant negative impressions. Then, an ANOVA with human gender X robot gender was conducted for each of the twenty-one item scores.

The results found the statistically significant main effects of participants' gender in three items, suggesting that the female participants felt more familiar, pretty, and faster for the robot than did the male participants. Moreover, one item showed the statistically significant main effect of robot gender which suggested that the robot in the female condition was felt more pretty. Moreover, five items except for the above items showed the statistically significant or significant trend of interaction effects. Simple main effect tests with Bonferroni's method revealed a trend almost common among these five items; the participants felt more positive for the robot of the same gender as them. Figure.2 shows the means and standard deviations of the representative item scores and the results of the ANOVAs.

IV. DISCUSSION

Although the experiment results suggested that the female robot was preferred in this specific type of role in comparison with the male robot, this trend was not strong. On the other hand, it was suggested that female persons preferred to the female robot in comparison with males. Some existing studies on robot gender found the trend that

humans rated robots of the opposite gender as more credible, trustworthy, and engaging [7]. The experiment results are not consistent with these studies.

It is estimated that influences of gender stereotypes depend on several situational factors such as kinds of jobs and application contexts. Future experiments should include these factors and consider interaction effects between them and robot factors such as appearances and sizes.

ACKNOWLEDGMENT

The research was supported in part by the Japan Society for the Promotion of Science, Grant-in-Aid for Scientific Research No. 25280095 and 25240042.

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