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Commentary

The New Frontier in Communication Research: Why We Should Study Social Robots

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Abstract
Social robots—robots that are made for interaction with humans—are becoming increasingly popular. In contrast to other disciplines, however, communication research has been slow in studying them. In our view, there are at least three theoretical reasons for communication researchers to deal with social robots. First, social robots challenge our notions of medium and media. Second, social robots challenge our understanding of the communication partner. Finally, social robots challenge our notions of the boundaries of communication. We therefore believe that social robots should play a more central role in communication research than it is currently the case.

Keywords
artificial intelligence; communication science; human-machine interaction; human-robot interaction; social robots

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1. Introduction

Due to ground-breaking advancements in computing, sensor technology, and artificial intelligence (e.g., Eberl, 2016), robots are nowadays increasingly designed for interaction with human beings (for a recent review see, e.g., Broadbent, 2017). These social robots integrate multiple communication modalities (e.g., vision, speech, touch) and can, once properly programmed, relate to human beings in meaningful ways (Broadbent, 2017; Fong, Nourbakhsh, & Dautenhahn, 2003; Lee, Peng, Jin, & Yan, 2006). As a result, social robots are already used as language tutors, as well as companions for elderly people and children with autism spectrum disorder (Cabibihan, Javed, Ang, & Aljunied, 2013; de Graaf, Allouch, & Klamer, 2015; Han & Kim, 2009). Moreover, a growing number of interactive 'smart' toys, which typically rely on social-robot technology, are currently entering the market (Future of Privacy Forum & Family Online Safety Institute, 2016; Peter, Kühne, Barco Martelo, De Jong, & Van Straten, in press). Finally, scholars and public commentators expect that, in the future, people will progressively encounter social robots as companions, collaborators and colleagues (e.g., Dautenhahn, 2007; Mols & Vergunst, 2017). Against this backdrop, several observers consider social robots a key future technology (Barnatt, 2015; Ross, 2016).

While engineering sciences and robotics have been investigating social robots for some time, communication research's response to the emergence of social robots has tended to be rather slow and scattered, some notable exceptions notwithstanding (e.g., Sandry, 2015; Zhao, 2006). This is surprising because in any interaction between social robots and humans some type of communication is essential, regardless of whether this communication is verbal or non-verbal. Moreover, various scholars have recently called for more attention of communication researchers to intelligent machines (e.g., Gunkel,

2012; Jones, 2014). In a paper published more than ten years ago and aptly titled "Humanoid Social Robots as a Medium of Communication", Zhao (2006, p. 402), for example, observed: "[The] emerging movement of social roboticization is causing a fundamental change in the meaning of social interaction and the nature of human communication in society". Focusing more broadly on semi-intelligent machines and 'smart' devices, Gunkel (2012, p. 2) has requested that "[c]ommunication studies…must come to terms with this development and reorient its theoretical framework". Thus, we are not the first to link social robots to communication and to propose that communication researchers should focus on human-machine communication; one of us has also requested already elsewhere that communication researchers pay attention to social robots, notably in research on young people (Peter, 2017). Based on existing research (e.g., Gunkel, 2012; Guzman, in press; Zhao, 2006), we rather believe that at least three important reasons for communication researchers to study social robots need to be (re)emphasized, especially now that the developments surrounding social robots are becoming increasingly powerful and pervasive (for an elaboration of the first two points below, see also Peter, 2017).

2. Three Reasons to Study Social Robots

First, social robots challenge our notions of medium and media. As Zhao (2006, p. 402) has succinctly noted, "social robots…are not a medium through which humans interact, but rather a medium with which humans interact". Social robots thus do not just function as mere transmission channels—a conceptual and theoretical problem that has been described also for computers in particular and media in general (Cathcart & Gumpert, 1983; Gunkel, 2012). Rather, social robots transcend the role of a medium because they can be both senders and receivers and acquire the status of social actors (e.g., Gunkel, 2012; Guzman, in press). Empirical research within the computers-are-social-actors paradigm has solidly demonstrated that human beings treat computers, and media more generally, as social actors and eventually as if they were human (e.g., Reeves & Nass, 1996). Given the vastly expanded abilities and characteristics of social robots, the idea of a medium as a communication partner thus deserves more attention (e.g., Zhao, 2006).

Second, social robots challenge our understanding of the communication partner. The vast amount of communication research—be it on interpersonal, computer-mediated, or mass media communication—seems to assume (at least implicitly) that communication takes place between two or more human beings (e.g., Guzman, in press). A social robot, however, can be seen as "another kind of communicative Other—who confronts human users, calls to them, and requires an appropriate response", as Gunkel (2012, p. 21) put it, referring to computers more generally. The communication partner is thus no longer human. Accordingly, social robots force us to reconsider the notion that the communicative other is typically human (Gunkel, 2012). Attention to this major shift merges partly with what has been called the 'nonhuman turn' (Grusin, 2015a). The nonhuman turn currently takes place in various fields in the social sciences and humanities that are "engaged in decentering the human in favor of a turn toward and concern for the nonhuman" (Grusin, 2015b, p. vii). We certainly do not advocate abandoning the human in communication research. Similar to others (Gunkel, 2012; Guzman, in press; Zhao, 2006), however, we do believe that an extension of our theoretical and empirical research to non-human communication partners is not only timely but will also advance the field of communication research as a whole.

Third, social robots challenge our notions of the boundaries of communication. Social robots vary in their morphology from anthropomorphic (with human-like features), to zoomorphic (with animal features), to caricatured (similar to animation figures), to functional (with machine-like features) (Fong et al., 2003). As these robots may increasingly feature advanced and perhaps even unique skills, communication with them may go beyond what we currently know about human-human, human-animal, human-agent, or human-machine communication (Sandry, 2015). More specifically, according to some observers (e.g., van Bergen, 2016), social robots may in the future have better language and visual skills than human beings. With the advancement of social robots that are supposed to read human emotions and respond to them, such as Pepper (SoftBank Robotics), communicative possibilities may thus emerge that may exceed the boundaries of human communication (Sandry, 2015). This development may force us to confront, also in human-robot communication, what Sundar (2008) has termed the 'ftf fallacy' in reference to the relation between computer-mediated communication (CMC) and face-to-face (ftf) communication. According to Sundar (2008, p. 59), the ftf fallacy implies that "[f]tf is the gold standard, and all CMC innovations, situations, and devices are measured against this standard". Being aware of the ftf fallacy in human-robot communication means acknowledging that communication with social robots may be different from ftf communication and not necessarily comparable with it. Applied to human communication more generally, it means that human-robot communication finds its equal place next to human–human communication (e.g., Guzman, in press).

3. Conclusion

In summary, the emergence of social robots challenges three paradigmatic assumptions in communication research—about the medium, the communication partner and the boundaries of communication. We believe that it is crucial that communication research broadens its scope to the study of social robots in order to de-

velop more comprehensive communication theories (for this request more generally focused on human-machine communication see, e.g., Gunkel, 2012; Guzman, in press). However, we warn researchers also against an exaggerated tech optimism, notably against overestimating the ease of doing research with current social robots (Belpaeme et al., 2013), and falling into the trap of technological determinism. Still, we are convinced that social robots should receive more attention and be given a more central position in communication research.

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Conflict of Interests

The authors declare no conflict of interests.

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