

Chapter 2

Sociable Robots for Later Life: Carebots, Friendbots and Sexbots



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2.1 Introduction

How should we design a robot for Mary, a care-dependent older adult who lives alone? Consider three options.

1. *Carebot*. Carebot is a robotic caregiver that can assist with activities of daily living, which include eating, bathing, dressing, toileting, transferring, ambulating, and continence.
2. *Friendbot*. Friendbot is a robot that can do everything a carebot does, plus be sociable and promote human-robot bonding. For example, it looks at Mary with doughy eyes, a sweet face, and encouraging words; smiles and speaks softly; sings songs Mary likes and invites her to sing along; offers Mary chances to engage in ways she enjoys, such as going outside, playing pinochle, and humming songs.
3. *Sexbot*. Sexbot is a robot that does everything friendbot does, plus behaves sexually and enables Mary to be sexual. For example, it lifts Mary with soft cushiony fabric arms she likes to touch and stroke; massages her; invites her to cuddle and sit close; touches and pats her as it passes by; inquiries about Mary's sexual feelings; and stimulates her breasts and genitals while asking what she does and does not like. It can learn Mary's sexual preferences and tailor what it offers to match.

All three robots rely on artificial intelligence (AI) to learn individual facts about a user's personality and preferences, gathering data while in the user's presence, then adapting itself to meet user wishes. Prior to deployment, each is trained using a big data set with key features expected to resemble the end users. In this case, the data set would be like Mary: a eighty-two-year-old Caucasian middle class woman who lives

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alone and recently lost a spouse. If the carebot were selected, its job would involve becoming well acquainted with Mary's bodily functions and daily routines in order to assist her with activities of daily living. A carebot would offer Mary opportunities to be healthy, exercise bodily integrity, and regulate her environment. If the friendbot were chosen, it would get to know Mary's personality and feelings in order to build rapport, eventually acquiring "interests" of its own that align with Mary's and behaving like a dear friend. Friendbot would offer opportunities carebot could not, such as chances to affiliate and be less lonely, express emotions, and maintain mental health. Finally, if sexbot were selected, it would add to friendbot's offerings the ability to meet Mary's sexual needs. In Mary's case, sexbot would offer chances to renew important parts of her life she may miss, such as her ability to function sexually and feel intimate. Despite enjoying sex, Mary's sex life has all but disappeared since the loss of her spouse. Post-stroke, she might be less inclined to look for a new partner because her body feels different. She may also be less confident about her body image, due to hemiplegia (one-sided paralysis), and she may have trouble speaking clearly, making her self-conscious and less apt to speak. For these reasons, Mary's social isolation is unlikely to abate, which makes it difficult for Mary to meet and get to know a human sex partner.

Which robot would Mary prefer? This might depend on further facts about Mary. Suppose Mary's situation is something like the following.

The Case of Mary. Mary is an eighty-two-year-old woman with cardiovascular disease who had suffered an ischemic stroke two months prior to submitting an application for a home robot. The stroke left Mary unable to speak coherently, ambulate, and move the right side of her body. She takes Plavix for secondary stroke prevention. One-month post-stroke, Mary's spouse of twenty-three years had a cardiac arrest and died suddenly. Mary was recently diagnosed with depression and her primary care provided prescribed Prozac.

Mary's former spouse functioned for many years as Mary's caregiver, and did so even more intensely in the aftermath of her stroke. He helped her move from place-to-place, dress, eat, and bathe, as carebot would do. He also took her outdoors on walks, held her hand, and hummed music she enjoyed, like friendbot would do. Mary's spouse was sexually intimate with her as well, like sexbot would offer. Despite Mary's functional limitations post-stroke, he had unflinchingly communicated that she was desirable, which helped Mary to feel good about her body and derive pleasure from it.

Given Mary's situation, what would be the best robot for her? It might be to try a sexbot, because that would come closest to returning her to the baseline she previously enjoyed. A sexbot would carry a number of advantages. First, it would treat Mary as more than a body to clean and feed. A smartly designed sexbot could affirm her emotions, meet her needs for companionship, and invite her to show and feel intimacy. It would do this by hugging, patting, nuzzling, tickling, rubbing, massaging, and arousing Mary. While a carebot would keep Mary safe and a friendbot would offer her company, a sexbot would affirm her sexually, which was an important source of meaning and value in Mary's life until recently.

There are many older adults like Mary, who suffer chronic progressive diseases, experience disabilities, have lost a life-long partner, live alone, and are without sex partners. Although a great deal of attention has been paid in the scholarly literature to

the needs of older age groups for long-term supportive care services to assist with activities of daily living, relatively less attention has been devoted to supporting other central human capabilities. Yet, clearly, as *human beings*, older adults have many central capacities beyond bodily functions. To lead *dignified* lives, Mary and others in her situation need more than help dressing, eating and going to the toilet. They also need support for a range of central human capabilities, such as exercising senses, imagination and thought; affiliating; feeling and expressing a range of human emotions; being intimate; and playing, laughing, and feeling good about themselves.

This chapter makes the case that societies ought to make reasonable efforts to support these and other central human capabilities at a floor level. Its focus is designing and deploying robotic caregivers (carebots) for care-dependent older adults; robotic friends (friendbots) for socially isolated older individuals, and sex robots (sexbots) for older people without sex partners. The chapter's central argument holds that omitting such support not only *harms* older adults but poses threats to their *dignity*. Throughout the chapter my focus will be applying a capability conception of human dignity, rather than defending it, which I have done at length elsewhere (Jecker 2020a).

The argument unfolds stepwise. (1) First, the chapter establishes that assisting older adults to perform activities of daily living is integral to respecting dignity. At stake are central human capabilities such as health, bodily integrity, and control over the immediate physical environment. Here, the argument establishes the vital role that carebots-of-the-future might play in aged societies as the supply of working age adults falls shy of demand. (2) Next, the chapter extends this analysis to designing friendbots for socially isolated older adults. Friendbots could be made to support older adults' floor level central capabilities in areas such as feeling a range of human emotions, affiliating with others, and playing. Unlike carebots, friendbots offer friendship. The argument holds that reasonable efforts to provide access to friendbots for socially isolated adults is a societal responsibility. (3) Finally, the chapter applies similar reasoning to show that societies ought to make reasonable efforts to support sexual capabilities for older adults who want to be sexual but are bereft of sex partners. In these instances, central human capacities at risk include bodily integrity; intimate relationships; and the use of senses, imagination and thought. The type of robot needed to respect dignity in a particular case depends on the particular features and context of the care recipient. For someone who is physically disabled but has a strong human social network, a carebot may suffice. For others, social isolation will give strong reasons for favoring a friendbot. Finally, a person who is socially enmeshed in the lives of others, such as children and grandchildren, yet sexually alone, might prefer a sexbot.

2.2 The Argument for Carebots

The Case of Adolfo. Adolfo is ninety-four-year-old man who is frail and needs help with most of his activities of daily living. He was diagnosed with degenerative joint disease ten years prior. He lacks mobility and requires help ambulating and transferring due to balance

problems. Adolfo has had compression fractures that reduce his mobility and cause pain. He cannot safely bathe or dress without help. He lives in a small village in southern Italy, where his daughter cares for him, but now she has taken a job and is less available than she was in the past.

Adolfo might benefit from a carebot to help him perform activities of daily living that he is unable to perform safely or at all on his own. Although supportive services for care-dependent older adults like Adolfo have historically been provided by unpaid female family members, family caregiving is fast becoming unsustainable. First, as societies age, families age too and there are fewer working age adults to care for a growing numbers of older family members. Italy is a case in point. It is currently the third most aged society, with 27% of people sixty-five years of age or older (United Nations 2017). Second, as more women around the globe gain opportunities outside the home for education and paid employment, fewer are available to offer loved ones 24-hour unpaid caregiving support. Third, many families cannot afford to have a working age adult stay at home. Finally, reliance on family members is incomplete, because not everyone has children and among those who do, not all grown children are available to serve as caregivers for aging parents. All things considered, families alone are inadequate to meet the rapidly growing demand for caregivers.

One response to such challenges is importing people from low- and middle-income countries to serve as live-in aides for elderly family members. Migrant caregivers are common in Italian homes such as Adolfo's, and across other high-income regions in northern, southern, and Western Europe, North America, and the Arab states (International Labour Organization 2018). Should Adolfo employ a migrant caregiver? One argument that tells against this approach is that it contributes to the larger practice of *global care chains*, which involve the transfer of care workers from one country to another, typically young women traveling from poorer nations to high-income nations to sell low-wage care services that middle-class families in high-income countries can afford. While a migrant care force has helped take the pressure off family members in receiving nations, it is not without drawbacks. First, it raises ethical concerns because recruiting agencies, family sponsors, and sending and/or receiving nations often fail to protect migrants' fundamental dignities (Jecker and Chin 2019). For example, exclusion from legal protections afforded citizens may leave migrant workers without official recourse when employers engage in inhumane practices, such as wage theft (withholding, delaying, or underpaying wages); demanding round-the-clock work; or not granting time off for public or religious holidays.

Another worry is that poorer nations are increasingly facing their own population aging, which is being exacerbated by net emigration of working age people. When this occurs, the movement of working age adults to richer nations will increasingly create care gaps in sending nations (Gordon 2011). Although today, the oldest societies are in places like North America and Europe, by 2050, many more societies will join the ranks of the aged. This will occur in Latin America, Africa, and Asia (Adioetomo and Mujahid 2014). Anticipating care gaps in poorer sending nations, the World Health Organization urges wealthier nations to take steps to avoid

practices that create or exacerbate care gaps (2002). All things considered, migrant and family caregiving cannot meet the growing demand for caregivers for care-dependent older adults, even if it might serve well enough for a particular individual, such as Adolfo.

In the future, a third option might become available to someone in Adolfo's situation: a smartly designed carebot. Adolfo might elect this not just because human caregivers are not readily available, but because carebots carry certain advantages. First, they are not vulnerable in ways that human caregivers are: they do not burn out, get sick, feel impatient, act impulsively, need breaks, take vacations, or complain. Second, carebots display assets that human caregivers may lack: they are unflappable when being yelled at; never grow annoyed dealing with forgetful people; are endlessly tolerant of demandingness; and do not take advantage of vulnerable care recipients for personal gain. Third, carebots might be superior to human caregivers, because they could be designed with super-human strength and a vaster pool of knowledge to draw on. They could readily sidestep the personal sacrifices that Adolfo's daughter (and other human caregivers) would be forced to make if she took on his care.

Caregiving, whether human or robotic, not only enhances well-being, but is integral to respecting *dignity*. Like human caregivers, carebots support dignity by supporting floor-level central human capabilities – the central things older adults can do and be as human beings. The ethical argument for furnishing carebots draws on capability approaches to justice, originally formulated by Nussbaum (2011) and Sen (1980), and the underlying ethical principle of respect for human dignity, defined as making reasonable efforts to support central capabilities at a threshold level. Table 2.1 shows one possible list of central human capacities and their definition.

Table 2.1 Central human capabilities and their definition

Capabilities	Definition
1. Life	Having an unfinished narrative
2. Health	Being able to be healthy, including being emotionally and mentally healthy
3. Bodily integrity	Being able to use one's body to realize life stage appropriate desires and goals
4. Senses, imagination, thought	Being able to engage in life stage meaningful ways in imagining, thinking, reasoning and using the senses, and to do so in a truly human way, informed & cultivated by education
5. Emotions	Being able to feel and express a range of human emotions, including loving and caring for others
6. Practical reason	Being able to feel and express a range of human emotions
7. Affiliation	Being able to live for and in relation to others
8. Nature	Being able to live in relation to nature and other species
9. Play	Being able to laugh, play, and recreate
10. Environment	Being able to participate in and regulate the immediate physical environment

Table 2.2 Capabilities carebots could support

Capabilities	At-Risk Capabilities Carebots Support
1. Life	X
2. Health	X
3. Bodily integrity	X
4. Senses, imagination, thought	
5. Emotions	
6. Practical reason	
7. Affiliation	
8. Nature	
9. Play	
10. Environment	X

Table 2.2 identifies four at-risk capabilities that carebots could support in a case like Adolfo's: life, health, bodily integrity, and environment.

Below we highlight the capabilities at risk in the case of Adolfo.

Life. Life capability is sometimes interpreted as being able to live an average life expectancy (Nussbaum 2011). I defend a narrative, rather than a chronological, rendering of life (Jecker 2020a). If we understand life capability narratively, then respecting dignity requires reasonable efforts to ensure floor level opportunities for narrative progression. Carebots can support this capability by doing such things as helping people move from place to place, be nourished, keep healthy, control bladder and bowels, or get dressed. This support keeps open opportunities for people like Adolfo to do other things, such as go outdoors, get together with friends, or feel at ease.

Health. The ability to be healthy can be understood broadly as encompassing not only physical health, but mental and emotional health, and the ability to be adequately nourished and sheltered. In the future, adequate support for Adolfo's might require a carebot that can lift him out of bed and transfer him to a chair, feed, or bathe him.

Bodily Integrity. Bodily integrity refers to being able to use one's body to carry out one's desires and wishes. If Adolfo needed help with bowel or bladder, ambulating or transferring, for example, a carebot could provide necessary assistance.

Environment. The ability to regulate the environment refers to the ability to exercise some measure of control over physical spaces, as well as the social, political, and cultural environments in which a person lives. By assisting with activities of daily living, carebot would enable dependent older people, such as Adolfo, to gain more control over these environments.

Despite these advantages, critics might be reluctant to trust carebots. Perhaps Adolfo, or his daughter, would be reluctant to trust because carebots use artificial intelligence (AI) systems that are undecipherable to human users. Thus,

an AI program is a black box, it will make decisions as humans do, but without being able to communicate its reasons for doing so. The AI's thought process may be based on patterns that we as humans cannot perceive, which means understanding the AI may be akin to

understanding another highly intelligent species — one with entirely different senses and powers of perception (Bathae 2018, p. 893).

When users cannot tell how decisions were made within an AI system, this creates a vulnerability that for-profit companies could exploit. For example, Adolfo might worry that the company selling him a carebot is profit-based and designed the carebot to maintain his dependence and thereby protect market share. In response, rather than rejecting carebots outright, we should stress government regulations and other measures that ensure accountability. If carebots were considered medical equipment, they would likely be subject to government oversight, which could increase safety and establish consistent standards. Another reply is that human caregivers can be black boxes too, yet we trust them. Lastly, as we have seen, the alternative to carebots may not be a doting family member.

Still, critics might press back, arguing that even if a carebot can be an ethically viable way of caring for a dependent older adult, introducing them in long-term care facilities serving older people would risk untoward effects, such as a care environment entirely devoid of human caregivers. Sparrow and Sparrow envision “a future aged-care facility where robots reign supreme. In this facility, people are washed by robots, fed by robots, monitored by robots, cared for and entertained by robots. Except for their family or community service workers, those within this facility never need to deal or talk with a human being who is not also a resident” (Sparrow and Sparrow 2006, p. 152). To avoid such risks, a better investment is hiring human caregivers.

Yet, as noted, in aged societies where the proportion of older to younger people is out of synch, human caregivers will not be enough; the alternative of importing low wage migrant workers has led to exploitation and human rights abuses. Carebots avoid these difficulties, since they can meet the growing demand and according to most, but not all (Wareham 2020), accounts of them they do not have moral standing on a par with humans that needs to be considered.

2.3 The Argument for Friendbots

The Case of Li Wei. Li Wei is an eighty-one-year-old man who lives alone in a newer high rise building in the Western District of Hong Kong. Li Wei has become increasingly socially isolated since the death of his spouse seven years prior. His wife had served as a helper with some activities of daily living, such as getting dressed and bathing. His daughter is his main visitor, but she started coming less often since the birth of her second child, who is developmentally disabled and requires intensive support. Li Wei also tends to be introverted, which makes it difficult for him to reach out and establish new friendships. Most of the male friends he had during younger years either rarely get out or have moved to long-term care facilities.

Some older people, such as Li Wei, might be accustomed to having a human caregiver whose care is rooted in love and affection. Spouses and offspring tend not only to help older people with activities of daily living, but also to show them love and affection. Many migrant workers develop kin-like relationships with care recipients too, despite being outsiders and subject to exploitation and abuse (Baldassar et al. 2017). Smartly designed machines could learn to become experts at bonding with care recipients in much the same way that human caregivers do. Rather than offering assistance only with bodily functions, they might serve as objects of affection for socially isolated older adults.

The need for companionship in the lives of older adult is evident worldwide. “Elder orphans,” or people living alone with little to no social support, are on the rise. In the U.S., for example, elder orphans account for roughly 22% of U.S. adults age sixty-five and over (Carney et al. 2016). According to the WHO, more adults around the globe are electing not to have children; among those with grown children, more are living alone (World Health Organization 2015, p. 22). Even in places with strong traditions of filial piety, such as Japan, this trend is apparent: the percentage of elderly people in Japan who live alone jumped from 7% in 1960 to 33% in 2005. In Hong Kong, 91.9% of older persons live in domestic households and of these, 13.1% live alone (Government of Hong Kong Special Administrative Region, Census and Statistics Department 2016).

Li Wei might hire a carebot in tandem with a robotic dog or seal. There is a good chance this would help him feel less lonely. Studies show that both living and interactive robotic dogs are equally effective at reducing loneliness and social isolation among elderly people in long-term care facilities (Banks et al. 2008). Robotic seals gradually introduced in an aged care facility helped with rapport-building for socially and verbally withdrawn residents (Birks et al. 2016); other robotic pet companions have generated emotional (Bemelmans et al. 2015), behavioral (Sung et al. 2015), and socially positive outcomes (Takayanagi et al. 2014; Robinson et al. 2016). Yet, despite the advantage of robotic pets, a friendbot would offer Li Wei more, because it would resemble a human friend and be highly sociable in human ways. According to one rendering, a friendbot of the future would be able to

communicate and interact...understand and even relate ... in a personal way. It ... understand[s] itself and us in social terms. We, in turn,... understand it in the same social terms. ... Such a robot must be able to adapt and learn,... incorporating shared experiences with other individuals into its understanding of self, of others, and of the relationships they share. ... [I]nteracting with it is like interacting with another person. At the pinnacle of achievement, [robots] could befriend us, as we could them (Breazeal 2002, p. 1).

The argument for providing Li Wei access to a friendbot rests on the ethical requirement to respect his dignity discussed already (Jecker 2020b). As noted, respecting dignity implies reasonable efforts to support central human capabilities, which are the central things that we can do and be as human beings. Some of our capabilities, such as life, health, and bodily integrity, are supported by a carebot, but others, such as affiliating with others, feeling a range of human emotions, and playing, are not. An intelligently designed friendbot could support a wider range of

Table 2.3 Capabilities friendbots could support

Capabilities	At-Risk Capabilities Friendbots Support
1. Life	X
2. Health	X
3. Bodily integrity	
4. Senses, imagination, thought	
5. Emotions	X
6. Practical reason	
7. Affiliation	X
8. Nature	
9. Play	X
10. Environment	

central human capabilities. For older people like Li Wei, who do not already have such support, reasonable efforts to furnish it at a threshold level could be a lifeline.

From the list of central capabilities identified previously (Table 2.1), Table 2.3 shows five at-risk capabilities that Li Wei experiences, followed by a brief summary of each and how a friendbot could help.

Life. Table 2.3 identifies five central capabilities at risk in the case of Li Wei: life, health, emotions, affiliation, and play. For most of us, the capability to live a life one has reason to value depends on being able to have ties to others. Li Wei's ties have been whittled down over time, to the point where his daily life does not include any close relationships, a fact that is unlikely to change for the foreseeable future. Having the companionship of a friendbot would not only make Li Wei's life sweeter but enable him to live the final chapters of his life in ways he would find personally meaningful.

Health. Related to this, well-designed friendbots would support capabilities for social and emotional health. A friendbot could make Li Wei laugh, invite him to share a memory, or coax him to go outside for a walk. These activities are not only highly valued, but integral to his ability to stay healthy. Supporting health in this sense extends the reach of robots beyond what carebots offer, which consists only of assisting with physical functioning and activities of daily living. Friendbots not only perform these caregiving tasks but also promote Li Wei's capacity to be healthy in a broader sense.

The importance of affiliation with others to sustaining health was robustly documented in a 2020 report from the U.S. National Academies of Sciences, Engineering, and Medicine, which summarized four decades of research demonstrating major adverse health outcomes associated with both social isolation (an objective state of having little social contact with others) and loneliness (a subjective feeling of being isolated while wanting company) in older adults: a significant increase in all-cause mortality, 50% higher rate of dementia, 68% increased rate of hospitalization, 57% increased rate of emergency department visits, 29% increased rate of incident coronary heart disease, and 32% increased rate of

stroke (National Academies of Sciences, Engineering, and Medicine 2020). The Academies recommend solutions that include integrating user-friendly technologies, such as social robots, that can function as conversational agents with artificial intelligence to “engage users in a dialogue either for general companionship or for meeting specific goals (reminders, health or safety assessment)” (National Academies of Sciences, Engineering, and Medicine 2020, p. 193).

Emotions and Affiliation. Even though carebots do not instantiate *human-human* friendship, they can instantiate *human-robot* friendship and thereby reduce loneliness and support human capacities for bonding and affiliating, enabling socially isolated older adults, such as Li Wei, to live in relation to something outside themselves; laugh and enjoy a conversation; and share experiences, thoughts, and feelings. Older individuals like Li Wei who gain access to high quality friendbots would better able to live in accordance with who they are as human beings. Meeting emotional needs of older people requires having others around who can laugh, listen, sing, reassure, play, and chat in a friendly way; robots can do all of these things, with skill and emotional intelligence.

Play. The ability to be playful is another central human capability missing from the lives of socially isolated individuals, such as Li Wei. Friendbots could fill this gap by inviting Li Wei to play a board game, join a round of cards, or take turns guessing letters in Ghost (a word game in which players take turns adding letters to a word fragment while trying not to complete a word). Well-designed friendbots would be trained on user groups that resemble the older adult they are helping. They could be tailored to the individual’s interests; for example, playing the games an older adult enjoys at a skill level that matches theirs. In the case of Li Wei, a friendbot might learn the songs he likes and invite him to hum along, perhaps singing slightly off key to make Li Wei laugh.

Critics might worry that friendbots would be *false* friends, inferior to the genuine friendship between mature adult human beings (Elder 2017). Classic theories of friendship in the West, such as Aristotle’s, define friendship in terms of a state of mutual recognition and goodwill and hold that to be friends, people “must be mutually recognized as bearing goodwill and wishing well to each other” (Aristotle 2009, Chap. V, Section III.2, line 1156a, at 4–5). Using this yardstick, the relationship between Li Wei and a friendbot would not measure up.

Yet, Danaher has responded persuasively to this challenge by arguing that it is philosophically reasonable to regard robots as *metaphysically* possible Aristotelian friends, even if it is not, for now, *technically* possible for them to serve in this capacity (Danaher 2019). To elaborate, Sorrell and Draper set forth a helpful strategy (Sorrell and Draper 2014, p. 184). They hold that our closest associates tend to be the sorts of things that can be present to us in a *sophisticated* way, where sophisticated presence means not just that something is co-located and brings it about that we no longer feel alone, but also indicates that capacity to engage by techniques like moving about, communicating, prompting and responding. Thus, a comfy couch is co-located, a simple cuddly toy makes us feel that we are not alone, but only a smartly designed sociable robot can be present in a sophisticated way; e.g., follow

us, show interest in what we do, prompt us to do or not do certain things, react to commands, and communicate.

A further defense of friendbots is that Aristotelean friendship is arguably only one form of friendship; namely, the kind that can obtain between mature and cognitively intact adult human beings. Yet, there are *many* other kinds of close relationships possible that we would have reason to value (see Jecker 2020a, chap. 8). Other examples, include dyadic relationships with varying degrees of reciprocity, such as relationships with pets that infuse love and warmth into a family, deep bonds between parent and infants or small children, and associations between people with intellectual impairments who are devoted to one another.

However, critics like Turkle might push back. Turkle draws a bright line between human-human and human-robot relationships by appealing to the notion of *alterity*, which she describes as the capacity to see the world through another person’s eyes (Turkle 2017). Even if it is possible to have a friendship with a small child or someone with intellectual impairment, friendship with inanimate objects lacks a crucial friendship feature because it is not possible to see the world through a robot’s eyes.

However, in response to Turkle, we recognize a range of reciprocity that includes fully reciprocal, partially reciprocal, and non-reciprocal relationships, shown in Table 2.4 (below).

In each of the relationships shown in Table 2.4, what matters in the end is that care gets *expressed*.

Yet, critics might contend that friendbots are inferior because they are replaceable. Are mass produced friendbots worth less than one-of-a-kind humans? In reply, even if rarity is a constituent of value, friendbots could be designed as limited editions, or even one-of-a-kind models, allowing them to be exclusive in ways that approximate the uniqueness of humans.

A further complaint is that friendbots lack a mental state of caring about users. In reply, keeping the focus on *users* aligns with the goal of serving and helping care recipients. Friendbots should exhibit sufficient emotional intelligence and social competence to put a user at ease, build rapport, and elicit a feeling of being cared about. Friendbots, like human friends, can succeed or fail in this respect. Empirical studies document that even a simple, two-dimensional character on a computer screen that behaves empathically evokes trust, liking, and a sense of being cared for (Brave et al. 2005). The simple rendering of a smile by an avatar also leads users to make more positive assessments of it and feel connected, trusting, comfortable, and satisfied with the interaction (Guadagno et al. 2011). Studies also show we tend to more readily confide in computer systems than humans (Lucas et al. 2014),

Table 2.4 A continuum of reciprocity

<i>Fully Reciprocal</i>	<i>Partially Reciprocal</i>	<i>Non-Reciprocal</i>
Neurotypical adults	Adults on autism spectrum	Caregiver & unconscious human
Child friendship	Child & pet rat	Human & robotic pet
Parent & toddler	Child & parent with delirium	Present & non-extant future people

perhaps based due to a perception that interactions with machines are more private, less embarrassing, or a safer bet. Close robot-human ties can be encouraged by leveraging the human tendency to anthropomorphize objects. Finally, despite the fact that robots do not share human impermanence, frailties, and the life-death cycle, we can program these experiential features into friendbots, enabling them to behave as though they had enjoyed “the full depth and breadth of human experience without having done any such thing” (Levy 2004, p. 111). Eventually, robot-human differences might be comparable to human-human differences based on culture, race, income, education and other factors. Even if a large gap remains, there seems to be no obvious reason why we cannot make friends or find companions with what is very different from ourselves, and it could be argued that doing so can foster personal growth.

In the final analysis, it does not matter much if friendbots qualify as friends *proper*. Instead, what matters is whether they can offer older adults like Li Wei a relationship that adds value to their lives (Kaliarnta 2016) and that restores important human capabilities at a minimal level. If access to a friendbot would help Li Wei to do and be things he has reason to value, such as affiliating with others, feeling affection, playing and laughing, then its internal state (or lack thereof) is beside the point.

2.4 The Argument for Sexbots

If we could befriend a robot, could we fall in love with one? Consider the case of Antonio.

The Case of Antonio. Antonio is sixty-eight-year-old man who has a strong social network. Unlike Li Wei, most of his friends are still alive and kicking. However, his wife of thirty-nine years is disabled and has lost all interest in sex. Antonio has not. He often feels torn because he wants to be loyal to his wife, yet he also wants a sexual partner. Lately, he finds himself not only looking at other women, but flirting in ways that he feels guilty about later.

While sex robots are often depicted as a product for younger, able-bodied people, we might re-imagine them as a way of meeting sexual needs of older people like Antonio.

Since sexuality is closely tied to central human capabilities, supporting sexuality at a floor level is integral to respecting human dignity (Jecker 2021). Table 2.5 shows six at-risk capabilities that sexbots could be designed to support, followed by a brief summary of each.

Life and Health. For someone in Antonio’s situation, central capabilities for life; health; bodily integrity; senses, imagination and thought; emotions; and affiliation are at heightened risk of falling below a threshold level. Sexbots could support the first capability, life, by expanding older people’s ability to create life narratives that include sexuality. They could also improve the emotional and mental health of older individuals like Antonio who lack access to sexual partners. Researchers have

Table 2.5 Capabilities sexbots could support

Capabilities	At-Risk Capabilities Sexbots Support
1. Life	X
2. Health	X
3. Bodily integrity	X
4. Senses, imagination, thought	X
5. Emotions	X
6. Practical reason	
7. Affiliation	X
8. Nature	
9. Play	
10. Environment	

demonstrated a close tie between general health and sexual partnership, frequency of sexual activity, a good quality sex life, and interest in sex in a population of middle and older aged adults in the United States (Lindau and Gavrilova 2010). Critics might worry that someone in Antonio’s situation might become dependent on and eventually prefer sexbots to human sex partners. In reply, we should remain open to the possibility that socially and emotionally healthy relationships with sexual robots and technologies are *possible*. History suggests that prejudice against sex robots can and will be overcome, just as prejudice against homosexuality, oral sex, fornication, and masturbation have been in more and more places. Some argue that *digisexuals*, or people whose preferred mode of sexual experience and relating is via immersive technologies with or without a human partner, should be accepted, rather than shunned (McArthur and Twist 2017).

Bodily Integrity. The capability for bodily integrity represents a form of self-determination by means of the body. It involves the ability to express one’s self through the body, including expressing sexual feelings and engaging in sexual behaviors. Antonio’s loss of the ability to express sexual feelings through the body diminishes his bodily integrity. Sex robots could support bodily integrity by being tailored to his sexual preferences and needs.

Emotions and Affiliation. It is sometimes held that the goal of erotic desire is not sex itself, but instead forming and sustaining close relationships. Aristotle, for example, regarded being loved, rather than having sex, as the ultimate purpose of sexual desire; similarly, Mill held that loving relationships are preferable to erotic pleasure alone and represented a higher type of pleasure. When older people like Antonio lack sexual partnership, they experience diminished capability for feeling intimately bonded and affiliated with others. Unlike other sex technologies, future sexbots could create the possibility of sexual *relationships*, rather than simply sexual *satisfaction*. Unlike other sex objects, people could one day come to care about sex robots, and even feel love for them.

A sceptic might counter that sexbots are “empty” on the inside and the relationships between a person and their sex robot would be unidirectional and inferior (Elder 2017). Yet, as noted already, caring relationships are best understood as

falling along a continuum, with reciprocal dyadic care between mature cognitively intact human beings at one end, and caring about non-existent future people at the other. In the interstices between are a multitude of ways of instantiating care, including human-robot friendship. For older adults, what matters is opportunities to be sexually connected to others in ways that are personally meaningful. Sociable sex robots of the future could enable this, suffusing tenderness and intimacy into the lives of older adults like Antonio who are bereft of human sexual partners or others, who are unable to use their bodies to carry out their wishes due to chronic disease and disability or age-related sexual impairments. Steps to improve older people's sexual capabilities through sex robots would not only make the world a happier place, it would give older adults the opportunity to choose to do and be what they have reason to value; namely: enjoy intimacy and be affectionate with others.

Still a critic might contend that even if there is ethical support for deploying robots to function as carebots and friendbots, deploying them as sexbots goes too far. It harms users and undermines, rather than supports human dignity. In reply, we cannot know in advance what effects sexbots would have if they were widely used for older adults who are bereft of human partners or who experience chronic disease and disability. Rather than dismiss them out of hand, we should be open to the possibility that sexbots might be on balance, a good thing for older people. At the very least, we can say that *if* sexbots are available to anyone, they ought to be available to those for who need them most. Rather than the current approach, which markets sexbots to predominantly young, able bodied, cisgender men, future sexbots should be designed with an eye to helping people who need them most. First in line should be people who are socially isolated and lonely; suffer from chronic disease and disability that impair sexual function; or experience age-related loss of sexual capability. From a moral point of view, supporting people's sexual lives at a threshold level is more important than augmenting the pleasure of those who already have sexual opportunities available. It is a way of supporting dignity by affirming central human capabilities at a threshold level.

2.5 The General Argument and Conclusion

The general argument for reasonable efforts to make carebots, friendbots, and sexbots available to older adults, who are care-dependent, socially isolated, or sexually alone, is summarized below.

A Dignity-Based Argument for Affording Access to Carebots, Friendbots, and Sexbots

1. Respecting human dignity requires reasonable efforts to support floor level human capabilities.
2. In the future, carebots, friendbots, and sexbots could be an integral part of reasonable efforts to do this.
3. Some older adults, including those who are care-dependent, socially isolated, or sexually alone, lack alternative ways of maintaining floor level human capabilities.

4. In the future, respecting their dignity may require reasonable efforts to afford access to carebots, friendbots, and sexbots.

This argument is dignity-based in the sense that it interprets respecting human dignity as requiring respect for minimal level central capabilities. Carebots, friendbots, and sexbots can be an integral part of reasonable efforts to respect human dignity. If we make them well, they can serve as a social good by making the world a better place: helping care-dependent older people with activities of daily living, keeping loneliness at bay, and improving physical, emotional and mental health.

References

- Adioetomo, S. M. and Mujahid, G., 2014. *Indonesia on the threshold of population ageing*. United Nations Population Fund (UNFPA) Indonesia Monograph Series, July 2014. [Online] Available: <https://indonesia.unfpa.org/sites/default/files/pub-pdf/BUKU_Monograph_No1_Ageing_03_Low-res.pdf>.
- Aristotle, 2009. *Nicomachean ethics*, trans. Ross W. D. New York: Oxford University Press.
- Baldassar, L., L. Ferrero, and L. Portis. 2017. 'More like a daughter than an employee': The kinning process between migrant care workers, elderly care receivers and their extended families. *Identities* 24 (5): 524–541. <https://doi.org/10.1080/1070289X.2017.1345544>.
- Banks, M.R., L.M. Willoughby, and W.A. Banks. 2008. Animal-assisted therapy and loneliness in nursing homes: Use of robotic versus living dogs. *Journal of American Medical Directors' Association* 9 (3): 173–177.
- Bathae, Y. 2018. The artificial intelligence black box and the failure of intent and causation. *Harvard Journal of Law and Technology* 31 (2): 890–938.
- Bemelmans, R., G.J. Gelderblom, P. Jonker, and L. de Witte. 2015. Effectiveness of robot Paro in intramural psychogeriatric care. *Journal of American Medical Directors' Association* 16 (11): 946–950.
- Birks, M., M. Bodak, J. Barlas, J. Harwood, and M. Peth. 2016. Robotic seals as therapeutic tools in an aged care facility. *Journal of Aging Research* 2016: 8569602. <https://doi.org/10.1155/2016/8569602>.
- Brave, S., N. Clifford, and K. Hutchinson. 2005. Computers that care. *International Journal of Human-Computer Studies* 62 (2): 161–178.
- Breazeal, C. 2002. *Designing sociable robots*. Boston: MIT Press.
- Carney, M. T., Fujiwara, J., Emmert, B. E., Liberman, T. A. and Paris, B. 2016. Elder orphans hiding in plain sight: A growing vulnerable population. *Current Gerontology and Geriatrics Research* 2016: 4723250. <https://doi.org/10.1155/2016/4723250>.
- Danaher, J. 2019. The philosophical case for robot friendship. *Journal of Posthuman Studies* 3 (1): 5–24. <https://doi.org/10.5325/JPOSTSTUD.3.1.0005>.
- Elder, A. 2017. Robot friends for autistic children. In *Robot ethics 2.0: From autonomous cars to artificial intelligence*, ed. P. Lin, K. Abney, and R. Jenkins. New York: Oxford University Press.
- Gordon, M. 2011. Ageing is a development fact. *Age international, facing the facts: The truth about ageing and development* 18-20. [Online] Available: <https://www.ageinternational.org.uk/Documents/Age%20International%20Facing%20the%20facts%20report.pdf>.
- Government of Hong Kong Special Administrative Region, Census and Statistics Department. 2016. *Population by-census thematic report: Older persons*. [Online] Available: <https://www.censtatd.gov.hk/press_release/pressReleaseDetail.jsp?charsetID=1&pressRID=4367>.

- Guadagnom, R.E., K.R. Swinth, and J. Blascovich. 2011. Social evaluation of embodied agents and avatars. *Computers in Human Behavior* 27 (6): 2380–2385.
- International Labour Organization (ILO), Labour Migration Branch and Department of Statistics. 2018. *ILO global estimates on international migrant workers*. 2nd ed. International Labour Office.
- Jecker, N.S. 2020a. *Ending midlife bias: New values for old age*. New York: Oxford University Press.
- . 2020b. You've got a friend in me: Sociable robots for older adults in an age of global pandemics. *Ethics and Information Technology*. <https://doi.org/10.1007/s10676-020-09546-y>.
- . 2021. Nothing to be ashamed of: Sex robots for older adults with disabilities. *Journal of Medical Ethics* 47: 26–32.
- Jecker, N.S., and J.L. Chin. 2019. Justice and global care chains: Lessons from Singapore. *Developing World Bioethics* 19 (3): 155–168. <https://doi.org/10.1111/dewb.12213>.
- Kaliarnta, S. 2016. Using Aristotle's theory of friendship to classify online friendships. *Ethics and Information Technology* 18 (2): 65–79.
- Levy, D. 2004. *Love and sex with robots: The evolution of human-robot relationships*. New York: Harper Collins.
- Lindau, S.T., and N. Gavrilova. 2010. Sex, health, and years of sexually active life gained due to good health. *British Medical Journal* 340 (7746): 580–591.
- Lucas, G.M., J. Gratch, A. King, and M. Louis-Philippe. 2014. It's only a computer: Virtual humans increase willingness to disclose. *Computers in Human Behavior* 37 (August): 94–100.
- McArthur, N., and M.L.C. Twist. 2017. The rise of digisexuality. *Sexual and Relationship Therapy* 32 (3/4): 334–344.
- National Academies of Sciences, Engineering, and Medicine. 2020. *Social isolation and loneliness in older adults*. Washington, D.C.: National Academies Press.
- Nussbaum, M.C. 2011. *Creating capabilities*. Cambridge: Harvard University Press.
- Robinson, H., E. Broadbent, and B. MacDonald. 2016. Group sessions with PARO in a nursing home. *Australasian Journal on Ageing* 35 (2): 106–112.
- Sen, A. 1980. Equality of what? In *Tanner lectures on human values, volume 1*, ed. S. McMurrin. Cambridge: Cambridge University Press.
- Sorrell, T., and H. Draper. 2014. Robot carers, ethics, and older people. *Ethics of Information Technology* 16 (3): 183–195.
- Sparrow, R., and L. Sparrow. 2006. In the hands of machines? *Minds and Machines* 16 (2): 141–161.
- Sung, H.C., S.M. Chang, M.Y. Chin, and W.L. Lee. 2015. Robot-assisted therapy for improving social interactions and activity participation among institutionalized older adults. *Asia-Pacific Psychiatry* 7 (1): 1–6.
- Takayanagi, K., Kiritani, T., Shibata, T., 2014. Comparison of verbal and emotional responses of elderly people with mild/moderate Dementia and those with severe dementia in responses to seal robot, PARO. *Frontiers in Aging and Neuroscience* 6, article 257.
- Turkle, S. 2017. *Alone together*. New York: Basic Books.
- United Nations, Department of Economic and Social Affairs, Population Division. 2017. *World population ageing 2017*. United Nations.
- Wareham, C. 2020. Artificial intelligence and African conceptions of personhood. *Ethics and information technology*. <https://doi.org/10.1007/s10676-020-09541-3>.
- World Health Organization (WHO). 2002. Ethical choices in long-term care. World Health Organization. [Online] Available: At: http://www.who.int/mediacentre/news/notes/ethical_choices.pdf.
- . 2015. *Global: Health and aging*. Geneva: WHO Press.