

# **HUMANOID ROBOTS IN RETAIL: WHETHER AND HOW DO CONSUMERS PERCEIVE DEEP AND SURFACE ACTING OF ROBOTS IN CUSTOMER-ROBOT INTERACTIONS?**

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## **ABSTRACT**

Service robots can interact, communicate, and deliver service to customers and are predicted to replace human service employees in many industries. However, service employees still play a key role in developing and maintaining customer relationships. Many service organizations usually employ explicit or implicit emotional display rules that suggest which emotions are appropriate within a service interaction and thus should be publicly expressed toward customers. Emotional labour (with deep acting and surface acting strategies) refers to this emotion management. Research has raised the question whether service robot behaviours (e.g., emotional display, gestures) influence customers' perception of the service. Service robots are programmed to display certain emotions and behaviours to customers. Depending on the details and lavishness of the programming, customers might perceive a difference in the genuineness with which emotional display behaviour is transmitted. The experimental study investigates whether customers *perceive* a humanoid service robot as apparently more deep acting than surface acting and whether these perceptions differ for interactions with human service employees and humanoid service robots. Moreover, the role of gender within these service interactions is examined.

**Keywords:** Service robots, Service employees, Emotional labour, Customer perception, Experimental study

## **INTRODUCTION AND RESEARCH OBJECTIVES**

Service robots can interact, communicate, and deliver service to customers and are predicted to replace human service employees in many industries (Mende, Scott, van Doorn, Grewal, & Shanks, 2019; Wirtz et al., 2018). Up to now, more than 25,000 humanoid “Pepper” and “NAO” robots have been sold worldwide (SoftBank, 2019). Humanoid service robots are said to be “easy to relate thanks to their human-like mannerisms and emotions (Bloomberg, 2017). The current study focuses on these humanoid service robots. However, it has also been acknowledged that service robots “are unlikely to be a source of competitive advantage” (p. 910), while service employees are and continue to be such a source (Wirtz et al., 2018).

Service employees play a key role in developing and maintaining customer relationships (Houston III, Grandey, & Sawyer, 2018). The manner in which service employees face customers accounts for more than 40% of the customers’ reconsideration of their purchase intentions in the store (Court, Elzinga, Mulder, & Vetvik, 2009). Many service organizations usually employ explicit or implicit emotional display rules, that is, norms and standards of behavior that suggest which emotions are appropriate within a service interaction and thus should be publicly expressed toward customers (Groth, Hennig-Thurau, & Walsh, 2009). Emotional labor (with deep acting and surface acting strategies) refers to this emotion management (Hochschild, 1983). Service employees can reveal emotions not only through facial cues but also through other behavioral channels (e.g., the tone of their voice) (Houston III et al., 2018). Similarly, service robots can express emotions through verbal and non-verbal signals (e.g., facial expressions) (Stock & Nguyen, 2019; Wirtz et al., 2018).

Research has raised the question whether service robot behaviors (e.g., emotional display, gestures) influence customers’ perception of the service (De Keyser, Köcher, Alkire, Verbeeck, & Kandampully, 2019). Service robots are programmed to display certain emotions and behaviors to customers. Depending on the details and lavishness of the programming, customers might perceive a difference in the genuineness with which emotional display behavior is transmitted. Thus, the questions arise whether customers *perceive* a humanoid service robot as apparently more deep acting than surface acting and whether deep and surface acting perceptions differ for interactions with human service employees and humanoid service robots. Moreover, the question arises whether customers’ gender has an impact on these evaluations since women have been found to be more receptive to emotional communication (Mattila, Grandey, & Fisk, 2003).

## **LITERATURE REVIEW**

### **Consumers’ Reactions to Humanoid Service Robots in Retail and Service Sectors**

Stock and Merkle (2018) focus on how consumers perceive innovative cues (i.e., the extent to which a service representative creates new ideas and solutions for the customer) shown by either a human service employee or a humanoid service robot. In their experimental study, they find that consumers show positive responses in the form of delight to a service robot’s innovative behavior. However, consumers who face the innovative acting service robot are not significantly more satisfied than consumers who face the neutral, but friendly and professionally acting human service employee. Thus, compared to human service employees, customers’ reactions are less positive for service robots.

Merkle (2019), on the contrary, finds that consumers rate the satisfaction with a humanoid service robot as comparably high as with a human service employee when the service is considered as appropriate and no service failure occurred. When faced with a service failure, consumers also rated their satisfaction level higher within the customer-robot interaction than

within the customer-employee interaction, indicating that consumers forgive humanoid service robots more than human service employees.

van Pinxteren, Wetzels, R uger, Pluymaekers, and Wetzels (2019) identifies anthropomorphism (i.e., the tendency to assign human characteristics to inanimate objects) as an antecedent to trust in humanoid service robots. This finding has, however, to be evaluated in more detail since Mende et al.'s (2019) results indicate that robots that highly resemble humans in their appearance can have a negative effect on consumers' evaluations. When interacting with humanoid service robots, Mende et al. (2019) find that consumers display compensatory responses (e.g., buying status goods in a retail context, eating more in a restaurant context) compared to consumer-employee interactions because consumers feel discomfort when interacting with a service robot.

### **Emotional Labor**

Hochschild (1983, p. 7) originally defined emotional labor as the "management of feeling to create a publicly observable facial and bodily display." Service employees regulate their emotions and emotional expressions to satisfy organizational display rules (e.g., "service with a smile") within a service encounter. Deep and surface acting are two emotional labor strategies that service employees use to comply with these corporate rules (Hochschild, 1983). When employees truly feel the expressed emotions and thus make the effort to either create the emotions within themselves ("exhorting feelings") or to evoke thoughts, images, and memories ("trained imagination"), they use deep acting (Hochschild, 1983). When they fake the displayed emotions, shape and work only on their outward appearance to fit the situation, they perform surface acting (e.g., Grandey 2003; Hennig-Thurau, Groth, Paul, and Gremler, 2006). These regulatory strategies differ in the degree of genuineness or authenticity of the displayed emotions. The emotions displayed in deep acting have been found to be perceived as more authentic compared to surface acting emotions (Grandey, Fisk, Mattila, Jansen, & Sideman, 2005). Moreover, it has been found that deep acting is linked to more favorable customer outcomes (e.g., service quality perceptions) (Groth et al., 2009; Hennig-Thurau, Groth, Paul, & Gremler, 2006). As to gender reactions to emotional displays, Mattila et al. (2003) show that women focus more on the emotional displays than men because women are more process-oriented and men more outcome-oriented.

### **HYPOTHESES**

At the moment, robots cannot feel real emotions and engage in deep acting (Wirtz et al., 2018), but they can be programmed in such a way that customers might perceive a difference in the genuineness with which emotional display behavior is transmitted and consequently *perceive* a humanoid service robot as apparently more deep acting than surface acting (H1). Research on service robots assumes that "customers are unlikely to respond to robot-displayed emotions as they would to [...] emotions from human frontline employees" (Wirtz et al., 2018, p. 911). Thus, customers' reactions to deep and surface acting are more positive within a service employee interaction than a service robot interaction (H2). Since women are believed to be more emotional and focus more on the emotional display (Mattila et al. 2003), it can be further hypothesized that women (in contrast to men) do not perceive a difference between surface and deep acting within a service robot interaction (H3).

### **METHOD**

The hypotheses were tested through an online experiment. For the main experiment, a usable set of 179 consumers (mean age = 30.4; 52.5% male) was recruited to take part in the study. A 2 (service agent: human service employee vs. humanoid service robot) x 2 (emotional labor:

deep acting vs. surface acting) between-subjects factorial design was employed where participants were randomly assigned to one of the four scenarios. In the end, 88 (91) participants were in the human service employee (humanoid service robot) condition. Regarding emotional labor, 96 (83) were in the deep acting (surface acting) condition.

Each participant received a short scenario and a questionnaire. The scenario described a service interaction situation, and participants were instructed to read the scenario and put themselves into the described situation. The service agent was manipulated in such a way that s/he was described as either being a human service employee or a humanoid service robot (Merkle, 2019). Emotional labor was manipulated by (1) following the procedure by Houston III et al. (2018) who focused on authenticity and described the displayed emotions of a service employee as genuine (e.g., warm smile, a broad genuine smile) or not genuine (e.g., puts on a big smile) in scenarios and (2) by considering the emotional labor literature. The scenarios were pretested with 50 participants in a marketing graduate course (mean age = 23.3; 22.0% male). The results of the pretest revealed that the chosen manipulation was successful.

### FINDINGS

In the main experiment, the manipulations were successful. 90% (74%) of the participants in the human (robot) scenario successfully recognized a service employee (service robot) as the service agent. Customer perceptions of deep and surface was measured on 7-point scales (with 7=highly agree) by Groth et al. (2009). The deep acting condition was perceived as deep acting ( $M_{DA}=6.69$ ,  $M_{SA}=4.81$ ;  $F(1, 177) = 27.81$ ,  $p < .01$ ) and the surface acting condition was perceived as surface acting ( $M_{DA}=3.74$ ,  $M_{SA}=5.12$ ;  $F(1, 177) = 35.91$ ,  $p < .01$ ) by the participants. Moreover, deep acting was perceived to be more authentic than surface acting ( $M_{DA}=4.43$ ,  $M_{SA}=3.23$ ;  $F(1, 177) = 29.75$ ,  $p < .01$ ; Hennig-Thurau et al. 2006).

For the group of participants who faced the service robot, an ANOVA was performed with perceptions of deep acting and service acting as dependent variables. Consumers who interacted with the service robot perceived the deep acting robot as more deep acting ( $M_{DA}=5.37$ ,  $M_{SA}=4.36$ ;  $F(1, 89) = 4.12$ ,  $p < .05$ ) and the surface acting robot as more surface acting ( $M_{DA}=4.42$ ,  $M_{SA}=5.29$ ;  $F(1, 89) = 8.20$ ,  $p < .01$ ). Thus, consumers perceived a difference in genuineness that is associated with the two emotional labor strategies for customer-service robot interactions. Thus, H1 is supported.

We performed two more ANOVAs with loyalty intentions as the dependent variable. Perceived competence of the service agent, consumers' affinity for technology interaction, and consumers' ability to put themselves into the situation were controlled for. For the group who faced the deep acting strategy, the effect of a human employee on loyalty intentions was higher than of a service robot ( $M_H=6.08$ ,  $M_R=4.87$ ;  $F(1, 91) = 7.79$ ,  $p < .01$ ). For the group who faced the surface acting strategy, the same effect held ( $M_H = 5.32$ ,  $M_R = 4.31$ ;  $F(1, 78) = 3.80$ ,  $p < .01$ ). Thus, H2 is supported.

Another ANOVA was conducted with loyalty intentions as dependent variable and the manipulations of the service agent and emotional labor as well as gender and their interactions as independent variables. The same controls were used. The results revealed a main effect of service agent and emotional labor on loyalty intentions. In particular, human service employees had a stronger impact on loyalty intentions than service robots ( $M_H=5.74$ ,  $M_R=4.60$ ;  $F(1, 168) = 13.00$ ,  $p < .01$ ) and deep acting had a stronger effect on loyalty intentions than surface acting ( $M_{DA}=5.49$ ,  $M_{SA}=4.79$ ;  $F(1, 168) = 5.53$ ,  $p < .01$ ). Interestingly, there was also a three-way interaction between service agent, emotional labor, and gender ( $F(1, 168) = 3.00$ ,  $p < .10$ ). For

women who interacted with a human service employee, deep acting had a stronger influence on loyalty intentions than surface acting ( $M_{DA}=6.39$ ,  $M_{SA}=5.54$ ;  $F(1, 31) = 3.71$ ,  $p < .10$ ). However when women interacted with a service robot, there was no significant difference between the impact of deep and surface acting ( $M_{DA}=4.65$ ,  $M_{SA}=4.60$ ;  $F(1, 44) = .07$ ,  $p > .10$ ), suggesting that they do not respond differently to various degrees of emotional behaviors of robots. As to men, for both human and robot interactions, there was a significant difference. Thus, H3 is supported.

### CONCLUSION & FURTHER RESEARCH

Service robots can interact, communicate, and deliver service to customers and are predicted to replace human service employees in many industries. Additionally, they are programmed to display certain emotions and behaviors to customers. However, no study has investigated whether customers *perceive* a service robot as apparently more deep acting than surface acting and whether deep and surface acting perceptions differ for interactions with human service employees and humanoid service robots.

The results of the experimental study contribute to the current literature by showing that consumers perceive a difference in emotional labor strategies not only for customer-employee interactions but also for customer-robot interactions. Independent of the type of interaction, deep acting has more positive effects than surface acting. Interestingly, women do not respond differently to various degrees of emotional behaviors of humanoid robots.

Retailers that think about using humanoid service robots have to keep in mind that customers respond to human service employees more positively than to service robots. Thus, service robots should be seen as supporting the service employees than as replacing them. Moreover, women react differently to various degrees of emotional behaviours of robots than men, suggesting that robots should be programmed in such a way to best appeal to female and male customers.

Further research might employ images/videos or even real interactions with robots as stimuli material to provide a more realistic setting. Moreover, future studies should also control whether respondents already had contact with robots and whether their overall attitude towards robots is positive or not.

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