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Chapter 2

Aliveness and the Off-switch in Human-Robot Relations

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If robots are going to share human homes, workplaces and social spaces in the future, how will they communicate with people, and how might this frame people's perceptions of them? Should a robot's communication style reinforce the sense in which they seem to be somewhat alive, trustworthy assistants, co-workers or possibly even friends? Is there value in people recognizing and respecting the agency of robots, while also being reminded that even the most personable social robot is a machine that can be switched off? The questions in this list are too complex to answer fully in this short chapter. Its aim, instead, is to offer a starting point for discussing such questions: to demonstrate how a detailed analysis of people's communication with and about robots from a number of communication theoretical perspectives is a productive way to think through the deployment of robots into everyday life.

Theorizing Communication between Humans and Robots

As might be expected, communication with robots is often discussed in terms that draw upon cybernetic theory. The cybernetic tradition of communication theory considers communication in terms of information processing and exchange. It is an archetypal transmission model, which places particular value on precision in the coding of messages (Craig, 1999). Alongside this, from the perspective of the semiotic tradition, communication occurs through intersubjective mediation that employs shared languages and other sign systems (Craig, 1999). These theoretical traditions offer different ways to analyze communicative situations, cybernetics valuing the way that meaning emerges within coded exchanges, while semiotics focuses on the nuances of meaning conveyed by signs and

language; however, the two can also be seen to work together in discussions of human-robot communication when combined in cybernetic-semiotic theory that emphasizes the value of conveying precise information in a human language or with humanlike signs (Sandry, 2015). From a cybernetic-semiotic perspective, people and robots must be able to communicate clearly using shared language and signs, such that robots can take instructions from people and respond in ways humans can easily understand (Sandry, 2015).

Although the exchange of information is an important part of building relations with robots, the sociocultural tradition of theory adds another facet most often drawn upon when discussing robots that are designed to be "social." In particular, sociocultural theory describes communication as a process through which people's understandings of the world are produced, shared and reproduced (Carey, 1992; Craig, 1999). This perspective emphasizes the ways in which social robots and their communications are often framed to fit alongside human lives and understandings of the world as seamlessly as possible. Other discussions of robots focus on their ability to persuade people, or at least attempt to persuade them, to act in particular ways (Bartneck, van der Hoek, Mubin, & Al Mahmud, 2007; Gonzales & Riek, 2012). These analyses of communication draw on a sociopsychological tradition, which is concerned not only with a process of information transmission between sender and receiver, but also the effect of the message, and the way in which the receiver's existing understandings, attitudes and beliefs support or undermine the desired outcome of the sender (Craig, 1999).

The cybernetic-semiotic, sociocultural and sociopsychological traditions are the theoretical perspectives on communication that are most overtly drawn upon in discussions about the design of robots that are expected to interact with people (Sandry, 2015). As an alternative, which provokes a broader understanding of the possibilities of human-robot interaction, this chapter also considers the phenomenological tradition of communication.

This tradition theorizes communication as the experience of otherness (Craig, 1999). It therefore offers a definition of communication as an event that does not require precise information exchange, the sharing of familiar sociocultural perspectives or the exertion of persuasive power, but rather requires being open to and respectful of otherness (Peters, 1999; Pinchevski, 2005). Adopting a phenomenological perspective emphasizes the possibility of relating to robots as a form of quasi-other, or maybe more productively as technological others that are valuable in their own right (not just because they are somewhat like human others). This perspective offers new ways to explore the potential of supporting people's responses to robots as nonhuman beings with which they might want to interact at home, at work or in social spaces, while also reminding people that, as machines, robots might need to be rebooted, repaired or replaced with a newer model.

Considering the details of communication with and about robots through the lens of these theoretical traditions supports a broad understanding of the variety of ways that robots convey a sense of their personality and "aliveness" to the humans with whom they communicate. As will be considered in more detail below, one advantage of assessing robots as somewhat "lively" is that it encourages people's recognition of the agency of robots and the value of their responses to and actions on the world. This takes human-robot interaction beyond tool use to introduce the potential for collaborative team working, because a robot's otherness can encompass nonhuman skills and abilities to be employed alongside human collaborators in creating multi-skilled human-robot teams. For human-robot teams to work to their best joint ability, human team members need to keep in mind the nonhuman advantages the robot has and work with the robot, rather than seeking to control it as a tool. In addition, humans may also need to support the robot in light of nonhuman disadvantages from which it might suffer in certain environments. It is therefore important that, even as a robot's communication supports shared understanding and team-working with humans, the potential

for robots to remind people of their machinelike nature is not forgotten. As machines, robots not only have nonhuman skills and abilities, but also, on most occasions, can be switched off as necessary and without lasting damage. It therefore seems vital that the communication of a robot's liveliness and personality, supporting rich human-robot interactions and collaborations, should not occlude people's sense of the robot as a machine.

This chapter considers how and why the seeming "aliveness" of robots can and should be juxtaposed with an understanding of them as machines by analyzing the details of human-machine communication with three robot examples, all designed to communicate with humans, two factual and one fictional. The three illustrative examples were chosen because of the availability of texts that show and/or discuss the course of human interactions with the robots in some detail. The aim of this research is to provide a framework that demonstrates how different communication traditions offer a variety of useful theoretical perspectives on human-machine communication. Future research could draw on this strategy to consider how other robots and humans might interact now and in the future, in ways that enable humans to relate to and collaborate with them, while also maintaining a clear sense of the machine's technological otherness.

Relating to Social Robots as Humanlike Communicators

Cynthia Breazeal, creator of Kismet, one of the earliest robots specifically designed to take part in social interactions with humans, states that a "sociable robot" should be "socially intelligent in a humanlike way" (Breazeal, 2002a, p. 1). Her goal in creating Kismet, amongst other sociable robots, has been to make people's interactions with the robot like "interacting with another person" (Breazeal, 2002a, p. 1). From Breazeal's perspective, Kismet's sociability was supported by its expressive face and ability to turn-take in dialogue with people, most often using a toddler-like "babble" as opposed to fully formed human language.

Breazeal argues that humanoid robots have the potential to receive, interpret and reciprocate "familiar social cues in the natural communication modalities of humans", because they "share a similar morphology with humans" (Breazeal, 2002b, p. 883). Christoph Bartneck et al. make a similar assumption, justifying selection of the iCat robot for their experiment on human responses to being asked to switch off a robot, because it "can generate many different facial expressions, such as happiness, surprise, anger or sadness, that are essential in creating social human-robot interaction dialogues" (2007, pp. 218–219). While neither Kismet nor iCat are realistically humanlike in appearance, one of the keys to their socially communicative ability, at least from Breazeal's and Bartneck et al.'s perspectives, is a face that can produce humanlike facial expressions.

As this chapter goes on to note, and Breazeal's more recent robot designs demonstrate, perceptions of the social nature of robots can be supported in ways that involve less humanlike facial designs than seen in either iCat or Kismet, through development of machinelike robots that are nonetheless highly expressive and communicative. However, before moving on to discuss more recent examples of social robots, it is worth considering Bartneck et al.'s findings using iCat, employing a range of communication theoretical perspectives to analyze how a sense of the intelligence and personality of a robot is built up, such that it causes people to hesitate when asked to turn it off. This example provides a particularly relevant starting point and is discussed in some detail, because it directly investigates people's responses when asked to switch off a robot with which they have developed a connection over time, the perceived "ability" and "personality" of the robot being seen to shape the strength of feeling against switching the robot off.

Bartneck et al.'s experiment asked people to collaborate with iCat in playing Mastermind with a computer. This game involves players in trying to guess a pattern of colors chosen by the computer. Each guess is scored based on correct color and/or position,

so subsequent guesses can be chosen strategically based on this information. Participants were told the overall goal of the experiment was to see how the robot's personality would build over the game. Once the game was over, people were asked to switch-off the robot, having been told that this would permanently wipe the robot's memory and the personality it had developed. In fact, the robot was always under the control of the experimenter, as opposed to building its personality autonomously. The experimenter operated the iCat either in high agreeableness or in low agreeableness mode and, in addition, made the robot suggest colors in highly or less intelligent ways. The highly agreeable iCat would politely ask if it could make suggestions in relation to the game, whereas the disagreeable iCat would simply insist it took its turn, rather than collaborating with the human. As soon as the person was asked to switch it off, the iCat would speak up, begging to remain on. The dial to switch the robot off was linked with the robot's voice, such that turning the dial slowed the iCat's voice until it eventually stopped completely. Participants were not forced to switch off the iCat, but they all did in the end. Many people hesitated both before and while turning the dial, in particular those who experienced the more intelligent robot that had also been an agreeable collaborator.

iCat's communication during the experiment involved the cybernetic-semiotic transmission of precise information through its voice as it either stated the color it would like to try on its turn, or suggested colors the team could try next. The color it chose was also displayed by lights in its ears, in a form of nonverbal communication that reinforced its choice for the human. At this level, the clarity of iCat's communication was linked with the idea that it was intelligent, appearing more intelligent the better its color suggestions proved to be. Alongside this, people also based their judgement of iCat on the social nuances of its interaction. In sociocultural terms, it was when the robot was polite in suggesting potential colors to try, as opposed simply to insisting on taking its turn, that this robot seemed to want

to work intelligently alongside the human, behaving in acceptable and familiar ways to negotiate the choice the team might make next. These aspects of the robot's communication therefore supported human assessments of its intelligence and personality, while also conveying the sense that it was a "lively" partner with which to play Mastermind. At the end of the experiment, human participants were faced with the iCat's sociopsychological attempts to persuade them to ignore the instruction they had been given when it begged to remain switched on. Although not mentioned overtly by Bartneck et al. in their written paper, the linked video of the experiment shows that when iCat pleaded with users in this final stage of the experiment, its facial expressions and head and neck movements strongly reinforced the sense of its distress at the prospect of being switched off, adding to the sociopsychological effect of its words.

In this experiment, the robot was situated as a partner with which to play a game, introducing a sociocultural frame within which people were encouraged to assess the robot's communication. The sense of being in a team with the robot was therefore reinforced for participants when the intelligent robot adopted a more socially aware and polite communication style, making its sociopsychological influence that much stronger at the end of the experiment. The idea that turning off the robot would result in the permanent loss of its memory and the personality it had supposedly built up over the course of the interaction, alongside the fact that its voice and facial expressions strongly indicated its desire to remain on, likely gave people the sense that switching it off would be a form of "death" for that version of the robot at least.

Although the fact that "robots can exhibit life like behavior" does not mean they are "alive" in the same sense as humans and animals (Bartneck et al., 2007, p. 217), keeping this in mind may be particularly difficult when interacting with robots that appear to express humanlike emotions and might therefore be assumed to experience humanlike feelings.

Maybe it is no wonder that people who had played Mastermind in a team with the more social and polite personality for this robot hesitated before switching it off. Scholars have suggested that human perceptions of the apparent "aliveness" and "emotional state" of robots may be problematic. One fear is that human relations with these robots might lead people to devalue the feelings of trust and friendship experienced within human-human relations (Turkle, 2011; Gerdes, 2015). The results of the experiment with iCat do raise the question about whether the relations that people develop with social robots over longer periods of time might cause them to think twice before either switching the robot off, or leaving it to its "death" in a house-fire, for example. Of course, a social robot in the home would likely have a personality that was safely stored, or at least backed up, in a cloud computer system, but in moments of stress, would owners be likely to remember this and decide to abandon the robot itself?

The New Breed of Social Robot

The question of how human-robot interactions might be experienced in homes in the relatively near future leads to an analysis of Jibo,[1] about which a considerable amount of marketing material and technical journalism coverage exists. Jibo is one of a number of social robots currently being developed for long-term home use; others include Buddy[2] and Zenbo.[3] The design details of Jibo, Buddy and Zenbo differ from one another, notably Buddy and Zenbo can move around houses autonomously, while Jibo must be moved by hand. This may be because the focus for Jibo's design team has been on developing the robot's expressive personality and ability to communicate in ways that support the sense that this robot can become part of the family. In spite of a long delay prior to release, the Jibo website tagline is: "He can't wait to meet you," a statement that immediately genders Jibo and promotes the sense that this intelligent and sensitive robot wants to be your friend.

The original promotional video for Jibo explains how he can act as a photographer, read out emails, remind people of appointments, record and play back voice messages, remember a person's past preferences, and be an educator with the help of interactive applications. The video shows the practical tasks Jibo undertakes, but the narrative also indicates that, in social terms, Jibo should be positioned somewhere between your things (house, car and toothbrush) and your family. The video suggests that members of the family are drawn into an emotional connection with the robot, such that Jibo receives thanks and is wished goodnight. The language used throughout situates Jibo as an intelligent agent, eventually overtly stating that Jibo isn't really just a form of sophisticated technology, but rather is "one of the family". Breazeal's aims with Jibo are to "humanize technology", by making a robot that treats "you like a human being" and acts "like a partner rather than simply being a tool" (Jibo Robot, 2014).

The promotional text on the Jibo website (Jibo, Inc., 2017) explains that this robot "experiences the world, and reacts with thoughtful movements and responses." The robot is again positioned as practically helpful, able to "snap a photo or send a message" on your behalf, but also as wanting to develop "more meaningful relationships" by getting "to know you and the people you care about", so that "he becomes more and more a part of the funny stories, tender moments, and warm memories families share" (Jibo, Inc., 2017). Jibo may exist somewhere between your things and your family to begin with, but his longer-term goal is to become part of the family over time. In short teaser videos on the website, Jibo explains that he doesn't feel like a robot, plays staring competitions and tells (bad) jokes, including making fun of his lack of hands. Jibo was clearly designed to appeal through his cute personality and appearance, as Roberto Pieraccini, one of the people who worked on the prototype for this robot, admits (Rozenfeld, 2017).

At the level of completing tasks, such as taking photographs and issuing reminders, interactions with Jibo are mostly reliant on a cybernetic-semiotic process of information transmission using a voice interface. The robot listens for his name, “Hey, Jibo!”, in a similar way to Apple’s Siri and Amazon’s Alexa (embodied as the Echo). He then attends to what people say and responds with his own humanlike voice or completes the requested task. In contrast with Siri and Alexa, Jibo’s design team have concentrated on making him a fun and friendly interactive partner. This is where analyzing his communication from both sociocultural and sociopsychological perspectives emphasizes his use of expressive face and body movements, easily interpreted by humans in spite of his overtly nonhuman appearance. Jibo looks rather like a sophisticated lamp with a tapered cylinder forming his “body” that supports a hemi-spherical “head” the flat portion of which contains a “face” formed from a liquid crystal display. In spite of this, his body and face support the expression of emotions that are easily read by humans. Communication with Jibo is heavily reliant on a voice interface, but Jibo’s body and face, which displays a single moving and changing circle “eye” most of the time, are, it seems, more expressive than his voice. His eye moves and changes shape, allowing Jibo to blink, crinkle his eye and look to one side. His body movement, as he sways and turns on three axes, allows Jibo to show gaze direction, make eye contact and convey emotions such as excitement and sadness, raising or dipping his head and face. The emotional content of Jibo’s communication is not only persuasive, but also positions him as caring about the people with whom he interacts.

At times, Jibo’s face does become a screen that is used to display specific image cues, such as a question mark or timer, illustrations for a story he is reading out, or the video feed from someone using him as an interface to make a telepresence call. In the latter case, the robot becomes a puppet, so the person calling can take control and use Jibo’s gaze to follow group conversations. In this situation, Jibo’s personality moves to the side in a way that might

be rather jarring for those used to interacting with this robot as an autonomous helper and friend. In fact, Jibo's face can also be used as a touchscreen, although the promotional and teaser videos do not emphasize this mode of communication with the robot, possibly because the act of touching this screen doesn't sit easily alongside the idea of Jibo as a lively, intelligent companion that expresses his personality through this interface as well as his voice and body movements.

Jibo's only language currently is American English, and his voice is somewhat machinelike but, as explained above, provides information with cybernetic-semiotic clarity. It seems that, although the narratives that surround Jibo's goals and abilities tend to stress his aliveness and personality, the designers nevertheless expect his voice to help people remember he is *just* a machine. This idea is reinforced by Pieraccini, who explains that from the very beginning of the design process the team felt people shouldn't consider Jibo to be a living being; instead, choosing "to remind people Jibo is in fact a robot" (interviewed in Rozenfeld, 2017). However, it is unclear whether a voice with machinelike qualities will be enough to attain this goal. Adding to the potential for confusion, the idea that Jibo should be recognized as a robot is strangely juxtaposed with the importance of designing Jibo to be unpredictable, a trait more often associated with living beings than with machines. Pieraccini describes asking Jibo what he dreamt last night, to which he will give a different answer each day the question is posed. While machines often have a "sleep" mode, they are not usually positioned as capable of dreaming, and this type of unpredictability in Jibo seems likely to reinforce people's sense he is somewhat alive, as opposed to being a robot. Indeed, the final quote from Pieraccini further complicates the issue when he suggests that "Jibo could live forever" (Rozenfeld, 2017), since cloud storage for the robot's personality and the information he has collected means this can all be transferred to a new Jibo when an older model stops working or is superseded.

Although Jibo isn't humanlike in form, his communication and the personality he expresses is certainly "lively," and he communicates in humanlike ways. His emotional expression, in language and through nonverbal body movements, are a key part of his interactions with people, in spite of the design team's desire to ensure people primarily recognize him as a machine. While his developers likely see his expressiveness as a way to embed him more strongly into the home environment, it seems possible that this will mean his machinelike nature is relatively easily overlooked by those with whom he interacts. This understanding may be contrary to some parts of the interview with Pieraccini, but is fitting given his final statement.

An Alternative Vision of the Social Robot

In contrast with Jibo, the fictional robot TARS is not part of a family, but rather is a member of a deep space exploration team. Science fiction as a genre provides a thoughtful perspective on all types of science and technology including robotics, by embedding depictions of human-robot communication within richly imagined social and narrative scenarios. Interactions between human characters and TARS in the film *Interstellar* (Nolan & Nolan, 2014) demonstrate quite clearly an alternative way to design the communication of robots that supports their interaction and collaboration with humans, while also helping to remind people that they are machines. TARS is overtly non-humanlike in form. Gendered male, he consists of four vertical oblong sections that can join at a number of points, depending on the exact form he needs to take to complete a task or to move around. The outer pair of oblongs that make up this robot's body can divide down further to create arm-like appendages. The narrative explains that TARS was originally built to fulfil a military role, but during the film becomes part of a scientific team on a dangerous mission into space. As this excerpt from the

film's dialogue demonstrates, TARS has a communication style that gives him a big personality to match his large frame:

> TARS: Everybody good? Plenty of slaves for my robot colony. [Cooper turns to Doyle, a quizzical expression on his face]
>
> Doyle: They gave him a humor setting so he'd fit in better with his unit, he thinks it relaxes us.
>
> Cooper: A giant, sarcastic robot… what a great idea.
>
> TARS: I have a cue light [flashes cue light] I can use when I'm joking if you'd like
>
> Cooper: That'd probably help.
>
> TARS: Yeah, you can use it to find your way back to the ship after I blow you out of the airlock. [Pause, then flashes cue light]
>
> Cooper: What's your humor setting TARS?
>
> TARS: That's 100 percent.
>
> Cooper: Bring it on down to 75 please.

In terms of being on a mission into the dangerous environment of space, TARS's communication follows an accepted human sociocultural understanding of defusing tense situations with humorous banter (this interchange occurring during the initial lift-off). Alongside this, his well-developed and very humanlike cybernetic-semiotic communication skills are also used to convey mission critical information. TARS' attempts at humor are complemented by the idea of the "cue light," as a means for his non-humanlike body to provide a nonverbal indication that he is being sarcastic or making a joke. This makes good sense given TARS's rather flat vocal tone and lack of an expressive face. In contrast with

Jibo, TARS is certainly not cute and does not try to get to know the members of the team. Maybe it is reasonable to assume that, as a robot, he will already know the details of their lives from electronic files of information. TARS certainly isn't shown as needing to get to know people in anything other than the context of the mission and its goals. The way in which Cooper can alter TARS's humor setting with a simple request is a reminder, operating within the narrative for the human team members as well as for the film's audience, that TARS is a machine. His personality can clearly be customized to suit a person's preferences or a situation as appropriate. Other parameters mentioned over the course of the film include honesty, discretion and trust, all of which shape TARS's personality and responses to questions and situations that arise in the film, and all of which, presumably, could be altered by Cooper if required.

Although a friendship develops between TARS and Cooper, which strengthens over the course of the film, this idea is juxtaposed with the recognition that TARS is a robot and not alive in the same way as a human. For example, when it is suggested that TARS could be used as a probe to collect and relay data from the event horizon of the black hole the team has named Gargantua, a mission from which he would be very unlikely to return, Cooper is concerned:

> Cooper: You'd do this for us?
>
> TARS: Before you get all teary, try to remember that as a robot, I have to do anything you say.
>
> Cooper: Your cue light's broken.
>
> TARS: I'm not joking. [Flashes cue light]

This exchange is somewhat ambiguous (and further complicated by the fact that TARS's honesty setting is only 90 percent). The use of the cue light could either be read as indicating that it isn't broken, and therefore TARS's comment that "as a robot" he has to do as Cooper commands is true. From this perspective, TARS is positioned as a machine for humans to expend as they see fit. TARS does not play on this situation. Alternatively, the cue light could be taken to indicate that TARS was joking all along. From this perspective, TARS could refuse to be used as a probe, but does not. Whatever way this exchange is understood, TARS does not attempt to apply sociopsychological pressure by pleading for his cause or making Cooper feel guilty and just offers a matter-of-fact statement of the situation. Of course, it might be assumed that TARS's personality, memories and experiences, as is the case for Jibo's, might be copied and stored within the ship, such that as a machine, in contrast to a human, TARS effectively will not die even if his body is destroyed.

Although the use of TARS as a probe is not immediately pursued, the only way to save Dr. Brand, the other human member of the team who survives into the film's final stages with Cooper, turns out to involve TARS's ejection into Gargantua, much to Dr. Brand's consternation:

> Brand: Cooper, you can't ask TARS to do this for us.
>
> Cooper: He's a robot, so you don't have to *ask* him to do anything.
>
> …
>
> TARS: It's what we intended, Dr. Brand. It's our only chance to save the people on Earth. If I can find a way to transmit the quantum data I'll find in there, they might still make it.

In this exchange, Cooper reiterates TARS's words from the earlier discussion, clarifying that since TARS is a robot it isn't necessary to ask him to do something, you merely tell him. Even as TARS offers comforting words for Dr. Brand, indicating that he is as fully committed to saving humanity as a person might be in this situation, it is, of course, only his non-humanlike form and abilities that make it possible for him to attempt the mission in the first place.

In contrast with Jibo, whose positioning as a machine is made somewhat problematic in the context of his humanlike communication, cuteness and drive to become part of the family, TARS occupies a role more attuned to the need for sacrifice in order to achieve a team's goals. As Ian Roderick (2010) suggests is the case for explosive ordnance disposal robots, TARS's relationships with the human members of the team are formed within an environment where robots may be sent into danger to save the lives of humans. Strong attachments to robots in these situations may be developed precisely because of their life-saving role (Roderick, 2010). However, the film's narrative suggests that when robots can communicate in humanlike ways, the situation may become complicated. It seems reasonable to suggest that human relationships with TARS, who uses humor as a particularly humanlike strategy, might develop less as a response to danger, and more as a result of close team collaboration over time. Nonetheless, there is potential that, alongside the development of human-robot relations which are very humanlike in tone, consistent reminders that a robot such as TARS is a machine with a personality that can be tuned by parameter settings, and a "life" that is very different from human life, might be helpful.

Phenomenology, Communication Theory and Absolute Alterity

Another direction from which to consider human interactions with Jibo and TARS, which has the potential to support an understanding of their ability to communicate with humans while

emphasizing the need to retain a clear impression of their nonhumanness, is offered by phenomenological perspectives on communication and relations in interaction. Unlike cybernetic-semiotic, sociocultural and sociopsychological theory, for which communication is a process that relies upon and reinforces the similarities between communicators (and thus values only the humanlike aspects of robots such as the iCat, Jibo and TARS), phenomenological theories stress the importance of retaining awareness of the difference that exists between communicators (Craig, 1999; Pinchevski, 2005; Sandry, 2015). Alongside this theory, Don Ihde's "alterity relation" offers a phenomenological framework that may provide a useful way to envision human-robot interactions (1990, pp. 97–108). Ihde describes "*alterity relations*" as "relations *to* or *with* a technology" within which humans encounter technology as a "*quasi-other*" (Ihde, pp. 97–98, italics in original). His use of the term "alterity" is borrowed from Emmanuel Levinas (1969); although Levinas uses the term to encapsulate "the radical difference posed to any human by another human" (Ihde, 1990, p. 98). For Levinas, alterity can only be present in an encounter with a human other, but Ihde extends the term to human-technology relations with the argument that, while technologies are not the same as human others, they can nevertheless be encountered as "*quasi-other*" (1990, p. 98). Ihde's move to consider non-human machines as alterities, relies upon particular interpretations of technologies, which he notes are often seen as "problematic" (1990, p. 98). The most direct approach is anthropomorphism, "the personalization of artifacts", which ranges "from serious artifact-human analogues to trivial and harmless affections for artifacts" (Ihde, 1990, p. 98). Ihde suggests that understandings of "computer 'intelligence' as human-like" are an example of the former, while developing fondness for particular objects is an example of the latter (1990, p. 98).

Jibo's use of human language, an expressive body and face are designed to cause people to anthropomorphize this robot such that "he" becomes a member of the family,

despite being clearly machinelike in construction. Regarding this robot as a quasi-other would seem to make a great deal of sense. However, it is also possible to argue that, from a phenomenological perspective, Jibo's communication does not take pains to reveal his otherness, but rather occludes this as much as possible in order to emphasize his liveliness and humanlike personality. Jibo is positioned as useful because he can maintain humanlike relations with his owners, pushing any sense of his otherness into the background. A similar argument might be made for TARS, with his sarcastic humor and evident humanlike commitment to the team and its goals. Nevertheless, the ease with which people can alter TARS's personality is telling, as are the non-humanlike physical abilities he possesses. The acts of dialing down his humor or upping his truthfulness as required might be understood to position him as a quasi-other, whose nonhuman attributes are also valuable, particularly in the context of a dangerous mission into deep space. Alternatively, TARS's overtly nonhuman nature might be understood to "temper" the way in which people anthropomorphize this robot (Sandry, 2015, pp. 57–58), providing a continual reminder of his otherness, even as they enter into a friendship relation with him as part of a team on a dangerous mission. From this perspective, TARS may be understood less as a quasi-other, a less-than-human other, to become a technological other in his own right, one that should be treated differently from a human, but nonetheless respected and valued as a team member.

Conclusion

Considerations of human relations to robots may seem simple from a perspective that is focused on the construction of the robot as a type of machine that draws people into communicative interaction; however, negotiating the nature of the relation may well become more complicated for people taking part in interactions with the machine, or even for those watching interactions between the robot and other humans. The robots discussed in this paper

can all, in one way or another, be described as encountered by humans in terms of Ihde's alterity relation. However, the details of their communicative actions and the development and operation of the human-robot relation in each case are an important part of analyzing how these interactions with robots are regarded both by humans in the relation and by onlookers.

The communicative abilities of real-life social robots form the basis for people's sense that they are somehow (or somewhat) "alive," with individual personalities that develop over time. When humans interact with robots they are often encouraged to anthropomorphize and on some occasions zoomorphize robots, conferring human or animal traits onto machines in ways that carry a perception of liveliness into people's understandings of their existence. Furthermore, human responses to robots are often surrounded by designer and mainstream media discourses that narrate the "lives" and "agency" of these robots in ways that further support the idea that they can become part of the family, or team members at work. This framing of human-robot relations raises the question of how easy it is to switch these robots off, or to abandon them to their destruction. The balance point between how personable robots are and retaining a clear sense of their machinelike nature might, on occasion, be heavily weighted towards understanding them as "alive" because of the strength of their sociocultural positioning and the sociopsychological shaping of people's responses to them.

Some people might love the idea of Jibo's quirky cuteness, whereas others (including me) might be more taken with the idea of "a giant sarcastic robot" that can be asked to dial down its humor if the situation (or a person's state of mind) requires. This suggests it might be helpful to develop robots with flexible communication styles and personalities that can adapt to people's preferences. Nonetheless, as this chapter has explored, designs that support human-robot collaboration and relation particularly well are also likely to seem the most

"lively." It is these robots that become more than tools to the humans with whom they interact and, instead, are respected as assistants, co-workers or possibly even friends. While the design of non-humanlike robots may help to temper the way that people anthropomorphize them during interaction, it seems reasonable to suggest that all robots, whatever their form, should communicate clearly about their machinelike nature. A well-designed robot should not appear able to "die"—its personality and memories lost, rather than being saved—unless, as is the case for the Tamagotchi, its death is a key part of the interactive relation and narrative it supports. Although designers might be concerned that allowing them to clarify their machine status will undermine people's connection with robots, supporting people's recognition of the absolute alterity of robots as machines should help them to remember not only the machine's specific skills and abilities that make them valuable members of multi-disciplinary teams, but also that they demand a new and different level and type of obligation on a person's part than is the case for human and animal companions.

References

Bartneck, C., van der Hoek, M., Mubin, O., & Al Mahmud, A. (2007). "Daisy, Daisy, give me your answer do!": Switching off a robot (p. 217). In *Proceedings of the ACM/IEEE international conference on human-robot interaction* (pp. 217–222). New York: ACM. https://doi.org/10.1145/1228716.1228746

Breazeal, C. L. (2002a). *Designing sociable robots*. Cambridge, Mass.: MIT Press.

Breazeal, C. L. (2002b). Regulation and entrainment in human-robot interaction. *International Journal of Experimental Robotics*, *21*(10–11), 883–902.

Carey, J. (1992). *Communication as culture: Essays on media and society*. New York: Routledge.

Craig, R. T. (1999). Communication theory as a field. *Communication Theory*, *9*(2), 119–161.

Gerdes, A. (2015). The issue of moral consideration in robot ethics. *ACM SIGCAS Computers & Society*, *45*(3), 274–280.

Gonzales, M. J., & Riek, L. D. (2012). A sociable robotic aide for medication adherence. In *Proceedings of the 5th International Conference on Pervasive Technologies Related to Assistive Environments* (Article no. 38). New York: ACM. http://dl.acm.org/citation.cfm?id=2413146

Ihde, D. (1990). *Technology and the lifeworld: From garden to earth*. Bloomington: Indiana University Press.

Jibo, Inc. (2017). Retrieved from https://www.jibo.com/

Jibo Robot. (July 16, 2014). *Jibo: The world's first social robot for the home* [Video file]. Retrieved from https://www.youtube.com/watch?v=3N1Q8oFpX1Y

Levinas, E. (1969). *Totality and infinity: An Essay on Exteriority*. Pittsburgh, PA: Duquesne University Press.

Nolan, C. (Director & Writer), & Nolan, J. (Writer). (2014). *Interstellar* [Motion picture]. United States: Paramount Pictures.

Peters, J. D. (1999). *Speaking into the air: A history of the idea of communication*. Chicago, IL: University of Chicago Press.

Pinchevski, A. (2005). *By way of interruption: Levinas and the ethics of communication*. Pittsburgh, PA: Duquesne University Press.

Roderick, I. (2010). Considering the fetish value of EOD robots: How robots save lives and sell war. *International Journal of Cultural Studies*, *13*(3), 235–253. https://doi.org/10.1177/1367877909359732

Rozenfeld, M. (April 5, 2017). Jibo: The friendly robot that makes you feel at home. *The Institute, IEEE*. Retrieved from http://theinstitute.ieee.org/technology-topics/artificial-intelligence/jibo-the-friendly-robot-that-makes-you-feel-at-home

Sandry, E. (2015). *Robots and communication*. New York: Palgrave Macmillan.

Turkle, S. (2011). *Alone together: Sociable robots, digitized friends, and the reinvention of intimacy and solitude*. New York: Basic Books.

Notes

1. https://www.jibo.com/
2. http://www.bluefrogrobotics.com/en/buddy/
3. http://zenbo.asus.com/