To err makes human - The influence of errors and speech parameters on perceived humanness of

robots

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Abstract

Social robots are being introduced in many different domains since humans are not proficient in communicating and interacting with machines. Instead, we are experts in interacting with conspecifics in their function as social actors (Bruckenberger et al., 2013). Therefore, the goal in designing a humanoid social robot is to create it as human-like as possible. Creating the machine more human-like should trigger anthropomorphization processes in us, resulting in an attribution of human-like characteristics and behaviours to non-human entities (Epley et al., 2007). This should lead to an acceptance of the robot as a social actor. As a result, the interaction with these machines might become easier, more authentic, and more efficient (Salem et al., 2015). When designing a humanoid social robot, particular attention is often drawn to appearance (Li et al., 2010). This coincides with past scientific approaches. While researchers have repeatedly suggested that anthropomorphism should be viewed as a multidimensional construct (Ho & MacDorman, 2017), only recent research starts focusing on more elaborated human characteristics, such as higher cognitions. For a simple knowledge task, we would expect a specially designed robot to handle this task without errors (Bruckenberger et al., 2013). Contrarily, we would expect a human, given a certain difficulty, to make a few mistakes in the same task. The implementation of the human ability of targeted knowledge retrieval eliminates another important human characteristic, which is failing in a task. A robot, acting flawlessly appears therefore less human (Ragni et al., 2016). Instead of focusing on the properties actually implemented in the robot, this submission tackles the capabilities of the robot as perceived by humans. Besides making mistakes, another characteristic of human being is the expression of personality through different language cues, such as a more dominant way of speaking (Ghazali et al., 2019).

The current study aims to explore to what extent the perceived anthropomorphism of the robot is influenced by its quantity of making mistakes and language cues. We therefore conducted a 3 (error rate: human average vs. above average vs. below average) by 2 (language cues: dominant

vs. submissive) experiment. Participants completed a quiz with the help of the robot NAO. In the experiment, the robot failed less, more or as much as a human. The average human error rate for this quiz was determined via an online-pretest. The answers given by Nao were also examined in a pre-test to determine the designed phrases that were perceived as dominant or submissive. This allowed us to analyze the persuasive impact of the different language cues. The quiz was followed by questionnaires measuring perceived anthropomorphism (UV-Scale; Ho & MacDorman, 2007), trust, attribution of blame (AoB Scale; Kim & Hinds, 2006), and dependency (PMA-Scale; Banks, 2018). Technological affinity (TTQ; Martínez-Córcoles et al., 2017), Big-Five personality traits of the participant, and perceived personality traits of the robots (both BFI-10; Rammstedt & John, 2007) were measured as moderators. In this way we would like to answer the question if similarity in characteristics has any impact. For the data analysis different path analyzing methods (e.g. MANOVA, mediated and moderated Regression) were conducted.

Keywords: anthropomorphism, human-robotic interaction, personality traits, language cues, higher cognition

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