



Professional Women and Elder Care in Contemporary Japan: Anxiety and the Move Toward Technocare

Anne Aronsson

anne.aronsson@yale.edu
Yale University

Abstract

The elder population in Japan is increasing drastically, causing a number of issues that have not yet surfaced in most Western countries. Demographic data from Japan reveal that the Japanese have the longest lifespan globally, resulting in the world's highest population of older adults. Concurrently, the country has a rapidly declining birth rate. As the population ages, the workforce is shrinking and leaving a high number of elders with fewer caregivers to meet their needs. At present, the Japanese government is developing robotic care solutions to overcome the elder care labor shortage and implementing a new agenda to introduce social robots into the field. This article discusses professional women in Japan and their burden of caring for aging relatives and how introducing robotic care devices might reduce current anxieties regarding the provision of elder care. It analyzes the elder care strategies of 12 white-collar professional women in their forties and fifties and examines the extent to which gendered, expected at-home caregiving affects their professional commitments and associated anxieties. The findings below provide crucial insight into the most effective strategies that can be used by Japanese women to balance their careers with responsibilities to care for older relatives, particularly when it is impossible to predict the intensity of caregiving in the future.

Keywords: Hyperaging; Japan; Lifecourse; Robotic Care; Social Robots

Anthropology & Aging, Vol 43, No 1 (2022), pp. 17-34

ISSN 2374-2267(online) DOI 10.5195/aa.2022.360



This work is licensed under a Creative Commons Attribution 4.0 International License.

This journal is published by the [University Library System](#) of the [University of Pittsburgh](#) as part of its [D-Scribe Digital Publishing Program](#), and is cosponsored by the [University of Pittsburgh Press](#).

Professional Women and Elder Care in Contemporary Japan: Anxiety and the Move Toward Technocare

Anne Aronsson

anne.aronsson@yale.edu
Yale University

Introduction: The Move Toward Robotic Elder Care

Substantial and ongoing growth in the number of older adults in Japan has resulted in a range of issues that have not yet surfaced in most Western nations. Demographic data from Japan reveal that the Japanese have the longest lifespan globally, resulting in the country having the world's largest population of older people (Cabinet Office 2020). At the same time, the country has a rapidly declining birth rate. As the population ages, the workforce shrinks, leaving an increasing number of elderly Japanese with fewer caregivers to meet their needs. Because caregiving represents a long-standing social expectation of women in Japanese society, they are increasingly forced to choose between pursuing careers and meeting familial obligations, particularly those relating to caring for aging parents, in-laws, or spouses. Changes in the Japanese labor market are fraught with serious challenges because the pursuit of professional careers by women upends conventional gender roles and expressions of femininity (Cabinet Office 2016, 2020; Ho 2018; Nemoto 2016; Ogasawara 2016; Roberts 2011). The significant influx of women into the workforce and the transformation of the work they perform have led to growing concerns about how women can balance professional careers with familial obligations, including the work of caring for children and aging family members. In this paper, I focus on professional women in Japan, their burden of caring for aging relatives, and how the introduction of robotic care devices—both service and social robots—may potentially alleviate anxieties about the provision of elder care.

Technology plays a key role in many areas of life. It can offer solutions to care work issues and provide new ways for people to interact and connect with others (Aronsson 2020; Aronsson and Holm 2020; Parks 2010; Pols and Moser 2009; Wright 2018), potentially alleviating the heavy burden that caregiving places on women, particularly those with careers. The professional women who were interviewed as part of this research indicated that despite the potential of technological care devices to relieve some of the pressures and anxieties they experienced around elder care, these new technologies still had limitations. In this paper, I analyze the elder care strategies of 12 white-collar professional women in their forties and fifties to examine the extent to which gendered expectations of Japanese women as caregivers affect their professional commitments and associated anxieties. I briefly explore the Japanese government's robotic solutions to elder care in both institutional settings and private homes. I then examine how such solutions affect the anxiety experienced by professional women and whether they feel comfortable with entrusting older relatives to robotic care. This study's aims are (1) to shed light on the best strategies Japanese women might adopt to balance their careers with caring for aging relatives, especially when the extent and intensity of future caregiving cannot be predicted, and (2) to consider how technological devices and anthropological approaches to human-robot interaction are imagined to serve as surrogate caregivers¹ and might offer elegant solutions to the challenges of care work by streamlining them and providing older adults with a steady or constant form of companionship (see

also Aronsson 2020). Such care devices represent new epistemic possibilities of caregiving that contrast with the actual human companionship for which they serve as a replacement. In the case of some older people, their relatives, and caregivers, these devices may be perceived as offering more authentic experiences than some human interactions (Aronsson 2020).

The Japanese Ministry of Health, Labor, and Welfare (2018) has predicted a shortfall of approximately 400,000 care workers by 2025. In response, the government has launched a two-pronged initiative to tackle this crisis in elder care. The first prong consists of admitting more foreign guest workers into the country, even though immigrant labor is not generally viewed in Japan as a desirable solution (although this position is gradually changing).² In 2019, a new immigration law opened the door to foreign workers in 14 sectors of the economy, including healthcare, by ensuring that visas were granted to meet Japan's employment needs (Hamaguchi 2019). As a result, some 60,000 visas were approved in the healthcare sector (2019). However, despite the fact that healthcare represents the largest percentage of visas granted, the required number of staff to care for the country's aging population still falls short.

The other prong in the initiative comprises increasing the number of robotic devices used in the nursing sector. As the situation has worsened, the government has turned to the idea of using service and social robots to provide a range of services in the elder care field. Former Prime Minister Shinzo Abe was behind Japan's state project to "roboticize" Japan. In 2007, during his first term as prime minister, Abe introduced Innovation 25, a retro-visionary blueprint for turning Japan into a nostalgia-tinged "robotopia" by (among others) restoring the traditional multi-generational household. All of this was supposed to occur by 2025. This timetable is now unrealistic; currently, the plan is referred to as Innovation (minus the 25), or Society 5.0, the smart society (Robertson 2018, 2021).³ It has been argued that developing robots with voice and facial recognition capabilities will close the gap between human needs and staffing shortages (Headquarters for Japan's Economic Revitalization 2015); in response, care centers have set about introducing an increasing number of robots to help with both service and social care tasks. Service robots [*saabisu robotto*] can assist in everyday tasks, such as eating, bathing, and toileting, while social robots, as the term implies, provide companionship for the elderly by listening and talking to them, as well as helping them feel like they are receiving attention and consideration. Social robots, defined as robots that are "able to communicate and interact with us, understand and even relate to us, in a personal way" (Breazeal 2004, 1), are equipped with artificial intelligence (AI), high-resolution cameras, and voice and facial recognition capabilities that help them interact with humans at social and emotional levels.

A body of literature on AI and social robots emerging from various fields, including anthropology and philosophy, contextualizes the concepts of technoliberalism and "surrogate humanity" (Atanasoski and Kalindi 2019) and outlines some of the anxieties surrounding intelligent technologies that are relevant for the discussion here. As social historians Simone Müller and Heidi Tworek (2016) note, imagined uses of technology can structure the political framing of technological research, thereby influencing the physical development of technologies.⁴ Some research has pointed to an agenda behind industry and state deployment of robotic agency: reinforcing sexual and gender divisions in the labor field and strengthening the model of the traditional multi-generational patriarchal household (Robertson 2021; see also Aronsson 2020). These considerations deserve a fuller discussion that is beyond the scope of this paper. As a result, automation has been racialized and gendered since the early days of the Industrial Revolution because the tasks that were considered automatable—manual labor, factory work, and care work—were perceived as unskilled and noncreative work dominated by the uneducated, the colonized, and women (Atanasoski and Kalindi 2019, 156). As a result, "surrogate humanity focuses on how engineering projects that create the robots, program the AI, and enhance the digital infrastructure

associated with a revolutionary new era are in fact predetermined by techniques of differential exploitation and dispossession within capitalism” (2019, 174).

Technoliberalism allows for an aspirational representation of humanity in relation to technological transformation, but this representation obscures the uneven gendered relations of labor, power, and social relations undergirding the current conditions of capitalist production. That is, “technological futures tied to capitalist development iterate a fantasy that as machines, algorithms, and artificial intelligence take over the dull, dirty, repetitive,⁵ and even reproductive labor performed by racialized, gendered, and colonized workers in the past, the full humanity of the (already) human subject will be freed for creative capacities” (Atanasoski and Kalindi 2019, 174). In other words, engineering imaginaries may aspire to a revolutionary status for the techno-objects they produce to improve human life, but they reinscribe gendered imaginaries of what kinds of tasks separate the human from the less-than- or not-quite-human other. In principle, technoliberalism underlies humanity’s fascination for, as well as its fear of, robots through symmetrical anti-humanism, which has placed humans and nonhumans on par with each other, meaning that humans have no unique qualities or features that make them distinct from other agents. Namely, the robot symbolizes surrogate humanity and has long been associated with dehumanization and the rise of nonhuman agents (Richardson 2015, 5). Actor networks, companion species, and assemblages have generated an ontological turn in anthropological theory where human and nonhuman agents are now considered interrelated and even somewhat enmeshed (Richardson 2015, 6; see also Haraway 2003; Ingold 2012; Latour 2005).

In addition to the “surrogate humanity” framework, I present a comparative perspective between the more technologically conventional robots used for elder living and care—mainly service robots—and the more recently introduced social robots. The former tend to generate anxieties related to elder care, while the latter appear to mainly alleviate those anxieties. Service robots—for instance, bed sensors, the lifting robot HUG, lumbar devices⁶ worn by caregivers to lift elders in and out of bed or the bathtub, and the Resyone wheelchair (to cite only a few)—were introduced in nursing homes before social robots. As Wright (2018) notes, “Across several different ministries, the government has spent over 15 years planning and funding large-scale public technology research projects and investing in the domestic service robotics industry (Wagner 2010), most notably in the ongoing ¥12.5bn (approx. US\$112 m) ‘Project for the development and promotion of the introduction of robot care devices’ run by AIST [Advanced Industrial Science and Technology] under guidance from AMED10 from 2013–17” (25). Nevertheless, social robots are accepted at higher levels than service robots. One reason appears to be their humanoid form, which allows for anthropomorphic projection or the human tendency to attribute human traits to nonhuman entities. This response can be understood as intersubjectivity in action. As Dumouchel and Damiano (2017) argue, intersubjectivity is the “result of rational analysis of the behavior of others, and it rests on an analogy with—which is to say that it is worked out on the basis of—what the subject himself feels and his own reactions in similar circumstances” (127–128). Intersubjective knowledge of emotions, for example, is just like knowledge of others’ minds since Descartes, it is never direct.

In 2010, relatively few service robots were in use in Japanese nursing homes (Wright 2018), but by 2019 they were increasingly introduced as part of the Innovation 25 project. As I demonstrate in this paper, the impacts of these technological changes in elder care on Japanese professional women’s thinking and experiences are related to the extent to which particular forms of technocare alleviate or exacerbate anxiety associated with caring for elder people.

Contextualizing the Implications of Care Work in an Aging Japan

In Japan, aging has a considerable impact on family members and those responsible for elder care, and the role of caregiver is typically filled by women (Buch 2015; Jenike and Traphagan 2009; Kavedžija 2016b). Cultural traditions of familialism and filial piety are deeply rooted in Japanese society, whose social values are based on the traditional stem family system (Danelly 2014; Jenike and Traphagan 2009). This family system presupposes that the eldest son, together with his wife and children, lives with his parents until they pass away. Even today, a relatively high percentage of older Japanese people live in such family units, highlighting the country's strong tradition of vertical social relations and the Confucian doctrine of filial piety. However, the development of public welfare programs, such as care services, has contributed to crucial changes in perspectives and attitudes.

These changes have subjected the Japanese family system to negotiation, contestation, and improvisation by men and women who have proposed new ways to solve old problems. One solution is the provision of elder care within the framework of the stem family system (Danelly 2014). Family members' involvement in and responsibility for the provision of care are embodied in the "Japanese-style welfare society."⁷ This is more efficient and comprehensive than the Western welfare state model because it offers better economic benefits through reduced welfare spending, which lowers taxes and accords with Japanese cultural values. However, since the demographic structure of Japanese society has changed and the population has aged, the provision of care has increasingly been regarded as a social, and not exclusively familial, concern (Peng 2003).

Moreover, a decline in traditional intergenerational cohabitation has occurred in Japan. The proportion of people aged 65 and over who lived with their children decreased from 49.1 percent in 2000 to 43.2 percent in 2009, while the proportion of the elderly living alone increased from 14.1 percent to 16 percent over the same time period (Takagi and Saito 2019). These declines have occurred despite "negative mobility," "downward mobility," and uncertain futures, which have led younger people to increasingly opt to live in multi-generational households (Fujita 2015). In contrast to previous generations, the generation of millennials is less interested in cohabitation and caring for aging parents and grandparents and more focused on personal goals, such as career building. Due to this trend, obligatory cohabitation is shifting toward strategic cohabitation. In other words, cohabitation and the provision of elder care have become less of a "natural duty" and more of an arrangement and a convention. The high cost of housing and the inadequate supply of childcare facilities play particularly important roles in this normative shift. This reflects that, although some demographic characteristics, such as marital status and number of children, are important factors of cohabitation, socioeconomic and geographic variables, such as education, home ownership, and region of residence, are the primary predictors of cohabitation. Harsh economic conditions have forced many people to accept cohabitation (Ochiai 2003; Wu 2004).

Aging is a particular concern in contemporary Japan because of the country's growing proportion of older adults. Glenda Roberts (2014) argues that the future of elder Japanese people, and perhaps the future of Japanese society as a whole, may be restricted due to the rapid growth in this segment of the population. In particular, increased longevity has led to an increase in the number of dependent adults. One quarter of the Japanese population is now over 65 years old, and one third of these individuals require daily assistance owing to frailty, dementia, or other chronic geriatric health issues (Ministry of Health, Labor, and Welfare 2018). As a result, stress and anxiety are occurring at multiple social levels: at the national level, there is increasing concern about the aging population's contribution to Japan's shrinking economy; at the community level, issues related to the aging population affect individuals within neighborhoods;⁸ at the family level, immediate family members and close relatives face challenges in dealing with the increased need for elder care and support; and at the personal level, individuals must cope with issues associated with caring for aging relatives in addition to their other family responsibilities and career-related obligations (Kavedžija 2016b, 214).

Individuals experience anxiety when they perceive that something they value is under threat, but anxiety is also a culturally informed response to perceived loss (i.e., the causes of anxiety vary by culture), such as feelings of unease when social stability and security are threatened, as is the case in Japan (Kavedžija 2016a, 2016b; see also Danely 2014; Long 2000, 2014). Since the 1990s, this threat has rapidly increased worry and anxiety among the general Japanese population. Until the 1970s, families were entirely responsible for providing care and support for the elderly, as established by traditional values and beliefs (Traphagan and Knight 2003). Social programs for the elderly were intended to relieve that burden, but increased longevity in Japan has overwhelmed their development, and consequently, the younger population bears an ever-increasing responsibility for elder care. John Traphagan and John Knight (2003, 150) note that as the number of people aged 65 and over has increased, so has the number of those aged 75 and over, an age group known as the “old old.”⁹

Historically, older people have always been financially and personally dependent on their children, but financial and personal dependence have not evolved simultaneously (Yamato 2006). From 1945 to the mid-1960s, parents’ financial dependence on their adult children was taken for granted, but this arrangement started to become less desirable in the 1960s. Between 1945 and the early 1980s, the public pension system was largely unavailable or unreliable but has since become increasingly efficient and useful. However, the personal care situation has remained mostly the same. Dependence on adult children has continued to be taken for granted, and women are expected to be the primary caregivers. Public care services were exclusively for the poor until the 1980s, but since then, such services have become more viable and less socially stigmatized. Nevertheless, it can be argued that although men—and in some cases women—have been liberated from the financial responsibility of supporting their elderly parents, women continue to bear the responsibility of providing physical care because public care services have not developed in pace with the population’s needs (Yamato 2006).

Methodology

This paper is based on interviews I conducted in 2010 as part of my doctoral research, with follow-up interviews conducted in 2019 during a six-month research stay in Tokyo and email exchanges with the interviewees throughout the summer and fall of 2020. I explore how the lives of professional women have changed owing to elderly relatives’ increased dependence and altered living circumstances in light of the growing use of robotic care in institutional and private settings. The process of recruiting these women for my research in 2010 was mainly undertaken through snowball sampling, and in 2019, I recontacted the same women. At the time of recruitment, inclusion criteria for participants stipulated that they had to be employed full-time in a career-track position and that they were currently caring for or had previously cared for elderly relatives. The research was based exclusively in Tokyo, where all of the interviewees lived.

The research participants were middle-class women in their forties (38 respondents) and fifties (19 respondents). For the interviews in 2019, I emailed all 57 women. In some cases, the emails were returned, or I was unable to reach the participants; some of them never replied to my emails or answered that they had no time for follow-up interviews. In total, 12 respondents agreed to a subsequent interview and met the recruitment criteria. Therefore, the sample for the 2019 interviews was much smaller than the one used in 2010. From the previous total of 57 interviewees, I worked with a sample of 12 to explore how professional women struggled with anxieties about elder care duties while pursuing their careers. The interviews followed the same format in both years.

Of the women in their forties, two worked in finance and two in the industrial sector (one each in the secondary and tertiary sectors); one worked in academia and one in the government, while another one was self-employed. Four were married, and three were single. Of the married women, two had one child each, and all the other women were childless. Of the women in their fifties, each one worked in finance, industry, and academia, and two worked for the government. Three were married and two women were single, but one of them had a partner. Of the three married women, two had two children each and one had one child.

The interviews were conducted in both Japanese and English, depending on the participant's preference. All questions were open-ended and focused on daily work routines, anxieties about elder care, engaging with care work, and perceptions of robotic care. The interviews ranged in duration from two to three hours. In some instances, I spent several hours with a participant, mainly on weekends, and all interviews took place in coffee shops, restaurants, or nursing homes. All interviewee names mentioned below are pseudonyms.

Shouldering the Burden of Care

Although all the interviewed women belong to the middle class and are financially secure, their aging relatives present an increasing caregiving burden despite the presence in the home of some hired help (e.g., cleaners and caregivers).¹⁰ As Kumiko (aged 42) explained, "I feel the financial burden, as well as the personal care burden of looking after my aging mother" (September 26, 2019). This dual burden of financial responsibility as well as personal care was voiced by several of my informants. Thus, as the interviews confirmed, concerns regarding elder care arise from the imperfections of the pension system, the prospect of future pressure caused by allocating financial resources to long-term elder care, and the general burden of taking care of older adults.

Elder care in Japan also encompasses deeper existential issues, especially for full-time employed women. Sacrificing careers to care for elder relatives creates uncertainty concerning future career prospects. "I do worry about financial security during my retirement," Hoshi (aged 44) explained. "I still have to pay off our mortgage on the apartment. My husband was recently diagnosed with cancer, so he might have to retire early. He is in his mid-fifties, so the financial burden is entirely on me" (September 5, 2019). Remaining employed is essential for women to ensure security in their own retirement, especially if they are unmarried. Thus, elder care comes with increased social anxiety, and there are multiple causes of such anxieties. The mental burden placed on Japanese career women who must take care of aging relatives triggers feelings of unease and intensifies many forms of fear and insecurity, such as those voiced by Hisa (aged 43): "I'm single and my prospects of getting married do not look promising at this age. Soon, one of my parents might start requiring support, and one thing is certain—I will not send them to a nursing home. I would like to have a caregiver look after them in their own apartment, but this is an additional financial burden" (September 30, 2019). Many of my informants have encountered the expectation that they should leave full-time employment to care for aging relatives. Concern about elder care partially results from uncertainty over being able to continue one's career until retirement. Further, the tendency to relate the expectations of extended career aspirations to a sense of growth provides a logical explanation for the steady rise of career-specific anxiety post-2000 (Kawano, Roberts, and Long 2014; Lukács 2020; Nemoto 2019; Ogasawara 2019). The concept of lifetime employment is in direct conflict with the duties of filial piety, which may require individuals to abandon their careers. Even though lifetime employment in Japan is overall declining (Mathews 2014), one of the most relevant social contracts used to be the one between a large company and their employees, in which the company provides a secure lifetime employment in exchange for the employee's total dedication. Thus, the time commitment required from these employees is diametrically

opposed to what care duties might require, and this potential conflict negatively affected the work experiences of my informants.

Margaret Lock (1993) writes that according to traditional views, Japanese housewives have no need to ponder or reflect on their *ikigai*—purpose and core concept of the meaning of life (Holthus and Manzenreiter 2017; Mathews 1996, 2017)—because it is already determined by their role in the family. This conception of women’s purpose in life no longer reflects reality. My informants no longer performed roles that were predetermined in the social universe, and most were grappling with the meaning of their lives. This issue became especially acute when life events derailed their plans, as in the case of Mayumi (aged 47) and Michiko (aged 55), who suddenly found themselves caring for elder relatives, experiencing burnout, and having to quit their jobs because they could not cope with the demands of both work and caregiving. Professional women face uncertainty not only because of having to fight social norms to pursue careers in the first place but also in their hesitation to take on the care of aging family members (see also Kikuzawa 2016; Niimi 2016).

Everyday Trials and Triumphs: Robots Alleviating Anxieties About Elder Care

To illustrate how robots might be able to alleviate feelings of anxiety over caring for elder relatives, I present the case of Yoshie (aged 44), married and childless, who was working as a full-time civil servant when her father, a widower, started showing signs of dementia and required constant support and care. Since Yoshie’s husband also worked full-time, the family had to find a care solution for her father. As Yoshie explained, “I had to struggle to overcome this conflict with my inner commitment to look after my father. My parents were very devoted to us [their children] when we were young, and now that they depend on our goodwill to provide care, we push them away. Something in me says that this is deeply wrong” (March 5, 2019). Her worries reflect the inner turmoil of my informants. Yoshie initially considered organizing a home-care solution for her father, but she discovered that this option was far too expensive in the long run. Additionally, her employer offered no option for part-time work. She began to research different options for institutionalized care and finally chose a community nursing home. Yoshie felt stigmatized by her family and circle of friends for making this decision, and she found their judgment emotionally taxing.

As this example demonstrates, there is a lingering sense in Japan that elder care should be done by women at home. Alternatively, spouses should do so if they are healthy and up to the task. However, this does not apply equally to men and women. Wives are expected to care for their husbands, but husbands caring for their wives are less common. If an older wife needs care for both herself and her husband, this work is likely to be delegated to their daughter or daughter-in-law, and outsourcing such help still draws censure. Employment trends show that an increasing number of Japanese women are pursuing careers that do not allow them to quit when care work becomes a necessity; furthermore, they may in fact not wish to quit.

In a follow-up email during the summer of 2020, Yoshie explained that her father, Rintaro (aged 76), was still a resident in the nursing home and now required round-the-clock care. She now felt relieved that she had made the decision five years earlier to move him to a nursing home. “I’m glad I did that, since his care was getting progressively more intensive, and it would have become too much for me to handle on my own, let alone continue working full-time. I would have needed to sacrifice my career without the chance of coming back. My family would have approved of that choice, but what would I have been left with? I couldn’t return to my job” (August 20, 2020). To justify her choice, Yoshie explained that the nursing home had introduced robotic devices to assist with the care work. “I have seen these devices myself,” she wrote. “Rintaro is lifted onto the bed from his wheelchair by the robotic

device HUG. He told me that it hurt him less under the arms when being lifted by the robotic arm than by a human arm” (August 20, 2020).¹¹ Yoshie’s anxieties were eased by the knowledge that her father experienced lower levels of discomfort when being assisted by a robot. Even though Rintaro and Yoshie felt positive about HUG, my other informants were more inclined to describe service robots as providing “cold care” (Parks 2010; Pols 2012; Pols and Moser 2009) since they only emulate the mechanics of care providers—that is, lifting and moving bodies. Now let us turn to an example with a social robot. Yoshie explained that on her latest visit to her father, the nursing home had introduced Pepper, a social robot.



Figure 1. – Picture of Pepper in the Japanese nursing home (© Anne Aronsson).

Pepper is produced through the collaborative efforts of Aldebaran Robotics and SoftBank Mobile, which sought to develop a robot capable of emotional response. Pepper’s design enables it to replicate human facial expressions, voices, words, and body movements and to react naturally and appropriately in different interactive situations. On the market since 2014, Pepper costs 198,000 yen (USD 1,650) and has been purchased by nearly 1,000 households in Japan, with worldwide sales totaling approximately 25,000 units in 70 countries. The robot is about 120 cm tall, with a shiny white plastic body.¹² It has a human torso and a curved and solid lower half that can move easily on a wheeled base and large, wide-set eyes that blink at its interlocutor. It also has other neotenous features that humans typically consider “cute.” Additionally, Pepper has a high-pitched, childlike voice that is meant to convey trustworthiness and safety. Cameras in Pepper’s mouth and eyes enable it to collect the information needed to process data in order to “assess” human emotions. Pepper also has an interface that clearly sets it apart from humans: a tactile screen on its chest.

Yoshie’s father followed Pepper’s 30-minute exercise session and seemed to enjoy this activity. “There were about fifteen people in the common room, most of them in wheelchairs, including my father. The caregiver pressed some buttons on the robot’s chest display, and it started playing sing-along songs, followed by some light physical activity” (September 5, 2020). When I asked Yoshie how she felt about robotic care devices, especially social robots, she replied that she felt that her father was receiving what would be the future of care, a combination of human and robot care. Given Rintaro’s positive experiences of being lifted to and from bed and engaging in exercise with a robot, Yoshie felt positive

about the use of both social and service robots in her father's care. "The nursing home lacks staff, and I prefer to have my father engage with a robot than nobody at all, with an emotionally distant caretaker, or with someone who does not speak the language properly. At least, the robot is even-tempered and predictable" (September 5, 2020). This answer immediately raises many questions such as: Why is a robot perceived to be a more adequate choice than an emotionally distant human? Why is a robot's still limited communication ability deemed to be better than that of a migrant care worker? Further questions have to do with the marketing and public perceptions of these robots, as well as the concept of robotic care in general. I acknowledge these as questions that need further research and address the topic of care elsewhere (Aronsson 2020; Aronsson and Holm 2020). Here, instead, I focus on older adults' and their family caregivers' overall perceptions of what it means to interact with these devices.

Yoshie was adamant that she had made the right decision. However, when questioned further, she expressed some nagging self-doubts:

"I struggle with a bad conscience; I feel selfish. Maybe it would have been different if I did not have a career, as I would not have this other option to consider. If I was available 'on-call,' I might not have these doubts; my role would have been clear. Also, I am not really used to hands-on care. I have no children, and my husband and I have a domestic helper. It is a pity that society still expects this type of care work to be carried out by women. I just do not have it in me" (September 5, 2020).

The provision of elder care presents a significant hurdle for most professional women in Japan, especially if they have not previously cared for someone in that capacity. It is unreasonable to expect all women to have this capacity, especially in the face of shifting attitudes toward gender roles. Therefore, it may not always be in the best interest of the care recipient to be cared for by a family member. Additionally, as Yoshie's experience demonstrates, not all women can be expected to possess the skills, mentality, and attributes to successfully provide care or to have the time, inclination, or financial ability to do so.

The issue of long-term care has had a significant impact on Yoshie's life. Six other women in the sample of 12 informants suffered varying degrees of anxiety about elder care.¹³ For example, Natsuki (aged 49) said that a robotic device would ease her anxiety about moving her mother to a nursing home. "I would not mind having such a device at home if it helps me take care of my mother for a longer time before moving her to a nursing home. If I had a robotic device that would help me lift her from bed to bathtub and back, it would save me time" (June 16, 2020). According to another informant, Michiko (aged 55), her mother Eriko (aged 75) "interacts with Pepper in a nursing home and does so with ease and seems to enjoy it. It almost feels like she's interacting with an oversized doll. How different would that be? I think her comfort shows that there is nothing to worry about" (November 22, 2019) (see also Aronsson and Holm 2020). Michiko did not seem informed about the precise nature of these human-robot interactions, but when further probed, she remained steadfast in her opinion.

Better provision of care through the use of robotic devices helped lessen overall anxieties about moving relatives into nursing homes, and having such a device at home helped one respondent postpone her mother's transfer to institutionalized care and alleviated her immediate feelings of anxiety. Therefore, robotic devices can be regarded as having the potential to enhance the quality of care, thus decreasing women's anxiety about moving their relatives into institutionalized settings. The interviewees felt that robotic care would improve care provision overall, and it gave them reassurance about remaining employed and pursuing their careers. As I argue elsewhere, the perceived robotic agency in social robots such as Pepper is exactly what the developers are aiming for when they model these robots after people:

“Rather than seeing in the computer the model of the human mind, social robotics uses human social and cognitive competences as a model for the social and cognitive performances of artificial social agents” (Damiano and Dumouchel 2018, 3 quoted in Aronsson and Holm 2020). Behind the unthreatening exterior of Pepper is an emotionless machine whose functions are based on sophisticated algorithms that evoke various feelings and responses in people (Aronsson and Holm 2020). Notably, this process appears to work because people are fond of Pepper and enjoy interacting with it—as seen in the cases of Rintaro and Eriko among others (Aronsson and Holm 2020; White 2018). As for service robots, even though Rintaro had positive experiences with HUG and Natsuki expressed an interest in having a robotic device at home for her mother, these devices, as I will argue in the next sections, tend to generate anxiety among elders and even more in their family members.

The “Cold” Touch: Robots Exacerbating Anxieties About Elder Care

Late one evening, Mayumi (aged 47), the managing director at an investment bank, was going through the tasks she needed to accomplish in the week ahead. These included preparing meetings, writing a client report, and submitting human resource evaluation forms from her team members. She also had to find time to look after her mother-in-law, Tamako (aged 89). Her husband was the eldest of four sons, and as traditional Japanese values dictate, his wife was obligated to look after her in-laws (see also Long 2008; Long et al. 2009). Mayumi’s father-in-law had passed away several years earlier, and she considered it her obligation to take care of her mother-in-law. Her own parents remained independent and did not require care, but the impending necessity of caring for her own parents in the future, in addition to her mother-in-law who lived with Mayumi and her husband, weighed heavily on her, causing her sleepless nights.

At that time, Mayumi’s daily schedule included looking after Tamako early in the morning before leaving for work and caring for her again in the evening. Tamako required a relatively low level of assistance because she could still manage her usual daily routines, such as going to the toilet, bathing, and eating on her own. Nonetheless, she had begun to show signs of dementia, and Mayumi started to feel the burden of her obligation as Tamako slowly became less independent. Mayumi developed a sleeping disorder, and her work also became more of a burden. At times, she feared that she was beginning to suffer from burnout because her resilience, the source of the inherent energy that she could always rely on, had started to decline. In her interview, Mayumi confided that she had spoken with her husband about this, assuring him that she would prioritize Tamako over her work, but she wanted to be respectful. Mayumi feels confused about her own feelings and she would prefer not to give up her job only to provide care for her mother-in-law at home since she worked hard to establish a career. She also thinks about her own aging parents and is overcome with anxiety since she is an only child.

I could not send them to a nursing home and choose to look after Tamako instead; it would break me. So far, Tamako is still quite independent, but she has been showing signs of dementia, and at some point, she will need help with basic tasks, like going to the toilet and taking a shower. I am now living with the constant fear that this situation will come sooner than expected, and then what? I would have to quit my job since, at my stage, I cannot work part time. But what is the point of working to get where I am now and then just giving it up? Maybe, in the beginning, I could look after Tamako, but once she requires more intensive care, I would look for other options and maybe put her in a nursing home. I know of friends who suffered burnout after years of elder care; the job is tough, both physically and mentally. These women endured, but there inevitably comes a breaking point. Secretly, I have already checked out nursing homes to ease my anxiety but have not shared it with my husband yet. I feel so guilty about it, but why are we women even in this situation in the first place? (May 16, 2019)

Mayumi's reflections on elder care are similar to those of the other women in this age group, who expressed a combination of uncertainty and fear, concerns about the lack of institutionalized care, and worries about putting aging parents and in-laws in nursing homes.

I met Mayumi again later in 2019. Tamako's care situation had rapidly worsened, and she and her husband decided to move Tamako into a private nursing home (in downtown Tokyo) that provided robotic care in the form of both service and social robots. "You know, from the beginning, I was hesitant to have Tamako taken care of by 'artificial hands.' It felt unnatural and cold to me. But then I saw the device that lifted Tamako in and out of the bathtub. She didn't complain, and she seemed in no pain or discomfort, but I felt this guilt resurfacing. I felt so lonely when I saw this" (September 17, 2019). As for the social robot group activation exercise, Tamako seemingly enjoyed the activity with the humanoid robot PALRO, but she was more hesitant to participate in following along in physical exercise and sing-alongs. "One of the caregivers told me that my mother did not follow the exercises," Mayumi explained, "and one day I witnessed the interaction. I must say, what I saw was both encouraging and frightening at the same time. Tamako cannot articulate how she feels about PALRO, but I find singing along with a robot less troublesome than being lifted in and out of bed" (August 26, 2020). When I asked her why, Mayumi replied that even though service robots were adopted in nursing homes prior to the introduction of social robots, the latter seem more technologically advanced and, because of their friendly demeanors and gentle gestures, they appear less "cold" than the former, which only emulate human mechanical functions.

Three other interviewees were similarly skeptical and uncomfortable over the use of robotic devices in care work. Their doubts and heightened anxiety over using technological assistance in institutional care were even causing them to question their career choices. Hanako (aged 54) made her concerns clear: "I feel inadequate. I was taken care of by my parents, and now, I not only rely on institutional care, but my mother is also a guinea pig of robotic care devices. It makes me even more stressed out as I feel guilty about my life choices" (September 17, 2019). A few months later, she said, "I think these devices do not improve care. They actually decrease the quality of care. In an automobile factory, you can have a robot assemble a car. But care work is intimate; nothing overrides human care" (December 2, 2019). Other interviewees perceived robotic care as "cold care" rather than the "warm care" (Parks 2010; Pols 2012; Pols and Moser 2009) provided by human caregivers. In other words, these women and their charges seemed to perceive care robots as "cold," "mechanical," and generally inferior to humans. Their reservations were leading to a particular strain of anxiety over the idea that robotic care is undignified and a poor replacement for human care.

The deep-seated anxiety these professional women experienced had to do with the conflict between caring for aged relatives and fulfilling their professional obligations. The interviewees described feeling torn between their career obligations, which felt self-indulgent, and their socially based obligations to their older relatives. This conflict reveals the lack of a straightforward solution to this problem because institutionalized care remains unconventional in Japan, despite its increasing availability and the lower levels of social stigma now attached to it (Yamato 2006). Furthermore, this type of care is now increasingly enhanced through the use of robotic care devices in both nursing homes and, to a lesser extent, private homes (Hatano 2018; Ishiguro 2018; Robertson 2018; Šabanovic 2010; Wright 2018). More research is needed to understand the introduction and use of these devices in noninstitutionalized settings, where guidance and surveillance involve more coercion.¹⁴

Robotic Elder Care as a Way Out of Anxiety

Changing norms affect all aspects of the social fabric, including the social roles of the elderly and those who care for them. The interviewees reflected on the role of family caregiver as one that had become diminished and less clearly defined in modern Japan. As such, they tended to perceive themselves as having been placed in “role-less roles” (Burgess 1960). In addition to the issue of changing and blurred social roles, caregiving is associated with isolation, fear of losing one’s purpose in life, and a loss of freedom. The strong grip this issue has on people’s minds has to do with its tangible presence in modern Japanese society and its correlation with several deep existential questions the country faces. The larger and most acute question for society is how to care for a growing aging population in the face of a declining workforce. However, on the level of individual caregivers, the primary issue is how to address anxieties over the ability to live a good life while still ensuring that their elders receive good care.

A possible way to address family caregivers’ anxieties over the use of technologies to care for the elderly is to examine the levels of anxiety associated with the use of service and social robots. Robotic devices can be viewed as part of a package of solutions that could potentially help Japanese women make decisions regarding their lives, careers, and caregiving obligations. Solutions of this kind expand the available range of public care services and nursing home facilities available and serve as options for a society dealing with increased dependency while also adjusting to new norms around women’s roles in the workforce.

Exploring care robots and anxiety over their use as intertwined concepts underlines an important aspect of what it means to lead a good life in Japan: caring for aging relatives is a central value for the majority of people of all generations. Understanding caregivers’ anxieties on an individual level first entails recognizing the values that individuals believe are under threat.¹⁵ The interviewees in this study valued their careers and social status, and they expressed concerns that these were under threat because of their expected role as caregivers. Their anxieties also related to a general sense of insecurity connected to Japan’s general reevaluation of its core values and direction, a source of unease across the society.

As the ethnographic vignettes illustrate, robots have the potential to both alleviate and increase anxiety among those in need of care, their families, and their caregivers. As a result, the introduction of new technologies is associated with both anxiety over the failure to fulfill caregiving roles and the expectation of improving lives and relieving people of some of the indignities of aging. In the case of professional women, although the introduction of care robots can help alleviate some feelings of anxiety, it may aggravate others by creating feelings of personal inadequacy. While technological innovations appear to have the potential to restore the status of both older adults and their family caregivers, it is too early in the use of such technologies to draw any firm conclusions. Elder care could play a leading role in social change since technoliberal logics attach notions of freedom and feeling human to technological developments (Atanasoski and Kalindi 2019, 407). Thus, robot-assisted care might help working women continue to pursue their careers, certain in the knowledge that their relatives are receiving the best care possible, and if these devices are used in private homes, they may allow the elderly to continue living autonomously for a longer period. Confronting the personal and societal anxieties and insecurities around the use of robotic care devices might lead to the creation of clearer social roles that can remove the burden of caregiving from the shoulders of women alone.

Nevertheless, critics argue that robots and AI-assisted technological devices cannot meet the deep human need for genuine contact with other human beings. In other words, robotic devices can only provide “shallow care” (Coeckelbergh 2010, 182), and even the most sophisticated robot cannot provide the kind of authentic, honest, human relationship that older people need to thrive. However, advancements in intelligent machine technology are redefining how people interact with technology (Aronsson and Holm 2020; Lukács 2020), and as anthropomorphic robots proliferate, growing numbers

of people in Japan are becoming emotionally attached to these machines. As the availability of sophisticated electronic devices continues to increase, this phenomenon will likely expand in Japan and globally.

Social robots such as Pepper¹⁶ currently cannot act based on either inner states or outward expressions, and service robots such as HUG can only emulate the mechanics of human movements. Indeed, these machines highlight new epistemic possibilities for caregiving that are in contrast to actual human companionship and care work, which is widely considered a more authentic experience. But as robotic care devices become more accurate in simulating the semantics and gestures of human interaction, people might begin to accept their authenticity in the same way that they accept the idea that their human partners are emotionally devoted to their well-being. Those receiving care might be just as likely to question the sincerity of those offering care out of a sense of duty as they are to believe in the sincerity of social robots (Aronsson 2020). Furthermore, the interviews uncovered another crucial aspect of anxiety over using technological devices for elder care: a comparison of the 2019 interviews with those from 2009, when social robots had not yet been introduced, revealed that much of the anxiety around care technologies focuses on the use of service robots. Although one might expect the newer technology, social robots, to be the source of the most anxiety among professional women who find themselves responsible for the care of older relatives, this study found the opposite to be true.

Care robots step in to function as surrogates for humans in labor and social contexts, enabling the formation and consolidation of neoliberal subjects—in this case, Japanese professional women—whose freedom is only made possible through the gendered unfreedom of the surrogate, the robotic device (Atanasoski and Kalindi 2019, 188). In their current stage of development, robots might contribute to feelings of anxiety over the adequacy of the care they provide; however, over time, robot imaginaries might become increasingly accepted since technological objects comprise a “shorthand for what the future should look like [as they] inherit liberalism’s version of an aspirational humanity such that technology now mediates the freedom–unfreedom dynamic that has structured liberal futurity” (Atanasoski and Kalindi 2019, 377–378). As demonstrated here, the use of social robots proved helpful in alleviating anxieties associated with balancing careers and a caretaking role, while service robots tended to exacerbate these anxieties. Nevertheless, more research is needed to determine whether this distinction holds over time in connection with changes in technologies, such as the possibility of new technologies that combine the roles and abilities of service and social robots to overcome distrust over “cold care.”

Notes

1. See also Robertson (2007) on household robots that are imagined to serve as surrogate housewives.
2. For media reporting on this change, see <<https://www.nytimes.com/2018/12/07/world/asia/japan-parliament-foreign-workers.html>> and <<https://www.washingtonpost.com/world/2021/11/18/japan-labor-shortage-immigration/>>
3. The Ministry of Economy, Trade, and Industry is promoting development of care robots and has provided 4.7 billion yen (USD 45 million) in subsidies since 2015. The Labor Ministry has spearheaded the spread of robots and in 2017 introduced them into 5,000 facilities nationwide at a cost of 5.2 billion yen (USD 50 million). There is no government data on how many care facilities use robots. The robotic therapy seal PARO costs 400,000 yen (USD 3,800) in Japan and about EUR 5,000 in Europe. Panasonic’s robotic Resyone bed costs 900,000 yen (USD 8,600), and Cyberdyne’s Hybrid Assistive Limb (HAL) exoskeleton costs 100,000 yen (USD 950) a month to rent.

4. Even though technoliberalism connects technological development to a future-oriented humanity in which gender, race, and labor might be overcome, this ideology hides the way it operates through a hidden grammar, that which Atanasoski and Vora (2019) term the “surrogate human effect.”
5. As James Wright (2018) writes, care workers often complain of back pain related to their job’s “3 K” conditions (*kitsui, kitanai, kiken*: difficult, dirty, and dangerous).
6. Bed sensors (*mimamori*) are widely used throughout nursing homes in Japan. Especially in the evenings, when nursing homes tend to be understaffed, bed sensors help care workers to complete their work. A HUG robot costs 1.44 million yen (USD 12,700) over five years (see also Wright 2018), and Cyberdyne’s lumbar device costs 158,400 yen (USD 1,400) to rent for three months.
7. The concept of the Japanese-style welfare society was developed by policy advisors close to Prime Minister Masayoshi Ōhira during his administration (1978-1980). As Ito Peng (2003) explains, in the 1990s, the Japanese-style welfare society became increasingly incompatible with the reality of Japanese family life. Given the decline in multi-generational households and the increase in the number of elderly people living alone or with only their spouses, Japanese families were in the process of “defamilializing,” contrary to the rhetoric of the Japanese-style welfare society. Thus, the combination of demographic aging and changes in gender relationships significantly affected shifting understandings of social care and the role of civil society in social policy development.
8. Even in Japan, individuals living in disadvantaged neighborhoods—characterized by an increased level of poverty—might be associated with weaker social ties, reduced physical activity, health problems, mobility limitations, increased levels of stress, and problems accessing health care.
9. Between 1950 and 1975, Japan’s working-age population increased from 50 to 75 million before peaking at 87 million in 1995. Since then, it has decreased by 1 percent per year, a pattern typical of an aging society (Ministry of Health, Labor, and Welfare 2018). Between 1970 and 2000, the life expectancy rate at retirement increased by one third for both Japanese men and women. In comparison, in 1935, only one third of Japanese people survived to reach the retirement age of 65. The average life expectancy at birth has steadily increased and is now approximately 88 years. By 2010, 30 million (23 percent) of Japan’s 127.5 million citizens were over the age of 65, while the fertility rate was only 1.2, making Japan the most aging country in the world. By 2050, more than one third of the Japanese population is projected to be 65 years or older (Coulmas and Lützel 2011). This population pyramid is unprecedented (Hirayama 2010). Japan’s working population must pay increasingly higher taxes to support the growing elderly population, and by 2030, Japan’s working population is predicted to be only 67 million (Fujita 2015; Hamada and Kato 2007).
10. It is not uncommon for professional women in Japan, China, Hong Kong, and Korea to hire someone to clean their homes once or twice a week or to have part-time help with older relatives living at home.
11. See also Wright (2018) in his discussion on tactile care and robot HUG, “[t]he moment of lifting and being lifted can reveal physical discomfort as well as fear of inflicting or receiving injury for both carer and resident, particularly if someone either is not used to the operation or if the carer doubts his or her own strength” (8).
12. For more information about Pepper see <<https://www.softbankrobotics.com/emea/en/pepper>>
13. Four of these six had close relatives (*a* mother, father, or spouse) in nursing homes, and they were all relatively accepting of robotic care devices.
14. As I have discussed elsewhere (Aronsson and Holm 2020), in a group activity with the social robot PALRO, some residents required no additional encouragement to interact with the robot, while others required ongoing caregiver work to motivate them to interact and participate in the activities.
15. As I argue elsewhere, the elderly are less accustomed to using technological devices to substitute for in-person interactions than the younger generation. Detrimental effects of these devices on the elderly may therefore be hard to assess (Aronsson and Holm 2020).
16. Although sincerity in delivering care and companionship is something social robots merely perform, that does not rule out their ability to positively impact humans. Humans are accustomed to pretense in their daily interactions and know how to treat expressed feelings as genuine in order to maintain social relations (Goffman

1969). Humans' capacity to restore failed or imperfect presentations of the self by others may be at the root of accepting machines as intentional caregivers, despite knowing that these are machines programmed to act as if they care.

References

- Aronsson, Anne Stefanie. 2020. "Social Robots in Elderly Care: The Turn Toward Emotional Machines in Contemporary Japan," in special issue "Relations, Entanglements, and Enmeshments of Humans and Things: A Materiality Perspective." *Japanese Review of Cultural Anthropology* 21(1): 421–455. https://www.jstage.jst.go.jp/article/jrca/21/1/21_421/pdf
- Aronsson, Anne Stefanie, and Fynn Holm. 2020. "Conceptualizing Robotic Agency: Social Robots in Elder Care in Contemporary Japan." In special issue "Finding Agency in Nonhumans." *Relations: Beyond Anthropocentrism* 8 (1–2): 17–35. <https://www.ledonline.it/index.php/Relations/article/view/2462>
- Atanasoski, Neda and Vora Kalindi. 2019. *Surrogate Humanity: Race, Robots, and the Politics of Technological Futures*. Durham, NC: Duke University Press.
- Breazeal, Cynthia. 2004. *Designing Sociable Robots*. Cambridge, MA: The MIT Press.
- Brooks, Rodney. 2003. *Flesh and Machines: How Robots Will Change Us*. New York, NY: Vintage.
- Buch, Elena. 2015. "Anthropology of Aging and Care." *Annual Review of Anthropology* 44 (1): 277–293.
- Burgess, Ernest W. 1960. "Roleless Role of the Aging." *Aging in Western Culture*. Chicago, IL: University of Chicago Press.
- Cabinet Office for Gender Equality. 2016. *The Fourth Basic Plan for Gender Equality*. [Accessed August 18, 2021] http://www.gender.go.jp/about_danjo/basic_plans/4th/pdf/2-02.pdf
- Cabinet Office, Government of Japan. 2020. *Annual Report on the Ageing Society*. [Accessed August 18, 2021] <https://www8.cao.go.jp/kourei/english/annualreport/2020/pdf/2020.pdf>
- Coeckelbergh, Mark. 2010. "Health Care, Capabilities and AI Assistive Technologies." *Ethical Theory and Moral Practice* 13 (2): 181–190.
- Coulmas, Florian, and Ralph Lützel, eds. 2011. *Imploding Populations in Japan and Germany: A Comparison*. Boston, MA: Brill.
- Damiano, Luisa, and Paul Dumouchel. 2018. "Anthropomorphism in Human-Robot Co-Evolution." *Frontiers in Psychology* 9: 468. <https://doi.org/10.3389/fpsyg.2018.00468>
- Danely, Jason. 2014. *Aging and Loss: Mourning and Maturity in Contemporary Japan*. New Brunswick: Rutgers University Press.
- Dumouchel, Paul and Luisa Damiano. 2017. *Living with Robots*. Cambridge, MA: Harvard University Press.
- Goffman, Erving. 1969. *The Presentation of Self in Everyday Life*. London: Allen Lane The Penguin Press.
- Fujita Takanori. 2015. *Karyū Rōjin: Ichioku Sōrōgo Hōkai no Shōgeki [Downstream Elderly: Impact of Collapse of 100 Million Retirees]*. Tōkyō: Asahi Shinbun Shuppan.
- Hamada, Koichi, and Kato Hiromi, eds. 2007. *Aging and the Labour Market in Japan: Problems and Policies*. Cheltenham, PA: Edward Elgar.
- Hamaguchi, Keiichiro. 2019. "How Have Japanese Policies Changed in Accepting Foreign Workers?" *Japan Labor Issues* 3 (14): 2–7.
- Haraway, Donna. 2003. *The Companion Species Manifesto: Dogs, People, and Significant Otherness*. Chicago, IL: Prickly Paradigm Press.
- Hatano Aiko. 2018. "Zaitaku Hitorigurashi Kōrei-sha no Nichijō Seikatsu ni Okeru Ningyō Robotto no Yakuwari" [The Role of Doll Robots for the Elderly Living Alone in Japan]. *Core Ethics* 14: 211–222.

- Helmreich, Stefan. 1998. *Silicon Second Nature: Culturing Artificial Life in a Digital World*. Berkeley, CA: University of California Press.
- Hirayama, Yosuke. 2010. "The Role of Home Ownership in Japan's Aged Society." *Journal of Housing and the Built Environment* 25 (2): 175–191.
- Ho, Swee-Lin. 2018. *Friendship and Work Culture of Women Managers in Japan: Tokyo After Ten*. New York, NY: Routledge.
- Holthus, Barbara and Wolfram Manzenreiter, eds. 2017. *Life Course, Happiness and Well-Being in Japan*. New York, NY: Routledge.
- Ingold, Tim. 2012. "Toward an Ecology of Materials." *Annual Review of Anthropology* 41: 427–442.
- Ishiguro, Nobu. 2018. "Care Robots in Japanese Elderly Care: Cultural Values in Focus." In *The Routledge Handbook of Social Care Work Around the World*. Edited by Karen Christensen and Doria Pilling, 256–270. London: Routledge.
- Jenike, Brenda R. and John W. Traphagan. 2009. "Transforming the Cultural Scripts for Aging and Elder Care in Japan." In *The Cultural Context of Aging: Worldwide Perspectives*. Edited by Jay Sokolovsky, 240–258. Westport: Praeger.
- Kavedžija, Iza. 2016a. "Introduction: Reorienting Hopes." *Contemporary Japan* 28 (1): 1–11.
- . 2016b. "The Age of Decline? Anxieties About Aging in Japan." In *Ethnos: Journal of Anthropology*. 81 (2): 214–237.
- Kawano Satsuki, Glenda S. Roberts, and Susan Orpett Long, eds. 2014. *Capturing Contemporary Japan: Differentiation and Uncertainty*. Honolulu: University of Hawai'i Press.
- Kikuzawa, Saeko. 2016. "Social Support and the Mental Health of Family Caregivers: Sons and Daughters Caring for Aging Parents in Japan." *International Journal of Japanese Sociology* 25 (1): 131–149.
- Latour, Bruno. 2005. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.
- Lock, Margaret. 1993. *Encounters with Aging: Mythologies of Menopause in Japan and North America*. Berkeley, CA: University of California Press.
- Long, Susan Orpett, Ruth Campbell, and Nishimura Chie. 2009. "Does It Matter Who Cares? A Comparison of Daughters Versus Daughters-in-Law in Japanese Elder Care." *Social Science Japan Journal* 12 (1): 1–21.
- Long, Susan Orpett. 2000. *Caring for the Elderly in Japan and the US: Practices and Policies*. New York, NY: Routledge.
- Long, Susan Orpett. 2008. "Someone's Old, Something's New, Someone's Borrowed, Someone's Blue: Changing Elder Care at the Turn of the 21st Century." In *Imagined Families, Lived Families*, edited by Akiko Hashimoto and John W. Traphagan, 137–157. Albany, AL: State University of New York Press.
- Long, Susann Orpett. 2014. "The Aging of the Japanese Family: Meanings of Grandchildren in Old Age." In *Capturing Contemporary Japan: Differentiation and Uncertainty*. Edited by Satsuki Kawano, Glenda S. Roberts, and Susan Orpett Long, 183–201. Honolulu: University of Hawai'i Press.
- Lukács, Gabriella. 2020. *Invisibility by Design: Women and Labor in Japan's Digital Economy*. Durham, NC: Duke University Press.
- Mathews, Gordon. 1996. *What Makes Life Worth Living? How Japanese and Americans Make Sense of Their Worlds*. Berkeley, CA: University of California Press.
- Mathews, Gordon. 2014. "Being a Man in a Straitened Japan: The View from Twenty Years Later." In *Capturing Contemporary Japan: Differentiation and Uncertainty*. Edited by Satsuki Kawano, Glenda S. Roberts, and Susan Orpett Long, 60–80. Honolulu: University of Hawai'i Press.

- Mathews, Gordon. 2017. "Happiness Pursued, Abandoned, Dreamed of, and Stumbled Upon: An Analysis of Twenty Japanese Lives Over Twenty Years." In *Life Course, Happiness and Well-Being in Japan*. Edited by Barbara Holthus and Wolfram Manzenreiter, 189–201. London: Routledge.
- Ministry of Labor, Health, and Welfare (MLHW). 2018. "Fukushi yōgu kaigo robotto no kaihatu to fukyū" [*Development and Spread of Welfare Equipment and Care Robots*]. [Accessed June 18, 2021] <http://www.techno-aids.or.jp/robot/file30/01kaihatu.pdf>
- Müller, Simone and Heidi Tworek. "Imagined Use as a Category of Analysis: New Approaches to the History of Technology." *History and Technology* 32 (2): 105–119.
- Nemoto Kumiko. 2016. *Too Few Women at the Top: The Persistence of Inequality in Japan*. Ithaca, NY: Cornell University Press.
- Nemoto Kumiko. 2019. "Why Women Won't Wed." In *Beyond the Gender Gap in Japan*. Edited by Gill Steel, 67–82. Ann Arbor, MI: University of Michigan Press.
- Niimi Yoko. 2016. "The 'Costs' of Informal Care: An Analysis of the Impact of Elderly Care on Caregivers' Subjective Well-Being in Japan." *Review of Economics of the Household* 14 (4): 779–810.
- Ochiai Emiko. 2003. "Post-War Transition in the Japanese Family." In *Women in Japan and Sweden: Work and Family in Two Welfare Regimes*. Edited by Carl le Grand, Toshiko Tsukaguchi-le Grand, 137–166. Stockholm: Almqvist & Wiksell International.
- Ogasawara Yuko. 2016. "The Gender Triad: Men, Women, and Corporations." In *Power in Contemporary Japan*, 167–182. New York, NY: Palgrave Macmillan Press.
- Ogasawara Yuko. 2019. "Working Women's Husbands as Helpers or Partners." In *Beyond the Gender Gap in Japan*. Edited by Gill Steel, 25–49. Ann Arbor, MI: University of Michigan Press.
- Parks, Jennifer A. 2010. "Lifting the Burden of Women's Care Work: Should Robots Replace the 'Human Touch'?" *Hypatia* FEAST Special Issue 25 (1): 100–120.
- Peng, Ito. 2003. "Pushing for Social Care Expansion: Demography, Gender, and The New Politics of the Welfare State in Japan." *American Asian Review* 21 (2): 25–55.
- Pols, Jeannette and Ingunn Moser. 2009. "Cold Technologies Versus Warm Care? On Affective and Social Relations with and Through Care Technologies." *Alter* 3 (2): 159–178.
- Pols, Jeannette. 2012. *Care at a Distance: On the Closeness of Technology*. Amsterdam: Amsterdam University Press.
- Richardson, Kathleen. 2015. *An Anthropology of Robots and AI: Annihilation Anxiety and Machines*. New York, NY: Routledge.
- Roberts, Glenda. 2011. "Salary Women and Family Well-Being in Urban Japan." *Marriage & Family Review* 47 (8): 571–589.
- Roberts, Glenda. 2014. "Work and Life in Challenging Times: A Kasai Family Across the Generations." In *Capturing Contemporary Japan: Differentiation and Uncertainty*. Edited by Satsuki Kawano, Glenda S. Roberts, and Susan Orpett Long, 27–59. Honolulu: University of Hawai'i Press.
- Robertson, Jennifer. 2007. "Robo Sapiens Japonicus: Humanoid Robots and the Posthuman Family." *Critical Asian Studies* 39 (3): 369–398.
- Robertson, Jennifer. 2018. *Robo Sapiens Japonicus: Robots, Gender, Family, and the Japanese Nation*. Oakland, CA: University of California Press.
- Robertson, Jennifer. 2021. "Gendering AI and Robots: Robo-Sexism in Japan." Online lecture, [Accessed February 25, 2021], *The University San Francisco Center for Asia Pacific Studies*.
- Rose, David. 2015. *Enchanted Objects: Innovation, Design, and the Future of Technology*. New York, NY: Scribner.
- Šabanović, Selma. 2010. "Robots in Society, Society in Robots Mutual Shaping of Society and Technology as a Framework for Social Robot Design." *International Journal of Social Robotics* 2: 439–450.

- Takagi Emiko and Yasuhiko Saito. 2019. "Japanese Older Adult's Loneliness, Family Relationships and Mortality: Does One's Living Arrangement Make a Difference?" *Geriatrics & Gerontology* 20 (2): 156–160.
- Traphagan, John, and John Knight. 2003. *Demographic Change and the Family in Japan's Aging Society*. Albany, GA: State University of New York Press.
- Wagner, Cosima. 2010. "'Silver Robots' and 'Robotic Nurses? Japanese Robot Culture and Elderly Care." In *Demographic Change in Japan and the EU. Comparative Perspectives*. Edited by Annette Schad-Seifert and Shingo Shimada, 131-154. Düsseldorf: Düsseldorf University Press.
- Wright, James. 2018. "Tactile Care, Mechanical Hugs: Japanese Caregivers and Robotic Lifting Devices." *Asian Anthropology* 17 (1): 24–39.
- Wu, Yongmei. 2004. *The Care of the Elderly in Japan*. London: Routledge Curzon.
- Yamato Reiko. 2006. "Changing Attitudes towards Elderly Dependence in Postwar Japan." *Current Sociology* 54 (2): 273–291.