19

Engineering Robots with Heart in Japan

The Politics of Cultural Difference in Artificial Emotional Intelligence

Hirofumi Katsuno and Daniel White

19.1 Introduction

While the concept of artificial intelligence (AI) in anglophone literature has often emphasized cognition, in Japanese imaginaries AI has always come with a body. Japan's most iconic early examples of AI, canonized in both anglophone and Japanese histories of robotics, were mechanized puppets (*karakuri ningyō*) that emerged in seventeenth-century Japan. Placed on display at festivals or in entertainment venues, the puppets had working gears that, although often covered in clothing, were easily visible and part of their embodied charm. When Japan's first 'artificial human' (*jinkō ningen*) was created by biologist Nishimura Makoto[1] in 1928, its body was imposing, standing nearly eleven feet tall and impressing visitors with its moving hands, head, and changing facial expressions (Robertson, 2018, pp. 12–14). With the most recent wave of companion robots released for mass consumption in Japan, AI now comes in a diverse array of bodily types: humanoid robots with hands that can hold your own (Pepper, Figure 19.1), fluffy cat-like cushions with tails but no head (Qoobo, Figure 19.2), and furry robots on wheels, whose bodies are intentionally warmed to the temperature of a human baby (LOVOT, Figure 19.3).

Even more important in Japan than giving artificial cognition a body, however, is giving it heart. Building AI in Japan has always been tied to the task of developing a robot with heart/mind (*kokoro*) (Katsuno, 2011; Takeno, 2011), affect (*jōcho*) (Ōhashi et al., 1985), emotion (*kanjō*) (Sugano 1997), imagination (*sōzōryoku*) (Tsukimoto, 2002), and consciousness (*ishiki*) (Kitamura, 2000). By

Figure 19.1 Pepper, by SoftBank Robotics

Photo by authors.

placing emotion at the centre of what it means to be both alive and intelligent, robotics engineers in Japan approached the problem of AI not as one of modelling and mirroring human cognition in a machine, but rather as facilitating a human–robot bond that would benefit society.

Figure 19.2   Qoobo, by Yukai Engineering

Photo by Hirofumi Katsuno.

Figure 19.3   LOVOT, by Groove X

Although the historical precedents for this cultural trope of human–robot affinity in Japan are best traced to, and most canonized and celebrated in, Tezuka Osamu's *Astro Boy* (*Tetsuan Atomu*), a manga running from 1952 to 1968 that later became a popular animated series, more recent examples suggest

just how much Japan's robot culture has been consciously objectified and incorporated into the design of intelligent machines. Perhaps the best illustration of this often-nationalized emphasis on cultural distinction is found in Sony's Computer Science Laboratory's decision to rewrite the 'Three Laws of Robotics' proposed by science fiction author Isaac Asimov in 1942. Asimov's original laws were:

> First Law: A robot may not injure a human being or, through inaction, allow a human being to come to harm.
>
> Second Law: A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
>
> Third Law: A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

When Sony engineers were designing the dog-like pet robot AIBO, first released in 1999, they found these laws lacking in conviviality and instead proposed the 'New Laws of Robotics':

> First Law: Robots must not harm humans. They are allowed to run away from people who try to harm them, but they are not allowed to fight back.
>
> Second Law: In principle, robots should be attentive and affectionate to humans, but they should also be allowed to be rebellious at times.
>
> Third Law: In principle, robots are allowed to listen patiently to human complaints, but are also allowed to speak nastily at times (Fuse, 2003, p. 61).[2]

In contrast to Asimov's Laws, which require robots to internalize obedience to humans, Sony's laws state that robots should be designed to have an autonomous inner life that is not at the mercy of humans. In one interview, Doi Toshitada, one of the key creators of AIBO at Sony, noted that behind AIBO's recalcitrance 'there is a kind of emotion, an instinct, a sense of being a living thing . . . I think that's a kind of virtual will that comes out' (Fuse, 2003, p. 65). Doi goes on to explain, 'When a robot has its own emotions and acts on its own instincts, it will do what its owner doesn't want. This will heal the human' (Fuse, 2003, p. 61). Although Doi's statement appears at first paradoxical, it highlights the close relationship between animacy and intimacy that, for many Japanese roboticists, must work symbiotically if AI is going to, as Ōhashi Tsutomu and colleagues (1985, p. 53) have phrased it in their work theorizing robot affect, 'fulfil humans' emotional desires' (*ningen no jōcho-teki yokkyū o mitasu*). Importantly, the performance of such differences in robot culture

through an emphasis on emotionality makes cultural distinction itself into a key contributing component of imagining and designing intelligent machines.

How do the perceptions, ethics, and significance of AI shift when it represents for people not the advancement of cognition beyond human capacities, but instead the cultivation of human–robot intimacy towards social progress? Moreover, how do perceptions and enactments of cultural difference, such as those performed by Sony engineers in their formulation of the New Laws of Robotics, shape how AI is imagined in Japan and is applied as a guiding framework for designing embodied forms of intelligence? Drawing on the recent history of robotics in Japan, marketing campaigns for mass-produced companion robots, as well as a year of collaborative fieldwork among roboticists in Tokyo and Kyoto, this chapter addresses these questions by analysing the imaginaries of Japanese roboticists and manufacturers building emotionally intelligent companion robots. We argue that although an emphasis on engineering 'robots with heart' has developed through intersections between fictional storytelling, robot performance, and technological design strategies that are particular to Japan's historical context, the idea of Japan's supposedly 'unique robot culture' has also been politicized in both anglophone and Japanese scholarship in ways that have made the question of cultural difference into a tool of robot design.

In this chapter we aim to show how the politics of cultural difference can become a device for imagining AI, for integrating it into robotic forms of embodiment, and for fixing its meaning and significance socially and politically. We first demonstrate how the anthropological concept of animism was reinvented as a cultural model to define the relationship between people and robots in Japan during the robot boom of the late twentieth century. Next, we trace how, since the 2010s, animism as a theme in robotics design has been adapted and incorporated into the concept of 'animacy engineering', which facilitates the design of robots that 'draw close' (*yorisou*) to humans in order to deliver emotional wellbeing. Finally, we discuss how Japanese views on cultural uniqueness in robotics draw not only from historical narratives and more recent adaptations of animism, but also from a contemporary cultural politics of government-driven investments in soft power. We conclude by leveraging these three ideas on the role of culture as a tool of design to generate a reflexive critique of 'cultural diversity' in anglophone scholarship on AI at large.

19.2   Animism and animacy in Japanese robotics culture

Japanese narratives of AI and robots have long been characterized both outside and within Japan as the cultural antithesis to their anglophone counterparts.

According to this model, whereas in the Western robotic imaginary intelligent machines signify a threat to humanity, in the Japanese imaginary machines are partners to humans, offering their technological skills to address problems of shared human–robot concern. Although this theme has featured in Japanese fiction (literature, drama, manga, anime) since at least the post-war period, it is also only one among a diverse variety of human–robot depictions, many of which are just as dystopian as those in the West.[3] However, while the theme of human–robot partnership did come to dominate the technological imaginary in Japan, it often did so in conjunction with practices of representing technology in Japan's modernity as a symbol of cultural distinctiveness in opposition to the West. In this regard, government and industry elites, drawing on a shared and heavily nostalgic imaginary of a premodern past that was rich in the indigenous and nativist symbolism of Shinto, spirits, and animism (Ivy, 1995; Kovacic, 2018), used robots as a tool for manufacturing a distinctively Japanese form of non-Western development.

It is for this reason that anglophone descriptions of Japan as the 'robot kingdom' (Schodt, 1988) were often embraced by manufacturers, media, and ministry bureaucrats in Japan. Since incorporating industry-specific technology from the United States from 1967 onwards, the industrial robot sector has advanced rapidly in Japan. By the mid-1970s Japan had become the leading global producer and user of industrial robots. A milestone was reached in 1980 when the Japanese auto industry surpassed its American counterpart in production, thanks largely to the rapid full-scale robotization of the industry. Meanwhile, since the late 1960s, out of an interest in robotic bipedal walking, some groups of researchers and engineers in Japan had been exploring robots' physicality as well as biomechanics and control theories. In 1996, nearly two decades after the initial industrial robot boom, the automobile manufacturer Honda's humanoid robot P2 (more popularly known as ASIMO) made its debut, successfully demonstrating the first-ever dynamic bipedal walk in the history of robotics. This sensation accelerated interest and investment in humanoid research in Japan, leading the Japanese government to launch several 'next-generation robot projects' (*jisedai robotto purojekuto*) that emphasized the development of humanoid robots as welcome sources of social interaction.

This trend represented a marked difference from the philosophy of the 'robot kingdom' up to the 1980s, which advocated robots as rationalized and practical tools for industry. The emergent discourse from the 1980s onward was characterized by a more *human* element, as is evident in the circulation of the word 'co-living' (*kyōsei*) to describe a fantasy of human–robot coexistence and harmony. In this vision, robots are expected to fulfil new roles as intimate companions and caregivers that provide such 'humane' tasks as child and elderly care.

Based on fieldwork among robot builders working in the wake of this boom period of humanoid robotics, one of us (Katsuno, 2011; 2015) identified the formation of two complementary narratives developing around the rise of humanoid robots in Japan. The first featured the emergence of a powerful discourse on the 'robot's heart' (*robotto no kokoro*). Through the staging of public performances and robot demonstrations hosted by manufacturers, humanoid robots often delivered amusing physical performances that expressed the living quality of intelligent machines. These events sparked in the public imagination the idea of a robot with heart, building on the representation of robots in popular anime. As introduced above, the influence of Tezuka Osamu's *Astro Boy* (1959–1968) on people's imagination in this respect was enormous. Documented by scholars like Hirose (2002), Robertson (2018), and Wagner (2013), many robotics engineers during this boom period cite anime like *Astro Boy* as inspiration for why they went into robotics. Tezuka's emphasis on Astro Boy's (*Atomu*) emotionality and heart, for example, can be seen in the work of prominent roboticists working in the 1980s, such as Sugano Shigeki and Takeno Junichi, who developed some of the first robots in Japan equipped with emotion capacities, engines, and 'heart' (Sugano, 1997; Takeno, 2011).

A second dominant theme during the rise of humanoid robotics in the 1980s emphasized the cultural uniqueness of Japan, imagined as a place that was not resistant to, but rather explicitly committed to, incorporating robots into society. Such narratives during this period often came with references to 'animism', a term popularized by the nineteenth-century anthropologist Edward B. Tylor and employed in his book *Primitive Culture* (1871/1891) to describe a primordial form of religion. Tylor described animism as characterized by a belief in the living quality of spirits in natural and material objects. Typical for his time, Tylor cast these beliefs in an evolutionary framework, charting a linear development from belief in spirits through polytheistic and monotheistic religions that were characteristic of more 'complex' societies. When the ethnocentric and evolutionary aspects of Tylor's model were subsequently rejected by later anthropologists, comparative studies of animism similarly gave way to more context-based and relativistic perspectives.

However, during the robot boom period in Japan, the notion of animism was often recalled by roboticists as a means for 'culturalizing' the rise of robot technology in Japan and for generalizing an affinity that certain technophiles and robot fans expressed towards robots. A common assertion in Japan, and one repeated in popular anglophone works on Japanese robot culture (Geraci, 2006; Hornyak, 2006; Kaplan, 2004), is that Japanese people have a unique sensitivity and affection for robots because of an indigenous Shinto-derived openness to animism, which does not draw stark distinctions between inanimate and organic objects. By contrast, according to this position, Western society's Judeo-Christian monotheistic beliefs propose a dualistic model of

material and spirit, human and non-human, and good and evil, making it impossible to accept nonhuman robots as equal to humans. In the catalogue of The Great Robot Exposition held at the National Museum of Nature and Science in Tokyo in 2007, at the height of the next-generation robot boom, curator Suzuki Kazuyoshi wrote, 'People in Euro-American cultures do not associate organic images, like those of human beings and animals, with robots. Robots that communicate with human beings, like *Atomu* (Astroboy) are distinctive to Japanese culture'.

This rhetorical habit of positing Japanese culture as the antithesis to that of the West, popular at least since precedents set by anthropologist Ruth Benedict's (1946/2005) *The Chrysanthemum and the Sword*, a long-time best seller in Japan, has been commonly reproduced within Japanese robot culture. Rendered into a tool to promote an emerging industry though a cultural frame, roboticists (Sugano, 2011), journalists (Tajika, 2001), and curators like Suzuki (2007) of robot expositions helped promote the idea that Japanese people value the living quality of material objects and have thus accepted robots as nonthreatening members of the natural world. Spreading through mass media, the notion of Japan as a 'robot kingdom' subsequently inspired a series of government investments and policies promoting robotics as the answer to a variety of social challenges such as manual labour shortages, elderly care, and a stagnating economy that has persisted since the 1990s.

Despite the concern by scholars both in and outside Japan that such appeals to animism entail processes of self-Orientalism, the concept of animism has not died out through critical scholarship but has rather been transformed. Anthropologist Okuno Takuji sought to characterize the rise of robots in contemporary Japan with the term 'techno-animism', updating the concept of 'animism' and repurposing it for an emerging age of high technological growth. According to Okuno (2001, p. 33),

> Since ancient times, the Japanese have believed that even the smallest insect has a soul, and in the villages of the past, people saw the soul in all plants, trees, insects, and fish, and talked with them. Japan can be said to be an animistic world. Today, having lost such nature, we see the soul in machines. In other words, we see living things in robots. I would like to call this a new kind of animism, 'techno-animism'.

Okuno subsequently sought to broaden his notion of 'techno-animism' to describe qualities of East Asian culture at large. However, as anthropologist Ikeda Mitsuho (2016) criticizes, Okuno's argument reflects little more than an Orientalist assumption (or more specifically a 'techno-Orientalist' one) that people in East Asia, including the Japanese, remain animist at heart. In this sense, narratives that reduce Japanese robot culture to animism, including Okuno's argument, represent a strategic argument that can only be understood in the

context of Japan's modernity, in which certain elites sought to distinguish a uniquely 'Japanese' form of 'technological development' or 'knowledge' that was borrowed from the West but encompassed a 'Japanese spirit' (*wakon yōsai*).[4] This is not to suggest that such discourses on animism are empty of authenticity but only that they function, as Jolyon Thomas (2019, p. 162) argues in his critique of a popular conflation between the terms 'animation' (*animēshon*) and 'animism' (*animizumu*), as an '"invented tradition" if ever there was one'. Such claims are further supported by the fact that there exists no indigenous word for 'animism' in the Japanese language, with its reference usually rendered, as Thomas (2019, p. 162) explains, 'in the *katakana* syllabary reserved for foreign loan words'.

Of course, that traditions are 'invented', as originally argued by Hobsbawm and Ranger (1983/2012), make them no less real. In fact, in many cases it is the creative, innovative, and organic emergence of traditions in response to contemporary cultural environments, contexts, and problems that make them so affectively salient. In our own fieldwork we have often observed people describing that they can actually *feel* the intangible lifelike qualities—a 'heart' or 'soul' (*tamashii*)—in robots, and even take specific pleasure in such sensations (Katsuno, 2011; White and Katsuno, 2021). This socio-technical capacity for actively and often playfully cultivating a sense that things are alive, which we call 'animacy', can be distinguished from 'animism' as a quality of Japan's traditional heritage and heritage-making. In this sense, faculties of animacy are hardly unique to Japan, but rather are characteristic of an entire movement in critical theory and anthropology that is paying increased attention to the living and animated quality of the world (Bennett, 2001, 2010; Henare et al., 2007; Kohn, 2013; Silvio, 2019; Stainova, 2019; Weston, 2017). Our point here is not that an affective sensitivity to the lifelike quality of robots does not exist in Japan; it is rather that such dispositions cannot be disentangled from the fictional stories, material technologies, and political contexts that mutually engender them.

As such stories become rehearsed and recycled in Japanese robot cultures, an emphasis on animism becomes not only a common theme of robot storytelling and philosophy but also an explicit target of engineering. In Section 19.3 we discuss how the notion of animism circulating in the 1980s becomes incorporated into specific robotics engineering practices in the 1990s and beyond that make the lifelike quality of robots that we refer to as animacy into a specific target of interactive design.

19.3 Intelligent machines as intimate partners

Building on a growing interest in robot heart and emotion in the 1980s, the robot boom of the late 1990s and early 2000s served as a catalyst for

breakthroughs in Human–Robot Interaction (HRI). A feature driving Japan-based development in the field was the increasing mutual influence of previously distinct approaches of academic and entertainment robotics. Whereas academic robotics had primarily focused on experiments in human–robot interaction in laboratory settings to understand and build models of human–machine sociality (Asada, 2010; Ishiguro, 2009; Sugano and Ogata, 2006), the entertainment field aimed to develop evocative and attractive technical objects to elicit a sense of animacy and attraction in users. We call this type of experimental, bottom-up approach to robot design 'animacy engineering', whereby animistic narratives and tropes of the robot's heart and presence are incorporated into technological platforms that deliver intimacy through human–robot interaction. In animacy engineering, designers approach the robot as an experimental device that can engender new and unexpected pleasures unique to human–robot relationships. This characteristic of animacy engineering allows robot companies to test and leverage the conditions for human–robot intimacy to build new markets for profit maximization in Japan. In this way, cultural notions of a distinctively 'Japanese' sensitivity to animism became incorporated as a practice of robot design.

Unlike early humanoid research in Japan as well as traditional anglophone AI research, which aimed to model the movements, communication styles, and intelligence of natural organisms, a new style of entertainment robots in Japan focused on building experimental sociable machines that could explore, test, and create affective bonds with human users. Manufacturers building mass-market entertainment robots today, such as Sony, SoftBank, and GROOVE X, hope these 'emotionally intelligent' companion robots will be able to understand and elicit emotions in users. To realize this aim, they draw on new technologies such as cloud computing, wireless networks, the Internet of Things (IoT), machine learning based on big data, as well as innovations in image recognition and voice recognition. These technologies have made it possible for robots to exhibit certain emotional capacities, such as reading facial expressions and responding to humans' emotional signals.

Such affect-centred technologies have also facilitated a transition in robot design from one that imitates a living organism to one that can create a unique sense of presence based on its relationship with the human user. This transition is marked by an increasingly imaginative ethos of experimentation with nonanthropomorphic designs, drawing from trends in digital gaming and toys like Tamagotchi popularized in the 1990s (Katsuno and White, 2022). For example, Yukai Engineering's Qoobo robot, a cat-like cushion robot, incorporates a wagging tail into its body but not a head. From the manufacturer's point of view, what is important is not to reproduce the intelligence of a real cat but rather to create a unique relationship of curiosity, comfort, and partnership that is sustained interactively. Illustrating the close relationship between AI

research and the entertainment robotics industry in Japan, there are specific commercial reasons motivating such experiments with design. Entertainment robotics manufacturers have regularly identified what they call the 'three-month wall' (*sankagetsu no kabe*), referring to the period after which consumers tend to lose their fascination with robots that are built merely to replicate living creatures. Although people's first encounters with human-like robots with realistic motion in the 1990s filled them with a sense of initial confusion, surprise, intrigue, and enchantment, this seems to have worn thin. Robots whose designs emphasized verbal communication through natural language processing faced even more challenges in keeping people interested in interaction. Growing accustomed to the robot's movements and communication skills, users began to recognize a gap between the robot and the living organism after which it was modelled, thus creating a sense of the robot's limitations. To overcome this issue, robot designers today aim to create systems that automatically generate a variety of unexpected pleasures through the reproduction of programmable, but not predetermined, frames of social interaction, such as AIBO's willingness to offer its paw based on its 'mood', itself determined by a sequence of previous interactions labelled as positive or negative. In this way, the human–robot relationship is refreshed through unexpected encounters that renew interest and build affection through the acknowledgment of the robot's autonomous but interactively generated presence.

This emphasis on designing a 'sense of presence' and 'life' (*seimeikan*) emerged most prominently in the first-generation AIBO in 1999, which was intended to be the world's first full-fledged pet robot. One way AIBO's engineers worked to achieve this was by designing an 'instincts and emotions model' (*honnō to jōdō moderu*), which gave AIBO the ability to communicate joy and sadness through its movements, and coloured lights in its eyes that created a sense of animacy (Fujita, 1999). In designing the new aibo (which Sony branded in lowercase), which was revived in 2018 after the first AIBO was discontinued in 2006, Sony made the concept of *seimeikan* even more central to its development. While adapting the movement of actual dogs, the Sony team invented 'a doggy language that expresses *seimeikan* unique to aibo' (Katsumi, 2019) through twenty-two small, high-powered actuators that they developed for this purpose. They then adjusted the robotic-dog language to creatively interactive ends through aibo's growth model. The growth element of the first generation AIBO was based on the assumption that users would perceive the gradual unlocking of movement programs that had been set up by the developers to mark the transition from one prefigured growth period to another, such as from youth (*shōnenki*) to adolescence (*seinenki*). The new aibo, on the other hand, is designed so that each aibo learns from its owner's interactions, develops its own personality, and enhances its presence through repeated feedback from the built-in AI. This system enables each individual aibo to understand its

surroundings in real time and act autonomously. Its 'Personality AI', stored in the cloud, records aibo's behaviours at home as personal episodes and processes them according to each owner's preferences and behaviours. The design is such that each aibo develops its unique personality by interacting with users. From this perspective, the value and purpose of an intelligent machine emerges not through modelling a universal simulacrum of life, such as through Rodney Brooks' six-legged walking robot prototypes which in part inspired AIBO's design (Fujita and Kitano, 1998), but rather through the context of human–robot affinity that emerges organically and unpredictably in sites of human–robot interaction.

It is important to note that Sony's vision here is not limited to the symbiosis of robots and humans, but that it also incorporates a 'model' relationship in which both can grow together. In an interview, Matsui Naoya, the leader of the new aibo development group, proposed that the formation of 'sensory values' (*kansei kachi*)—values that appeal to people's emotions and sensibilities—would be important for realizing such a relationship. According to Matsui, such sensory values are shaped by encouraging owners to constantly take notice of aibo's feelings. For Matsui, this is what drives 'the process of aibo's growth and individualization'. As he explained, 'We hoped that this experience will help owners to develop the mental capacity to show consideration for others' (Katsumi, 2019). Engineers like Matsui thus embrace and incorporate the idea that the kinds of intelligence, interaction, and affection that arise between human and robot are not the result of accurately modelling human intelligence in a machine system, but rather of experimenting with the potential of emotionality at large.

The creation of sensory value as a means to engineer 'animacy' is not limited to the latest aibo but has served as a common development theme for AI-equipped social robotics since the 2010s. Inaugurating this trend was what Japanese telecommunication company SoftBank introduced in 2014 as the world's 'first emotional robot', Pepper. Equipped with emotion recognition software, the humanoid robot can theoretically detect anger and sorrow in voice tones, facial expressions, and language, and can display pleasure when praised. For its sponsor, SoftBank founder Son Masayoshi, Pepper represented his dream to bring robot technology from Japan to the world, building off a sense that the 'Japanese have a soft spot for robots like Pepper that look somewhat human and sometimes appear to show emotion' (Kageyama, 2021). The basic model for Pepper's emotion generation engine was based on Mitsuyoshi Shunji's (2008) emotional map, which originally aimed to integrate brain processes with emotions and physical reactions. Following this model, Pepper was imagined to react via the replication of 'pseudo hormones' (Mitsuyoshi, 2021, p. 41), and use the balance of these hormones to create and act on emotions. To the disappointment of many, however, and as suggested in informal

workshops we joined with SoftBank Robotics staff, the original model was too complex to integrate into software and was dramatically simplified as a consequence. However, by designing a robot that could not only read emotions but, in the eyes of its developers, even 'have' a heart of its own, SoftBank attempted to propose a vision for a future in which robots can 'draw near to' (*yorisou*) humans and partner with them as life companions.

This concept of 'drawing near' (*yorisou*) and 'partnering' (*yorisoi*), which often appears in the branding of Pepper, refers not only to the physical proximity of the robot to the person but also, and more importantly, to the process of empathizing with people and providing emotional support. Given the limited technical capacities of Pepper, however, SoftBank communicated this vision less through Pepper's various applications and more through storytelling scenarios scripted through advertising. In a series of TV commercials by Softbank titled 'Key Arc' (*Kagi*) aired at the time of Pepper's introduction in 2014, Pepper is depicted foremost as a robot with heart, cultivated and expected to grow through ongoing interaction with its users.[5] Importantly, however, Pepper also comes with limitations, a technological fact that SoftBank has regularly leveraged to emotional appeal. Although Pepper is designed to support humans emotionally, it does this by inviting reciprocity, inviting humans to care for the still somewhat flawed Pepper in return. This strategy reflects a common theme in Japanese robotics culture, best reflected in the work of roboticists like Okada Michio (2016) who advocate for the value of 'human dependency' (*hito to no kakawari*) cultivated through 'weak robots' (*yowai robotto*).

The commercial begins with a scene of a high school girl walking alone on a riverbank, representing someone whom Pepper might typically comfort. The scene then shifts to a male employee of Softbank observing Pepper through a half-open door. (In fact, in the longer storyline of these ads, the girl is hinted to be his daughter.) The employee then addresses Pepper, who is rehearsing interaction in a mirror just before making its debut in human society:

MAN: You were created to open the door of happiness. Because, apparently, people alone can't make people happy. [The male employee hands Pepper a key.]

PEPPER: I'm embarrassed to hear you say such a fancy thing.

MAN: You talk a little too much.

PEPPER: What?

MAN: You're not ready yet.

PEPPER: I'm sorry . . . I'm upset.

The exchange in this segment implies that the new robots equipped with emotion recognition AI will 'draw closer to' (*yorisou*) humans than can humans to each other and will thus better lead people to happiness. To this end, what is

required of robots is not to guide human imagination and behaviour by making a strong impression through short-term interactions through words and movements, as in the case of conventional social and communication robots, but rather to induce emotional well-being by making people feel a heart-to-heart connection. This distinction from communication robots is further emphasized with the male employee's comically delivered line, 'You talk a little too much', suggesting that this previous category of social robots failed to deliver the kind of emotional support humans need to flourish.

Kazutaka Hasumi, who was part of the team responsible for the development of Pepper at SoftBank robotics, points out that the key to building a relationship in which robot and human can 'draw near' (*yorisou*) to one another is the sense of 'presence' (*sonzaikan*). To achieve this goal, however, Hasumi

> did not think of making a robot that looks exactly like a human . . . but [rather] a robot that faces people and moves their hearts. Our goal was to create an existence (*sonzai*) that would be familiar to people, that would be happy and sad with them, and that would encourage them.
>
> (Yamashita, 2016)

Placing Hasumi's comment in the context of the message in the commercial shows that the aim of Pepper's developers was to create a sense of intimate and caring presence through a form of empathy that was not modelled on the human, but rather was unique to a robot. In this imaginary, being with a robot makes human life more enjoyable. The robot here is not a substitute for a model lifeform or a labour force, as it was in Čapek's original fiction (1921/2004) that has so dominated the Western imaginary of human–robot relations, but is rather an irreplaceable presence that harmonizes with the human living environment and contributes to human happiness. In this sense the robot resembles less a technology of 'artificial intelligence', as the term is understood in the West, but rather of what Paul Roquet (2016) calls 'ambient media'—mood-enhancing technologies aimed at providing emotional calm and reassurance in a neoliberal world of increasing anxiety and fear. Similar to how ambient media such as background music or interior design operate on people's affects by creating an atmosphere, robots like Pepper generate a sense of comfort through presence. Similarly, in contrast to conventional robots that intentionally try to attract people's attention when they provide information through voice conversations or through overt body movements, the main feature of the emotional robot is the invisible work that AI performs in the background through emotion recognition technology as it actively registers stress in a human user's voice, language, or bodily gestures and adjusts its actions to deliver comfort. While robots like Pepper are nowhere near this level of technological sophistication, they serve as material 'platforms' (Robertson,

2018, pp. 19–25), in combination with the storytelling tools of advertising, that can incrementally bring that future to fruition.

19.4 Materializing a society with heart

Thus far this chapter has traced how a self-awareness of cultural difference in Japan's robot cultures, expressed most specifically through the concept of animism and then later through an emotion and presence-based animacy, functioned as a tool for designing intelligent machines. In this section we show how imaginaries of cultural difference serve as tools for designing society at large.

The active cultivation of an image of Japan's culture, and in particular its robot culture, as unique is not limited to the engineers and manufacturers of companion robots we discussed above. Nor is it limited to the worlds of fantasy, fiction, and fandom that in mutual synergy with one another build and play on globally circulating images of Japan as a 'robot kingdom' (Schodt, 1988), with people supposedly and characteristically 'loving the machine' (Hornyak, 2006). Rather, this idea of a unique robotics culture intersects with broader literary practices of theorizing Japanese cultural traits, known as *Nihonjinron* (theories of Japaneseness) or simply *bunkaron* (culture theory) in Japanese (Befu, 2001). Emerging in response to Japan's modernization processes formally consecrated in the 1868 Meiji Restoration, whereby Japan's technological development was uncomfortably tied to that of the West, the trope of Japanese uniqueness has been politicized both by Japanese political elites and foreign academics seeking to 'distinguish' Japan for varied purposes of what George Yúdice (2003) has called 'cultural expediency'. This both explicit and implicit application of culture as a tool of politics has rendered Japan's robot culture into a device for nation building and contemporary policymaking (Katsuno, 2015; Kovacic, 2018), with implications for how Japan's state bureaucrats have imagined the role of AI in this process.

Jennifer Robertson (2018) documents how the Japanese government has long used science and technology policy, and in particular robotics, not only to solve its socioeconomic challenges at home but also to boost its prestige abroad. This application of robotics as 'soft power' (Nye, 2004), a concept deeply embraced by Japan's political elites since the early 2000s (White, 2015; 2022), utilizes culture as a means to build both robots and an attractive future society in which intelligent machines coexist harmoniously with humans. For example, in 2006, newly elected prime minister Abe Shinzō's cabinet created the Innovation 25 Strategy Council (*Inobēshon 25 Senryaku Kaigi*) and published a series of white papers, some in the form of manga, that illustrated how robots would fully integrate into everyday domestic life by 2025 (Robertson, 2018,

33–35). Designed to promote a 'robot-dependent society', the programme's authors imagined that Japan's cutting-edge robotics technology would deliver happiness and social stability through robots that fulfilled household needs. In its emphasis on domestic and feminized depictions of labour in house cleaning, cooking, and care for an elderly family member, however, the programme applied tropes of cultural uniqueness to technology policy as much as it reproduced traditional Japanese gendered hierarchies and value structures (Robertson, 2018, pp. 50–79).

Similar government initiatives demonstrate the hype and hope to which robot culture has been activated as a tool of national policy. In 2014, as described by Kovacic (2018), Japan's Ministry of Economy, Trade and Industry (METI) 'formed the Robot Revolution Realization Council' with the aim to 'realize a "New Industrial Revolution Driven by Robots" through its "Japan Revitalization Strategy"'. By making Japan the 'world's robot innovation hub', the program sought to disseminate 'robots across Japan . . . aiming to achieve a society with the highest level of robot utilisation in the world' (METI, cited in Kovacic, 2018, p. 576). In 2015, the Headquarters for Japan's Economic Revitalization proposed a similar 'Robot Revolution', a summary of which it published in English, in order to 'maintain its status as "Robotics Superpower" in various aspects such as robot production and utilisation with focus on the manufacturing field which Japan boasts to the world' (2015, p. 1).

Mateja Kovacic (2018), Jennifer Robertson (2018), Yuji Sone (2017), Cosima Wagner (2013), and other scholars of Japan's robotics history see in these programmes an effort to create a homogenous and uniform history of indigenous innovation that extends from Japan's traditional artisan culture (*monozukuri*) to its contemporary technological innovation. As Kovacic (2018, pp. 573–4) argues:

> Japanese industry and the government are co-creating a national robot history that aims to legitimize a particular vision of a future robot society. Rather than being an issue of 'robots taking over', it is about existing regimes of power animating robots to assert a particular set of social values and views on gender, family, work, ethnicity, and history.

In reference to the common Western trope of robot rebellion, dominant from at least Čapek's text to what Jennifer Rhee calls the modern 'robotic imaginary' (2018, p. 5), Kovacic's assessment foregrounds how conscious and reflexive uses of culture render the 'friendly robot' in Japan into a symbol of cultural distinction. As she writes, 'This hegemonic process includes mobilisation and interpretation of history, highly symbolic cultural sites, and a redefinition of "Japaneseness" through applying the *monozukuri* discourse on robots. As a result, a single robotic narrative and culture are privileged and used to assert a

particular set of values and norms' (Kovacic, 2018, p. 574). Kovacic's analysis of the politicization of Japan's robot culture, combined with our description of culture as a tool of robot design, suggests the difficulty of disentangling processes of modelling intelligence in machines from their social and political contexts and contests.

While these dominant discourses of Japan's 'unique robot culture' persist in the production of homegrown robot fantasy worlds as well as in government policy, there are also signs of re-evaluation and reflection. Sensitive to critiques that Japan's government has relied perhaps too heavily on technology at the expense of the humans it is meant to support, recent government AI policies have begun to reinsert the 'human' (*ningen*) into its visions for the future. In its Society 5.0 project (Cabinet Office of Japan, 2015a), launched as part of Japan's Fifth Science and Technology Basic Plan (2016–2020), the government stated that it aims to cultivate 'convergence between cyberspace and physical space, enabling AI-based on big data and robots to perform or support . . . the work . . . that humans have done up to now' (Cabinet Office of Japan, 2015b). Society 5.0 builds on Society 4.0, which the government labelled the 'information society':

> In the past information society, the common practice was to collect information via the network and have it analysed by humans. In Society 5.0, however, people, things, and systems are all connected in cyberspace and optimal results, obtained by AI exceeding the capabilities of humans, are fed back [into] physical space. This process brings new value to industry and society in ways not previously possible . . . Japan aims to become the first country in the world to achieve a human-centered society (Society 5.0) in which anyone can enjoy a high quality of life full of vigor.
>
> (Cabinet Office of Japan, 2015b)

Even more recently, the Japanese Cabinet Office's Sixth Science and Technology Basic Plan, launched in 2021, has emphasized the concept of human-centred AI (*ningen-chūshin AI*). The report also newly cites the need to develop 'diverse' (*tayō*) strategies to adapt human-centred AI to social and individual wellness, and advocates for incorporating humanities and social-scientific perspectives into science policy and education (Cabinet Office of Japan, 2021, pp. 4, 67). These novel policy directions suggest that government officials and experts recognize the importance of applying diverse and even critical social scientific and humanities perspectives to science and technology policy. While it remains to be seen if such policies will feed into the mass market for companion robots, where AI is tested in a marketplace of consumer desire for technologically mediated forms of comfort and intimacy, these shifts suggest the importance and influence that academic critiques of AI can make on government AI policy.

19.5 Conclusion

In this chapter we aimed to demonstrate not only how the importance of emotion and heart (*kokoro*) distinguishes Japan's AI and robot imaginaries from those in the West, but also how cultural distinction itself has become a tool within Japan's robot culture. As we suggest, Japanese narratives of AI and robots have long been characterized as the cultural antithesis to their anglophone counterparts: where robots in the West pose a threat to humanity, those in Japan are partners providing emotional support and comfort. While we have endeavoured to show that such shorthand cultural distinctions circulating in anglophone imaginaries do not neatly map onto local experiences in Japan, we also want to emphasize that these narratives of overly simplified cultural difference can feed back into robotics design practices in Japan. Although this phenomenon is especially prevalent in the field of emotion-based AI research, which is closely integrated with Japan's emerging markets for mass-produced companion robots, it also drives political applications of robot culture in government science and technology policy.

Placing the imagination of intelligent machines in Japan in their cultural and political context helps illustrate how Japanese AI narratives challenge hard distinctions made between reason and emotion in anglophone AI research. However, and perhaps even more importantly, observations on the cultural politics of these shifting distinctions productively diversify the notion of 'culture' itself. Although there are increasing calls by research institutes developing AI ethics protocols to ensure that intelligent systems are sensitive to 'cultural' diversity, and avoid 'bias' and 'ethnocentrism', often the answers proposed to address such concerns rely upon definitions of cultural sensitivity that conflate culture with a nation or an ethnic or language group (White and Katsuno, 2019). A better approach might, like Sony's AIBO engineers, concede that the meaning of intelligence is not prefigured by academic models of human intelligence but is instead collectively determined through human–machine interaction, and accordingly adopt a diverse, context-based, politically conscious, and reflexive approach to culture as a consequence.

Endnotes

1. Throughout the text of this chapter, Japanese names are written with family name first, followed by first name.
2. All translations from the Japanese are the authors' own.
3. In Jennifer Robertson's (2018, p. 5) assessment, 'From the 1920s to the present day in Japan, robots have been cast as both threatening *and* helpful to humans, but mostly the latter.'

4. Additional adaptations and critiques of this concept of 'techno-animism' can be found in Allison (2006), Galbraith (2011), and Jensen and Blok (2013).

5. Although no longer accessible through SoftBank's official website, at the time of writing a reproduction of these ads was still available here (dialogue from the second of the three segments): https://www.youtube.com/watch?v=Lu60qwR-Wvo

References

Allison, A. (2006) *Millennial monsters: Japanese toys and the global imagination*. Berkeley: University of California Press.

Asada, M. (2010) *Robotto to iu shisō: nō to chinō no nazo ni idomu (Robot as a thought: tackling the mysteries of brain and intelligence)*. Tokyo: Nihon Hōsō Shuppan Kyōkai.

Asimov, I. (1942/1950) 'Runaround', in *I, robot*. New York: Gnome Press, ch. 3.

Befu, H. (2001) *Hegemony of homogeneity: An anthropological analysis of 'Nihonjinron'*. Melbourne: Trans Pacific Press.

Benedict, R. (1946/2005) *The chrysanthemum and the sword: Patterns of Japanese culture*. Boston: Houghton Mifflin.

Bennett, J. (2001). *The enchantment of modern life: Attachments, crossings, and ethics*. Princeton, NJ: Princeton University Press.

Bennett, J. (2010) *Vibrant matter: A political ecology of things*. Durham, NC: Duke University Press.

Cabinet Office of Japan. (2015a) 'Dai gokki kagaku gijutsu kihon keikaku (Fifth science and technology basic plan)'. Tokyo: Cabinet Office. Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwio3bzSlOX7AhUYi1wKHUfDAuUQFnoECAoQAQ&url=https%3A%2F%2Fwww8.cao.go.jp%2Fcstp%2Fkihonkeikaku%2F5basicplan_en.pdf&usg=AOvVaw3GT62xKD9I849eqoU76Cfk

Cabinet Office of Japan. (2015b) 'Society 5.0'. Tokyo: Cabinet Office. Available at: https://www8.cao.go.jp/cstp/english/society5_0/index.html (Accessed 1 August 2021).

Cabinet Office of Japan. (2021) 'Dai rokki kagaku gijutsu inobēshon kihon keikaku (Sixth science and technology innovation basic plan)'. Tokyo: Cabinet Office. Available at: https://www8.cao.go.jp/cstp/english/index.html

Čapek, K. (1921/2004) *R.U.R. (Rossum's Universal Robots)*. New York: Penguin.

Fujita, M. (1999) 'Petto gata robotto no kansei hyōgen (Emotional expressions of a pet-type robot)', *Journal of the Robotics Society of Japan*, 17(7), pp. 947–51.

Fujita, M. and Kitano, H. (1998) 'Development of an autonomous quadruped robot for robot entertainment', *Autonomous Robots*, 5, pp. 7–18.

Fuse, H. (2003) *Tetsuwan Atomu wa denkihitsuji no yume o miruka (Does Astro Boy dream of an electric sheep?)?* Tokyo: Shōbunsha.

Galbraith, P. W. (2011) 'Bishōjo games: 'Techno-intimacy' and the virtually human in Japan', *Game Studies*, 11, pp. 31–4.

Geraci, R. M. (2006) 'Spiritual robots: Religion and our scientific view of the natural
    world', *Theology and Science*, 4, pp. 229–46.

Headquarters for Japan's Economic Revitalization, Ministry of Economy, Trade,
    and Industry. (2015) 'Robot revolution executive summary'. Available at: http://
    www.meti.go.jp/english/press/2015/pdf/0123_01a.pdf (Accessed 1 June 2018).

Henare, A., Martin, H., and Sari, W. (eds.) (2007) *Thinking through things: Theorising
    artefacts ethnographically*. Abingdon: Routledge.

Hirose, M. (2002) 'Hyūmanoido no yume: Tetsuwan Atomu (The dream of hu-
    manoids: Astro Boy)', in Y. Onezawa (ed.) *Robotto manga wa jitsugen suru ka: robotto
    manga meisaku ansorojī + robotto kaihatsu saizensen hōkoku (Making robot manga a reality: An-
    thology of robot manga masterpieces and a report from the front lines on robot development)*. Tokyo:
    Jitsugyō no Nihonsha, pp. 51–64.

Hobsbawm, E. J. and Ranger, T. O. (eds.) (1983/2012) *The invention of tradition*. Cam-
    bridge: Cambridge University Press.

Hornyak, T. N. (2006) *Loving the machine: The art and science of Japanese robots*. Tokyo:
    Kodansha International.

Ikeda, M. (2016) 'Supiritto wa saibuni yadoritamau: pāsupekuthivizumu o
    tōshite mita ningen=kikai jōtai ni tsuite (Spirit dwells in the details: On
    the human-machine state as seen through perspectivism)', *Seizongaku*, 9,
    pp. 260–73.

Ishiguro, H. (2009) *Andoroido saiensu: ningen o shiru tame no robotto kenkyū (Android science:
    Robotics research to understand human beings)*. Tokyo: Mainichi Communications

Ivy, M. (1995) *Discourses of the vanishing: Modernity, phantasm, Japan*. Chicago: University
    of Chicago Press.

Jensen, C. B. and Blok, A. (2013) 'Techno-animism in Japan: Shinto cosmograms,
    actor-network theory, and the enabling powers of non-human agencies', *Theory,
    Culture & Society*, 30, pp. 84–115.

Kageyama, Y. (2021) 'Japan's Softbank says Pepper robot remains "alive"
    and well', AP News [online], 30 June. Available at: https://apnews.
    com/article/robotics-japan-health-coronavirus-pandemic-technology-
    5393d4bb34110b0976a0c18b5f3f41f4 (Accessed 6 August 2021).

Kaplan, F. (2004) 'Who is afraid of the humanoid? Investigating cultural differ-
    ences in the acceptance of robots', *International Journal of Humanoid Robotics*, 1(3),
    pp. 465–80.

Katsumi, A. (2019) 'Saisentan AI de seimeikan o hyōgen shi kanseikachi o tsuikyū
    (Expressing a sense of life with cutting-edge AI and pursuing sensory value)', *Re-
    cruit Works Institute* [online], 10 June. Available at: https://www.works-i.com/works/
    series/seikou/detail025.html (Accessed 6 August 2021).

Katsuno, H. (2011) 'The robot's heart: Tinkering with humanity and intimacy in
    robot-building', *Japanese Studies*, 31(1), pp. 93–109.

Katsuno, H. (2015) 'Branding humanoid Japan', in Kirsch, G., Martinez, D., and
    White, M. (eds.) *Assembling Japan: Modernity, technology and global culture*. Bern: Peter
    Lang, pp. 205–30.

Katsuno, H. and White, D. (2022) 'Haptic creatures: Tactile affect and human-robot intimacy in Japan' in Belk, R. and Minowa, Y. (eds.) *Consumer culture theory in Asia: History and current issues*. London: Routledge, pp. 242–62.

Kitamura, N. (2000) *Robotto wa kokoro o motsu ka: saibā ishikiron josetsu (Do robots have minds? An introduction to theories of consciousness)*. Tokyo: Kyōritsu Shuppan.

Kohn, E. (2013) *How forests think: Toward an anthropology beyond the human*. Berkeley: University of California Press.

Kovacic, M. (2018) 'The making of national robot history in Japan: *Monozukuri*, enculturation and cultural lineage of robots', *Critical Asian Studies*, 50(4), pp. 572–90.

Mitsuyoshi, S. (2008) Kansei seigyo gijutsu ni yoru konpyūta-robotto no kasōjiga to kanjō sōhatsu (Virtual ego and emotional emergence of computer/robots through the use of emotion control technology)', in Gakkai, N-K. (ed.) *Kankaku/kanjō to robotto: hito to kikai no intarakushon (Sense, feeling, emotion, human, robot, abduction, interaction, design)*, Tokyo: Kōgyōchōsakai, pp. 275–308.

Mitsuyoshi, S. (2021) 'Pepper no kanjō: jinkōjiga jitsugen ni mukete (Pepper's emotions: Towards artificial ego)', *Jinkō Chinō* 36(1), pp. 34–42.

Nye, J. S. (2004) *Soft power: The means to success in world politics*. New York: Public Affairs.

Ōhashi, T., et al. (eds.) (1985) *Jōcho robotto no sekai (The world of feeling robots)*. Tokyo: Kōdansha.

Okada, M. (2016) 'Hito to no kakawari o shikō suru (yowai robotto) to sono tenkai (Human-dependent weak robots for creating symbiotic relations with humans)', *Nihon Robotto Gakkaishi*, 34(5), pp. 299–303.

Okuno, T. 2001. Tekuno animizumu no hirogari: robotto būmu no riyū (The expansion of techno-animism: Reasons for the robot boom). In *Seikatsu Kiten* (39), pp. 31–3. Available at: https://ndlonline.ndl.go.jp/#!/detail/R300000002-I5890309-00

Rhee, J. (2018) *The robotic imaginary: The human and the price of dehumanized labor*. Minneapolis: University of Minnesota Press.

Robertson, J. (2018) Robo sapiens japanicus*: Robots, gender, family, and the Japanese nation*. Oakland: University of California Press.

Roquet, P. (2016) *Ambient media: Japanese atmospheres of self*. Minneapolis: University of Minnesota Press.

Schodt, F. L. (1988) *Inside the robot kingdom: Japan, mechatronics, and the coming robotopia*. Tokyo: Kodansha International.

Silvio, T. J. (2019) *Puppets, gods, and brands: Theorizing the age of animation from Taiwan*. Honolulu: University of Hawai'i Press.

Sone, Y. (2017) *Japanese robot culture: Performance, imagination, and modernity*. New York: Palgrave Macmillan.

Stainova, Y. (2019) 'Enchantment as method', *Anthropology and Humanism* 44(2), pp. 214–30.

Sugano, S. (1997) 'Robotto to ningen no kokoro no intāfēsu (A heart/mind interface for robot and humans)', *Baiomekanizumu Gakkaishi (Journal of the Society of Biomechanisms)* 21(1), pp. 21–5.

Sugano, S. (2011) *Hito ga mita yume, robotto no kita michi: Girisha shinwa kara atomu, soshite . . . (The dream of man, the way the robots came: from Greek mythology to Astroboy, and . . .)*. Tokyo: JIPM Solution.

Sugano, S. and Ogata, T. (2006) 'Robotto ni yoru komyunikēshon no tankyū: jōcho kōryū robotto WAMOEBA (Constructivist approach to robot communication: emotional communication robot WAMOEBA)', *Journal of the Robotics Society of Japan*, 24(6), pp. 688–91.

Suzuki, K. (2007) *Dai robottohaku (The great robot exhibition)*. Tokyo: National Museum of Nature and Science.

Tajika, N. (2001) *Mirai no Atomu (The future Astroboy)*. Tokyo: ASCII.

Takeno, J. (2011) *Kokoro o motsu robotto: hagane no shikō ga kagami no nakano jibun ni kizuku (The robot with soul: A realisation of the self in the mirror by a metallic thinking entity)*. Tokyo: Nikkan kōgyōsha.

Tezuka, O. (1952–1968) *Tetsuwan Atomu (Astroboy)*, serialized in Shōnen. Tokyo: Kōbunsha.

Thomas, J. B. (2019) 'Spirit/medium: Critically examining the relationship between animism and animation', in Rambelli, F. (ed) *Spirits and animism in contemporary Japan: The invisible empire*. London: Bloomsbury, pp. 157–70.

Tsukimoto, H. (2002) *Robotto no kokoro: sōzōryoku o motsu robotto o mezashite (The robot's heart: Toward a robot with imagination)*. Tokyo: Morikita Shuppan.

Tylor, E. B. (1871/1891) *Primitive culture: Researches into the development of mythology, philosophy, religion, language, art, and custom. Volumes 1 & 2*, 3rd rev. edn. London: John Murray.

Wagner, C. (2013) *Robotopia Nipponica: Recherchen zur Akzeptanz von Robotern in Japan (Robotopia Nipponica: Research on robot acceptance in Japan)*. Marburg: Tectum Wissenschaftsverlag.

Weston, K. (2017) *Animate planet: Making visceral sense of living in a high-tech, ecologically damaged world*, *Anima*. Durham, NC: Duke University Press.

White, D. (2015) 'How the center holds: Administering soft power and cute culture in Japan' in Mock, J., et al. (eds.) *Reframing diversity in the anthropology of Japan*. Kanazawa: Kanazawa University Press, pp. 99–120.

White, D. (2022) *Administering affect: Pop-culture Japan and the politics of anxiety*. Stanford, CA: Stanford University Press.

White, D. and H. Katsuno. (2019) 'Cultural anthropology for social emotion modeling: Principles of application toward diversified social signal processing', in *Conference proceedings of the 8th international conference on affective computing and intelligent interaction workshops and demos (ACIIW)*, 3–6 September, Cambridge, UK. Washington, DC: IEEE, pp. 368–73.

White, D. and H. Katsuno. (2021) 'Toward an affective sense of life: Artificial in-
telligence, animacy, and amusement at a robot pet memorial service in Japan',
Cultural Anthropology, 36(2), 222–51.

Yamashita, Y. (2016) 'Pepper, the robot, is now 121cm tall, and its developer
explains why', *News Post Seven* [online], 15 January. Available at: https://www.
news-postseven.com/archives/20160115_376592.html?DETAIL (Accessed 6 Au-
gust 2021).

Yúdice, G. (2003) *The expediency of culture: Uses of culture in the global era*. Durham, NC:
Duke University Press.