

OUR SEXUAL FUTURE WITH ROBOTS

A FOUNDATION FOR RESPONSIBLE ROBOTICS CONSULTATION REPORT

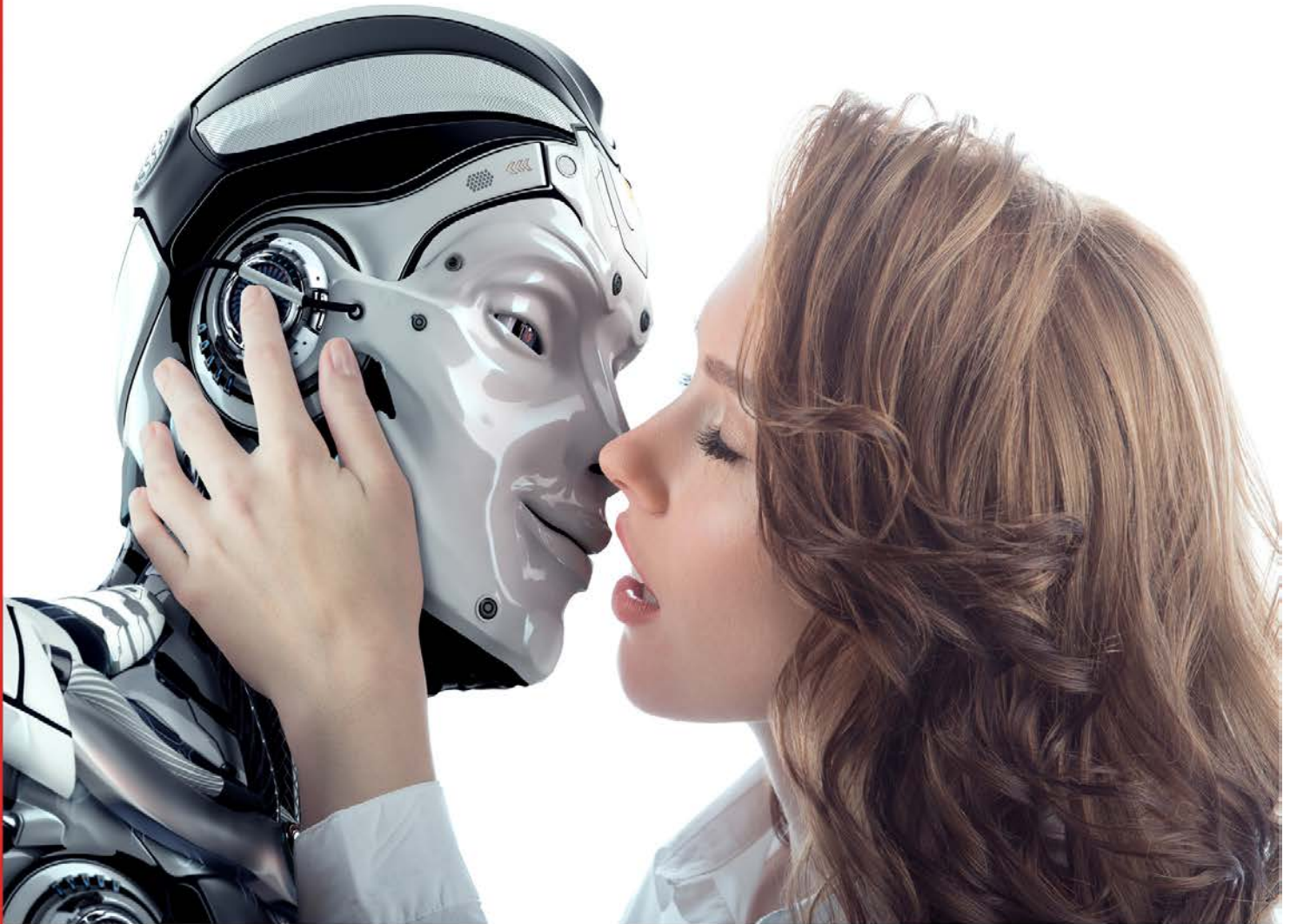


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Acknowledgements: Our special thanks for help and comments to Amanda Sharkey, Kristen Thomasson, Renee Mulcahy, Charles Ess, Mark Coeckelbergh, Christopher Markou, Kay Firth-Butterfield, Tory Igoe and Pat Lin



Introduction

In 2017 most liberal societies accept or tolerate sex in many different forms and varieties. Sex toys and masturbation aids have been used for centuries and can be easily purchased in stores in many countries. Now companies are developing robots for sexual gratification. But a robot designed for sex may have different impacts when compared with other sex aids. Those currently being developed are essentially pornographic representations of the human body – mostly female. Such representations combined with human anthropomorphism may lead many to perceive robots as a new ontological category that exists in a fantasy between the living and the inanimate. This is reinforced by robot manufacturers with an eye to the future. They understand the market importance of adding intimacy, companionship, and conversation to sexual gratification.

The aim of this consultation report is to present an objective summary of the issues and various opinions about what could be our most intimate association with technological artefacts. We do not contemplate or speculate about far future robots with personhood - that could have all manner of imagined properties. We focus instead on significant issues that we may have to deal with in the foreseeable future over the next 5 to 10 years.

We begin by presenting an overview of the technological state-of-the-art in sex robots and parallel sextech at the time of writing this document (May 2017). We then focus on seven core questions that have received prominent attention in the media and in scholarly literature:

- 1. Would people have sex with a robot?**
- 2. What kind of relationship can we have with a robot?**
- 3. Will robot sex workers and bordellos be acceptable?**
- 4. Will sex robots change societal perceptions of gender?**
- 5. Could sexual intimacy with robots lead to greater social isolation?**
- 6. Could robots help with sexual healing and therapy?**
- 7. Would sex robots help to reduce sex crimes?**

We conclude with interviews with two of the manufacturers of sex robots to allow them their say.

In compiling the report, we have sought a wide range of opinions and arguments from many stakeholders¹. To this end we have reviewed a variety of opinions and positions within the

¹ FRR consultation papers attempt to air the opinions of all stakeholders for particular types of robot

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academic community from roboticists, ethicists, social scientists, lawyers and tech scholars for our questions. This is a multidisciplinary endeavour. We have also turned to anecdotal evidence from sex workers and sex journalists for a real-world look at the topic. In section 8 of the report, we provide interviews with the two manufacturers who answered our interview request. And we have probed public perceptions by examining the results from a number of recent surveys and empirical studies.²

A problem with the public perception of sex robots is that the public is currently not well informed about the actuality of robots in general. Sex robots are new and only a few people have encountered them directly. Information in the public domain mainly comes from science fiction tropes engendered by television and the movies. This goes all the way back to ancient Greece with the myth of the artist Pygmalion who fell in love with a statue that he carved out of ivory. He had a special bed made so that he could sleep with it. So enamored was he, that the goddess Aphrodite turned it into a real woman. According to Richardson (2016) this is a story about a nonreciprocal relationship that underscores the promotion and development of sex robots.

In stories where there is intimacy with robots (mostly female), they are often portrayed as sexual objects. There are many examples. In the movie *A.I.* (Spielberg et al., 2001) there is a pair of male and female sex workers called Gigolo Joe and Gigolo Jane. They have the ability to change their appearances to match a user's preferences and they can react to human emotions in order to be better lovers. The movie *Ex Machina* (Garland et al., 2015) shows a robot creator, Nathan, having cold and cruel seeming sex with his creation. In the HBO series *Westworld* (Nolan et al 2016), bordello Madame Maeve Millay and her fellow hosts must service the darkest desires of the theme parks guests. In *Humans* (Chan, Parkinson, Carless, & Goodman-Hill, 2015), the married owner of the domestic nanny robot Anita initiates her sex mode with a compact disc much to the disgust of his wife and family. Another robot in *Humans*, Niska, a conscious robot, is forced to work as a prostitute while in hiding and ends up killing one of her clients. Then there is Pris, the replicant in *Blade Runner* (Scott et al., 1982), a 'basic pleasure model' for sexual gratification of humans until she becomes a cold and brutal killer.

applications. These are not definitive answers to complex questions and legal issues and do not necessarily express the opinions of the Foundation and its members.

²We were a little disappointed that the research has predominantly directed at western society with very little of anything else other than one report on Islamic law and sex robots. We do use data obtained from Asia but no surveys. Hopefully future research will be more balanced.

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The reality of current and planned sex robots is considerably different from their science fiction counterparts.³ They are essentially mechanised sex dolls with limited expressiveness and minimal conversational capabilities.

Current sex robots, parallel sextech and privacy

The success of dolls for sexual gratification has set a clear path for the role of robotics in the future of sex. Sex dolls have been offered by a number of companies, some of whom have gone on to add robotic capabilities to their dolls. RealDoll (whose parent company is Abyss Creations) have been supplying human sized dolls since 1996 and their dolls have been featured in popular culture including the movie *Lars and the Real Girl* starring Ryan Gosling. They offer both male and female dolls as well as the ability to custom order transgender dolls. CandyGirl, based in Japan, also offers lifelike sex dolls.

The success of dolls for sexual gratification has set a clear path for the role of robotics in the future of sex.

Modern sex dolls, unlike their vinyl blow-up counterparts, have a silicon skin with a human-like feel and touch. They often include an “articulated metal skeleton” so that they can be manoeuvred into a variety of positions⁴ and are increasingly customizable – down to the nipple shape and fingernail type/color.⁵ Although in the past, sex dolls tended to be gendered as females, Synthetics has had commercial success with their male sex dolls that allow a realistic penis to go from flaccid to erect – customers can choose

from a number of penis options. The company says that the number of their orders for male dolls is now equal to female dolls.⁶

The popularity of modern sex dolls is creating an increasingly competitive market. With rapid developments in technology, the companies are hoping to corner a larger slice of the market by creating moving robotic sex dolls powered by speech recognition and chatbot conversations. The company that can create the most realistic intimate sex companion at the right price is most likely to capture the largest market share.

³ Perhaps the first serious discussion of Sex Robots was in the 2001 documentary *Love Machine* written and directed by Peter Asaro and Doug Matejka.

⁴ <https://reallovesexdolls.com/>

⁵ See <http://realdoll.com/> for examples

⁶ There is a video interview from Vice that also shows two women enjoying the male doll: https://video.vice.com/en_us/video/male-dolls/57f41d3556a0a80f54726060 last accessed 21 May 2016

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Sex Robots: These new sex robots include: *Harmony* by Abyss Creations, *Android Love Doll* by Android Love Dolls, *Roxxy Gold* and *Rocky Gold* by TrueCompanion, and *Suzie Software* and *Harry Harddrive* by Sex Bot Company. They range in price from around \$5,000 for an Android Love Doll to around \$15,000 for Harmony (Kleeman, 2017). Customizations and add-ons can drive those prices up significantly. Browsing the company websites gives an idea of what are seen as the important features of sex robots: appearance, mobility, feel, and artificial intelligence. All the information about the sex robots in this consultation comes from the company websites unless otherwise noted.⁷

Appearance is the most customizable part of buying a sex robot. Options include: eye colour, pubic hair (colour and shape), ears (elf or regular), hair, skin colour and makeup. They are of a lifelike height (average around 170cm) but comparatively lightweight with the heaviest being around 70 lbs. On some sex robots the faces can be swapped. Current sex robots, like their sex doll cousins, are made from silicon rubber and are advertised as being “warm to the touch”. These robots are equipped with all over body sensors so that they can respond to touch. And sometimes the response is dependent upon the chosen personality trait of the sex robot.



Harmony from Realbox

Some sex robots offer a range of mobility features. None of them can walk yet but Abyss Creations hope to create a walker when the tech is less expensive. The Android Love Doll can perform “50 automated sexual positions”. Suzie Software and Harry Harddrive must be manually manoeuvred into a sexual position and are then able to simulate sexual movement. Roxxy Gold is advertised as being capable of displaying orgasms, although it is not clear whether this is through sound, motion, or both. Harmony is also advertised as having the ability to orgasm. It has “neck articulation, facial expression, moving eyes, and the ability to lip sync with spoken audio.”

All of these robots offer some version of artificial intelligence software. Android love dolls have “advanced Artificial Intelligence software for communication” and RealBotix allows for customisation of the AI by choosing “traits and emotions you find appealing” including high or low levels of happiness, shyness, humour, etc. Roxxy Gold comes with pre-programmed personalities including “Frigid Farrah” that gives the impression of reserved shyness and “Wild Wendy” with a scripted outgoing and adventurous personality.

⁷ Harmony: <https://realbotix.systems>; Roxxy and Rocky: www.truecompanion.com; Suzy Software and Harry Harddrive: <http://www.sexbots.us>; Android Love Dolls: <http://www.androidlovedolls.com/>

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Perhaps the most ambitious use of AI software to create a realistic experience comes from Abyss Creations. They want their Harmony to be a full companion robot and they advertise conversational abilities. While it is difficult to assess Harmony's performance from scripted videos, the company has released a programmable AI "Harmony" app that 'learns' about you as you converse with it. The app can connect to their sex robots. They also produce an avatar that can be used for virtual interactions. Their hope is to combine VR with Harmony's AI and a robotic body to create a completely immersive sexual experience. Abyss Creations also aims to soon include facial recognition and the ability to make eye contact in Harmony. In the meantime they have a cheaper head for oral sex.

Parallel SexTech: Looking a little further into the future of sex robots we may see them merging with parallel developments in sextech. One new departure is in the use of AI techniques to operate a dildo. This is the beginning of the merging of dildonics with robotics. The *Hum* vibrator is used to analyse the user's body reactions and respond back accordingly to allow for 'excelled sexual gratification'. The manufacturers claim that the AI system uses feedback from the body to respond in sync and draw out and accentuate an orgasm. They suggest that this is the beginning of robotic sex and they may well be right.

Another parallel development related to sex robotics is the host of teledildonics devices either currently on the market or about to enter it soon. Some of these involve Bluetooth technology (often referred to as bluedildonics) that allows users to "wirelessly-synch" (Wakeman, 2017) and remotely control each other's devices. The products generally include a 'male' and 'female' device. The 'male' device is a remote controlled vibrating dildo while the 'female' device is a contracting sleeve.

Teledildonics products include, the *OhMiBod* vibrator, made by a group of female US designers and engineers. It is an app-controlled, clitoral vibrator worn like a panty liner that allows users to control the pleasure of each other's vibrator. Similar developments in progress for virtual touch include the *virtual teletongue* that allows users virtual oral stimulation and *Kissenger*⁸ that allows users to kiss each other by attaching a device to their smart phones.

Another popular move in teledildonics is to use them during video calls to enable couples to have virtual sex over a distance and to enhance screen based sex work by allowing

⁸Yann Zhang, E., Nishiguchi, S. and Cheok, A. (2016). Kissenger - Development of a Real-Time Internet Kiss Communication Interface for Mobile Phones. Imagineering Institute, City University London.

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customers to “feel” what the sex workers are doing (e.g. when the sex worker strokes the ‘male’ dildo the customer’s ‘female’ sleeve contracts). The website CamSoda⁹ has now extended this service to offer a choice of different porn aromas (OhRoma) pumping into a VR mask to make the experience as realistic as possible.

Companies now offering distance teledildonic devices include Lovense¹⁰ with the male *Max* and the female *Nora*, and Kiiroo with the male *Pearl* and female *Onyx*. Kiiroo uses capacitive touch technology to allow one user to control the other’s device. This, the company claims, encompasses all senses and allows users to stimulate each other visually, audibly and physically. However, distance teledildonics devices are mostly operated through a third party company. Kiiroo users, for example, need to use the company website or their smart phone app. This has raised concerns about the potential misuse of data collection.

Privacy: A 2016 class action in Illinois against the company Standard Innovation Corp claimed that data collected and transmitted included the date and time of each use of the vibrator and the settings used. The allegation was that this data is sent together with the personal email address of the user who registered with the We-Connect app. Standard Innovation has now been ordered to pay \$4 million Canadian to affected users. Moreover, a number of security flaws were revealed at the *Def Con hacker* conference in Las Vegas in 2016. The app controlling the vibrator allowed anyone within Bluetooth range to seize control of the device.¹¹

Silicon replications of partners in a distance relationship could be used to create a mutual sexual experience with the couple speaking directly through the mouths of the robots.

It does not take a great leap of imagination to see that sex robots could also be operated in the same way as teledildonics. Silicon replications of partners in a distance relationship could be used to create a mutual sexual experience with the couple speaking directly through the mouths of the robots. Similarly, a sex worker on a site like camsoda.com could manipulate a sex robot and speak through its mouth to create a more realistic experience than a pre-

⁹ <https://www.camsoda.com/>

¹⁰ www.lovense.com/

¹¹ Hern, A. (2017). Vibrator maker ordered to pay out C\$4m for tracking users' sexual activity. The Guardian. <https://www.theguardian.com/technology/2017/mar/14/we-vibe-vibrator-tracking-users-sexual-habits> last accessed on May 22 2017

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programmed robot. Even robot-human orgies would be possible in this way or a robot threesome.

However, the idea of online sex robots, or *telex-sex-robots*, raises concerns, as in the case of Standard Innovation, about privacy and security in the most intimate aspects of people's lives. If as in the teledildonics pairings, a third-party company is involved, we need to ask, what sort of data could or would be collected and how would it be used? And there are strong concerns about the security of such data. It is not just about the companies' data being hacked. All Internet and Bluetooth connected devices are vulnerable to a greater or lesser degree to hacking as we have seen in the case of the vibrator exposed at the *Def Con hacker* conference. There are no ironclad solutions to these problems and we are sure that they will plague telex-sex-robots if and when they develop online

Q1. Would people have sex with a robot?

A number of polls have shown that there is a potential market for robots that provide sexual services. Scheutz and Arnold (2016) conducted a survey with 100 US participants ranging in age between 20 to 61 with 43% females and 57% males. They found that two thirds of males were in favour of using sex robots while almost two thirds of females were against but 86% of all respondents thought that robots would satisfy sexual desire. The Nesta FutureFest (2016) survey of 1002 UK adults found that 17% of respondents would be prepared to go on a date with a robot and that number increased to 26% for a robot that looked exactly like a human. A Huffington Post (2013) poll of 1000 US adults found that 9% would have sex with robots if they were available. de Graaf and Allouch (2016) polled 1162 Dutch adult participants and found that 20.2% of participants thought that sex robots had no negative consequences while 13.3% thought that they would change our norms and values.

These surveys differ quite widely in the numbers willing to have sex with robots. This could in part be due to the way in which the questions were phrased, lack of participant knowledge of what a sex robot actually is and perhaps, in part, due to individual differences. Szczuka and Kramer (2017) attempted to control for these effects by showing pictures of sexualized robots and then measured a number of personal characteristics such as loneliness, anthropomorphic tendencies and fear of rejection as well as measuring attitude towards robots. The main goal of the study was to see whether there would be differences in the evaluation of sex robots when asked explicitly (via self report) versus implicitly gathering data on their direct unbiased reaction towards pictures.

In their study 229 heterosexual males explicitly rated the sexual attractiveness of four women in underwear, four female robots in underwear with salient mechanical body parts, and four female androids in underwear. Unsurprisingly they rated the robots less attractive. However,

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when followed through with an indirect (implicit) study of 41 males using a reaction time measure of attractiveness (affective priming), the data suggested that the concept of attractiveness was just as strongly connected to the pictures of the women as to the pictures of the sexualized robots with salient mechanical body parts. Interestingly no relationship was found between the personality characteristics and the attractiveness evaluation.

To see whether the phenomenon of sex robots would be interesting at all to men, Szczuka and Kramer *ibid* asked the 229 heterosexual males whether they could imagine buying a sex robot (just as they saw them in the pictures) now or within the next five years and 40.3% indicated that they would. The individual differences measured in the study (e.g. relationship status, loneliness) did not appear to impact the decision to imagine to buy a sexualized robot. Only a negative attitude towards robots predicted that participants would find the robots unattractive.

Another study using an indirect method (Li, Ju, & Reeves, 2016) found that physiological arousal increased when people touched a robot in “private regions” of its body compared to touching it in other places. Whether or not this was sexual arousal, the study shows that we may view a robot body in a way that resembles that of another person.

The majority of those in the surveys above who answer positively are male but we should not neglect the importance of the females who answered positively about half as often. We have no explanation for these differences and more research is required.

*“We always assume men are more likely to enjoy sleeping with an object and that women need some sort of emotional connection to enjoy themselves, but that isn’t always the case.”
- Karley*

We do have a report on one woman’s satisfactory experience with a Synthetics male sex doll for a documentary film (Reardon 2017). Karley, a single 31-year-old writer from New York, explained that, “We always assume men are more likely to enjoy sleeping with an object and that women need some sort of emotional connection to enjoy themselves, but that isn’t always the case,” She said that “These dolls are 100% silicone, which makes the penis feel incredibly lifelike. At times it was indistinguishable from a real one.” And although it is a sex doll rather than a sex robot it has one robotic feature. It’s ‘penis’ moves from flaccid to erect. “It’s almost creepy,” Karley told the reporter. “It’s made to be hard on the inside with a soft

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layer over it. There’s even real pubic hair.” She said that while it was a good experience, it was not the same as having sex with a real person.

Finally, some people would not contemplate using a sex robot on religious grounds or because of religious laws. Our surveys have been all been conducted in western countries and have not considered the religious affiliations of the participants. The only article we found on religion and sex robots was from two Muslim scholars Jelili and Tijani (2012). They present an Islamic perspective on sex robots: “having intercourse with robot is unethical, immoral, uncultured, slap to the marriage institution and disrespect for human being” (*sic*). Under Sharia law, robot sex would have to be punished to deter the crime from spreading through society. Jelili and Tijani suggest that sex with a robot could be considered to be adulterous for married people and that would be punishable by stoning to death. For single people, the ‘offence’ could be considered fornication and that would carry a punishment of 100 lashes. This has yet to be tested in Islamic courts and with these possible punishments, not many are likely to risk it. Marriage to a robot would be forbidden under Islamic law in the same was a marriage to an animal or someone of the same sex.

Conclusions from Q1

Overall, the results from the surveys on whether people would have sex with a robot varied considerably. The lowest figure was 9% from the Huffington Post survey and others were as high as 66% for males with a smaller but still significant percentage for women. These results suggest there would be a market for sex robots – larger for men but there are still significant numbers of women. The surveys asked people explicitly about sex with robots but other studies using indirect experimental measures, found that people were aroused by touching robot’s “intimate” regions and that males found pictures of robots in underwear just as attractive as females in underwear. Research on individual differences did not turn up very much but these were only from two preliminary studies. More detailed empirical research is required to pinpoint a causal relationship between personal attributes and the desire for sex with machines.

Q2. What kind of relationship could we have with a sex robot?

The manufacturers of sex robots want to create an experience as close to a human sexual encounter as possible – a genuine intimate relationship. It would clearly be a step forward to roboticise a sex doll so that it could articulate its limbs in a convincing manner. But more is needed to compete in such a competitive market. The goal is to produce robots that we can form a relationship with; a robot that has human-like characteristics of emotion and conversation needed for authentic intimacy. This raises the questions (i) is it possible? (ii)

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would it be meaningful to us? (iii) how would it equate to a truly human intimate relationship?

Humans can easily be deceived into attributing mental states and behaviour to robots because of our natural tendency to project human characteristics onto appropriately configured inanimate objects. Such anthropomorphism (and zoomorphism) is commonly observed in response to all manner of robots. This illusion can aid in the development of sex robots by ultimately creating the perception of a genuine human sex partner. As a robot increasingly comes to resemble a human, our affinity with it increases to a point as shown in Figure 1 below.

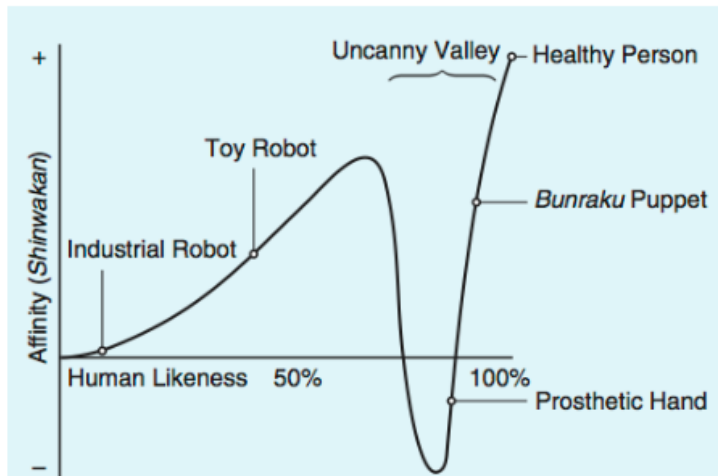


Figure 1 The uncanny valley

On the left hand side of the uncanny valley, human anthropomorphism creates a sense that either enables us to suspend our disbelief that a robot is a human-like actor or fools us into believing that it has mental states. After this point, the robot starts to look spooky to us and our affinity to it decreases dramatically. This phenomenon is what Mori et al. (Mori, MacDorman, & Kageki, 2012) call the uncanny valley.

Sophia by Hanson Robotics



Crossing the uncanny valley is the focus of much research in Japan (Kanda, Miyashita, Osada, Haikawa, & Ishiguro, 2008). Researchers have explored using silicon-like to create lifelike robots. The best examples come from Hanson robotics with their patented Frubber^(TM), a structured elastic polymer that mimics the movement of real human musculature and skin. Their robot Sophia is a good as it gets. However, despite many years of

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research, no one has yet managed to develop a robot that crosses the uncanny valley and fools us into thinking that it is a human.

The anthropomorphic illusion can be further progressed by natural sounding speech and conversation. Thanks to significant developments in speech research over the last decade, robots can now sound like real humans and they can convert speech sounds into text for further analysis. Machine conversation still has a long way to go. There are many chatbots that can converse a little awkwardly on a number of topics but we are still a long way off from having a chatbot convince us that it is human. There is certainly no sign of anything like the Scarlett Johansson character in the movie *Her*.

Yet another aspect of creating the illusion of humanness is to provide robots with the ability to respond with appropriate emotions in context. Again there have been enormous strides in robotics research over the last decade that enable robots to create emotional expressions that appear to us as happy or sad or even disgusted and so on. There are also classification systems that allow for the visual identification of human facial expression showing emotion. And robots can use bio signs such as heart rate, breathing and sweat to detect arousal.

However, except in very limited circumstances, there is still no evidence that a robot can react appropriately to the subtlety of human emotion in context e.g. was someone crying because of work stress or because their child had just died? More importantly, robots can no more *feel* the emotions that they express than cartoon characters can. We do not fully understand how human emotion works – chemically, hormonally or neurally – and we have no idea how to create genuine feelings in an artefact. So this is not worth considering for now.

Robot appearance and the illusion of emotion aside, whether or not a human can feel something for a robot addresses only one side of the equation. For a number of authors, the anthropomorphic illusion resulting from the design of a robot means that there can only be a one sided relationship between a robot and a human (Sullins, 2012). This may be considered similar to other technologies (e.g. your phone, fridge, or car). It would be a case of loving an artefact that cannot love you back (Turkle, 2011). This has led robot ethicist John Sullins *ibid* to argue that the illusion is disrespectful of human agency and “should not be used to fool people into ascribing more feelings to the machine than they should. Love is a powerful emotion and we are easily manipulated by it.”

Sullins *ibid* also frowns on the idea of human-robot loving/intimate/sexual relationships, saying that this ignores “the deep and nuanced notions of love and the concord of true friendship.” He argues that while we may find the machines physically attractive, “we have an engineering scheme that would only satisfy, but not truly satisfy, our physical and emotional

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needs, while doing nothing for our moral growth.” In other words, sex robots are little more than widely used sex toys.

This ties in with survey results. Scheutz and Arnold *ibid* noted that, “overall subjects view sex with a sex robot as somewhat more like masturbation or using a vibrator than having sex with a human”. When asked the question, *would having sex with a robot cause you to lose your virginity?*, only 30% said ‘yes’ while 70% said ‘no’ and there was no differences between males and females. This indicates that people see a difference between artefactual sex and human sex. Snell (Snell, 1997) coined the term, ‘technovirgins’ to refer to people who had only ever had sex with robots.

Nonetheless, 42% of the participants in the Huffington Post poll thought that being intimate with a robot constituted cheating while 31% thought that it wasn’t and 26% were unsure. Scheutz and Arnold’s participants rated robots as a substitute for cheating as an appropriate use of robots as 4.97 out of 7 on a scale with 1 being the lowest. This was significantly higher for men than for women.

As philosopher Charles Ess (2017) puts it, ‘since the machines are incapable of real emotions, they are simply “faking it”, no matter how persuasively’. And this ties in with views of some of those working in the sex industry. Cathyryn Berarovic (2016), a former sex worker and writer tells us,

Almost every client I ever saw, though, wanted me to have at least one orgasm during the course of our appointment, they all seemed to want to make me come as much as I didn’t want to come, and they tried everything. ...when all else failed they simply requested or demanded that I come for them. “Don’t fake it,” they almost always said, “I can tell when a woman’s faking.”

Elsewhere Ess (2016) discusses the notion of complete sex that is, “marked by the full presence and engagement of persons as autonomous, self-aware, emotive, embodied, and unique. He highlights Ruddick (1975) who sees the central role of mutual desire in complete sex between two such fully present persons: we not only desire the Other – we desire to be desired and, still more completely, we desire that our desire be desired.

Turning to Cathyryn Berarovic again, ‘the problem, though, is that no matter how good a whore is at her job, the client always knows, somewhere in his head, that he’s paying for this woman’s time and renting access to her body.’ The pretence might be even clearer when a robot is used. The knowledge that the robot is not experiencing genuine emotions might affect user experience, just like the situation with a sex worker. But we cannot currently answer this empirically. It is possible that ownership and long-term use might create a different perception in the user.

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As quoted in Choi (2008), an alternative argument put forward by Levy is that falling in love with a robot is no different from falling in love in a chat room, “it doesn't matter what's on the other end of the line. It just matters what you experience and perceive.” Levy (2008) poses the rhetorical question, “if a robot *behaves* as though it has feelings, can we reasonably argue that it does not? And elsewhere he writes,

We will recognize in these companions the same personality characteristics that we notice when we are in the process of falling in love with a human. If someone finds a sexy voice in their partner a real turn-on, they are likely to do so if a similar voice is programmed into a companion. That the companion is not in the physical presence of the user will become less and less important as its software becomes increasingly convincing (Levy, 2007)

The point Levy is making is that if the experience of the user is the same in a human relationship as it is with a robot relationship then what does it matter if the robot can feel genuine emotions? The only thing we should be concerned about, according to Levy, is the experience of the user. It is an empirical question whether or not a robot can generate the same experience that a human being can. This is doubtful when we listen to the narratives of some sex workers suggesting that that the pleasure of another human can often be tied to getting inside the life and emotional links of another human and to feel their enjoyment. As one sex worker puts it,

My clients always used to like to push boundaries. They like the fact that they are getting under your skin, or pissing you off.... They also like to know the real you. They also like to know they can control you... get in your head. I believe, for me, a lot of it can be psychological...the mind games can be the hardest work of them all actually...There are also clients who like to like the girlfriend experience and demand constant attention. They don't just want to buy sex they want to buy intimacy. Aimee and Kaiser (2015)

Other sex workers tell us that clients like to ‘party’ with them by joining them in drug taking and drinking and getting their back story just like a real girlfriend. One escort woman named Kylie Maria (she asked us to exclude her surname)¹² told us that,

Clients always want you to take drugs with them and agencies have to try crack down on this but it's impossible. Sometimes you know you have things to do the next day, but they insist. They want you to be intoxicated with them. Some girls that don't take drugs pretend to push the cocaine away with the notes

¹² Interviewed by Eleanor Hancock, one of the authors of this report

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they use to sniff them, but others enjoy getting intoxicated with clients. The clients specifically ask for 'party girls' sometimes, which basically means they want you to take drugs with them – alcohol is basically compulsory in this industry.

The idea of a sex robot being able to have a convincing background life to discuss while it got drunk and stoned is well beyond the reach of any near future or planned developments. The challenges of making such a robot may well exceed the capability of technology for a long time to come. We have no idea about how to go about this and so it remains entirely futuristic and speculative.

Although this means that some people would never be satisfied with a 'relationship' with a robot, it does not mean that other people would not. There is a great deal of diversity and differences in taste when it comes to what counts as an intimate relationship. Some may never have experienced any relationships before encountering a sex robot. Although sex robots are too new to know how clients will relate to them, there are a number of documented cases of men who believe that they have formed a relationship with passive non-moving sex dolls.

One of these (Cliff, 2016) is a Japanese businessman Senji Nakajima, who is married with two children. He said that he bought it originally for sex but after 2 months fell in love with it: 'She needs much help, but still is my perfect partner who shares precious moments with me and enriches my life.' Another example, is Phil, a 58 year-old man from the Island of Jersey. He bought his robot for sex and now pushes it around in a wheelchair everywhere he goes. People in his area have accepted it and see nothing wrong with him taking it down to the pub with his friends (Campbell, 2016).

The Danish photographer, Benita Marcussen, carried out a photographic project of men who have relationships with dolls, published on her website <http://www.benitamarcussen.dk/projects/>. She writes,

Each year 400 customized, sculpted real dolls are shipped off to new homes, improving the life quality of men whose loneliness, bad experiences with women or social void, sexually and spiritually, have driven them to enter into a unconventional, unorthodox form of life-long companionship: life with a doll. Though regarded as living in the outskirts of normality, the men find a profound attachment, comfort and joy in the dolls.

Conclusions from Q2

What does all of this tell us about the kind of relationship that we could have with a sex

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robot? Although there are many ways in which people can have relationships with technological artefacts, our question is about intimate interpersonal relationships that include sexual activity. We have noted that robots cannot feel love and tenderness or form emotional bonds. The best that can be achieved is the creation of an illusory relationship by reliance on human anthropomorphism. Robots can, at best, project expressions that represent human emotions and they can converse in a relatively limited way without understanding.

We have scholars telling us that the relationship afforded by sex robots is one sided; that it ignores “the deep and nuanced notions of love and the concord of true friendship” and will do nothing for our moral growth. They say that the best robots could do is ‘fake it’ and this will not be like the full presence and engagement required for ‘complete sex’ in which we

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desire to be desired and, still more completely, we desire that our desire be desired.

We have heard from sex workers, that even though their relationship with clients is a financial one, many clients still want the pretence of a relationship. They want more than a fake orgasm, they ‘want to get inside the heads’ of the worker. They want her to party with them and pretend that they are in a genuine relationship.

Pretence and fantasy are perhaps the key to an answer about the kind of relationship that could be had with a sex robot. It is unlikely that robots will be able to act out a fantasy relationship to

anywhere near the same level of performance as the theatrics of a good professional sex worker or be able to party with them convincingly, at least for the foreseeable future. However, they may be good enough to enable the user to ‘suspend disbelief’ and enter into what could be regarded as a *fictive relationship* with a robot. This is a little like imaginative play.

We must not underestimate the psychology of fantasy and the ability to suspend disbelief. As we have seen, there are already men having fictive ‘loving relationships’ with silicon dolls that cannot react in any way. These doll ‘relationships’ are certainly outside of societal norms but they are apparently making some people happy. And sex robots could push the illusion a step further by moving automatically, speaking and delivering limited conversations, moaning in the right places and showing emotional signs.

With the added repertoire that robots bring, the numbers of users would increase. The polls suggest that the increase could be considerable, certainly among males, although this will

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depend to some extent on whether social norms evolve to encompass fictive robot relationships.

Perhaps the main ethical issue here is in the deception of the vulnerable. Deception is a nuanced concept when it comes to our relationship with artefacts. Is the artefact constructed to enable a fictional relationship that we desire or is it deceiving us into believing that the relationship is two sided? It is an issue worth considering in the making of policy or regulation to ensure that descriptions and advertisements do not misinform about the limitations of devices

Q3. Will robot sex workers and bordellos be acceptable?

Although no robot brothels have been opened yet, Yeoman and Mars (Yeoman & Mars, 2012) predict that the red light district in Amsterdam will have robot sex workers by 2050. This is speculative and there is no way to verify it, but we can glean some evidence about the acceptability of robot brothels, or at least their use, from the rise of sex doll brothels in Asia. The company Doll No Mori started a sex doll escort service in Tokyo in July 2004. Their original plans for a call girl service were changed when they realized that labour costs would be cheaper with sex dolls. They started with 4 dolls and made back their initial investment in the first month because of many repeat customers.

This has now spread to Europe with the opening of the Lumidolls sex doll brothel in Barcelona. The company say that, “[They] are totally realistic dolls, both in the movement of their joints and in the touch, which will allow you to fulfil your fantasies without any limit. These Sex Dolls will make the experience more pleasurable, exciting and erotic.” They charge €80 for 30 minutes and €100 for an hour. It is too early to tell how this will fare in Europe but it shows an increasing social acceptability that will pave the way for sex robot brothels.

Levy (2007) points out that, “the early successes of these sex-doll-for-hire businesses is a clear indicator of things to come. If static sex dolls can be hired out successfully, then sexbots with moving components seem certain to be even more successful. If vibrators can be such a huge commercial success, then malebots with vibrating penises would also seem likely to have great commercial potential.”

In their survey, Scheutz and Arnold *ibid* asked the question, *would it be appropriate to use sex robots instead of prostitutes?* They used ratings on a scale from 1 to 7, with 7 being completely appropriate. The high average of 6.01 shows that most of those surveyed found the notion of robot prostitutes acceptable.

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Further, Levy (2008) argues that sexbots-for-hire will be able to satisfy the motivational as well as the sexual needs for those (of both sexes) who would otherwise be the clients of sex workers – to provide variety, to offer sex without complications or constraints, and to meet the needs of those who have no success in finding human sex partners. And the positive consequence, according to Danaher, quoted in the Daily Star (Waddell, 2016), is that robot intimacy will stop sex trafficking and forced prostitution. This is a very strong empirical statement and it implies that sex robots could replace most, if not all, human prostitution.

However, we have found no indications that robots will end prostitution or sex trafficking in our investigation or in the surveys. It seems unlikely given what sex workers say about the needs of their clients for human character and intimacy (see section Q2). Many clients still want the pretence of a relationship, “getting under your skin, or pissing you off”. They want more than a

we have found no indications that robots will end prostitution or sex trafficking in our investigation or in the surveys.

fake orgasm, they ‘want to get inside the heads’ of the workers. They want to get drunk and stoned with them and pretend that they are in a genuine relationship. They want to take control of another human and reach into their emotional life. For these clients, a robot would be a pale reflection – a fictional shadow – of a human. The anonymity and passivity of sex robots may appeal to some but not all potential bordello clients.

Kay Firth Butterfield, a human rights lawyer and author of “Human Rights and Human Trafficking”, points out that sex robots are unlikely, at least in the near term, to address the need for domination which can be a characteristic of the use of human trafficking victims.¹³

We have seen that even in places where prostitution has been legalized, sex trafficking does not diminish where ‘customers’ have an appetite for abuse or child sexual abuse. In fact, an increase is seen because sex is known to be available in these areas. It may be that once we can create robots which look like the ones in “Ex Machina” then a transfer can take place but do we want a society which continues the idea that it is acceptable to abuse in this way, especially if we are creating child sex robots to meet that demand?¹⁴

¹³ Personal email communication with Kay Firth Butterfield received May 4 2017

¹⁴ Kay Firth Butterfield pointed us to a paper by Lee and Persson to support her claims http://web-docs.stern.nyu.edu/old_web/economics/docs/workingpapers/2012/NEWLeePersson_HumanTraffickingandRegulatingProstitution.pdf extracted May 16 2017

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Conclusions of Q3

While we have no direct evidence about the acceptability of sex robot bordellos, one poll suggests quite strongly that they would be acceptable. We also have evidence from the precursors of sex robots with the onset of sex doll brothels. These started out in Asia and were quickly accepted and the numbers are increasing. We also noted that a Lumidoll brothel has now opened in Europe with big plans for expansion. The same bordellos could eventually upgrade their stock with robotic dolls without raising any further eyebrows. The additional repertoire offered by robots could well increase demand. Although we found no evidence for the notion that sex robots would stop sex trafficking, we found some evidence to the contrary.

Q4. Will sex robots change societal perceptions of gender?

Gutiu (2012) argues that, “sex robots, by their very design, encourage the idea that women are subordinate to men and mere instruments for the fulfillment of male fantasies. This type of harm has been explored in the context of pornography and is reproduced in the harm caused by sex robots. Like pornography, use of sex robots sexualizes rape, violence, sexual harassment and prostitution and eroticizes dominance and submission”

This argument is echoed by Kathleen Richardson who is campaigning against the use of sex robots.¹⁵ She is also concerned that the representation of sex robots is based on pornographic images of women. Richardson (2016) argues extensively that favouring the development of sex robots reveals a coercive attitude towards women’s bodies. Richardson (2016) argues that these robots reinforce a view of the female body as a commodity. Added to this, Sullins (2012) argues that sex robots, “contribute to a negative body image.”

In contrast, Barber (2017) argues that, “this can also be seen as a contemporary example of deviation as key to innovation and as a blatant opportunity to explore sexuality and the human condition in even more depth and reveal more about our need to be creative, innovative and inventive as part of our human evolutionary sexual strategy as a whole.”

Richardson proposes that male engineers in robotics are transferring their “heteronormative and sexualised versions of women onto the objects they produce.” She points out that while male looking robots do interesting tasks, female gendered robots perform services for males like an assistant or will be used sexually. This is, “another way for males to fantasize about how they can control women... if you already view women as objects, it's not such a stretch of

¹⁵ <https://campaignagainstsexrobots.org/>

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the imagination to then perpetuate this in the imagination of, and production of sex robots.”¹⁶

It is certainly an unfortunate fact that males dominate the Engineering industries. In the UK women take only 9% of engineering jobs and these numbers are reflected elsewhere in the world and with very low numbers in computer science and artificial intelligence. There is little doubt that this has a gendered impact on the technologies that we use. Robots tend to be female representations only when they are in a service or assistive role such as receptionist or waitresses. Having a more gender-balanced industry could have a dramatic effect on how gendered robots are used and depicted. However, having more women in the industry will not necessarily mean a change in the pornographic representations of women in sex robots. The choice of representations will still largely be determined by the demands of the market.

Moreover, Computer Scientist, Kate Devlin (2015), while agreeing with Richardson that “society has enough problems with gender stereotypes, entrenched sexism and sexual objectification”, also says, “opposition to developing sexual robots that aims for an outright ban. That seems shortsighted”. Devlin goes on to say that, “the internet has already opened up a world where people can explore their sexual identity and politics, and build communities of those who share their views. Aided by technology, society is rethinking sex/gender dualism. Why should a sex robot be binary?”

In support of Devlin’s argument, it is important to consider that a robot is a machine therefore it is genderless. A pornographic body representation is not required for sexual intercourse with a robot¹⁷. A unisex robot body with interchangeable genitals would work just as well. But the market and the consumers are likely to determine what sorts of bodies sex robots will have. Some may find more gender-neutral bodies more attractive whereas others may want the more pornographic representations. However, we have not yet found anyone manufacturing gender-neutral bodies.¹⁸

And yet another perspective on the objectification of women is provided by Tina Horn, a journalist for the magazine Jezebel. In a 2016 article on robots and sex in *Westworld* she writes, “women can consent to being objectified, just as we can consent to erotic role play of non-consent. In my experience, erotic fantasy is a cathartic way to reclaim the power that society systematically tries to keep from me. The times that I choose to be objectified, or choose to relinquish control, are the times I feel the most erotically empowered” (Horn,

¹⁶ Personal communication to the Foundation for Responsible Robotics via email September 2016

¹⁷ Would people accept or prefer a non-humanoid robot for intimacy? This is the subject of an amusing, yet telling, article by Summers (2016) who got people to draw their ideal sex robots.

¹⁸ Although we have not discussed it here, there may in future be problems with racial stereotyping with sex robot bodies. No research results are available. We do not have data on views of those who do not fit into binary gender conceptions.

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2016). In personal communication by email, Tina told us that she has “vast experiences with BDSM.”¹⁹

There is no question that creating a pornographic representation of women’s bodies in a moving sex machine, objectifies and commodifies women’s bodies.

Conclusions for Q4

There are complex issues with the impact of sex robots on perceptions of gender and gendered stereotypes. There is no question that creating a pornographic representation of women’s bodies in a moving sex machine, objectifies and commodifies women’s bodies. However, the big question is, what additional impact on societal perception this will create within an already burgeoning adult industry that thrives on such objectification and commodification? But it may be an amplifier, we just don’t know.

In balancing the arguments, we heard from a sex journalist involved in BDSM that she feels most erotically empowered when she consents to objectification. But this is objectification during an individual sex act with a consenting adult. This is different from women being objectified in the street or in the workplace without giving their consent. We have no public survey data on this question and it is certainly an area worth broader societal discussion that should include under-represented communities.

Q5. Could intimacy with robots lead to greater social isolation?

We have no direct evidence to answer this question and it would be considered unethical to set up controlled experiments. The majority of experts reviewed here propose that sex robots could lead to some form of social isolation. Sullins (2012) states that, “these machines will not help their users form strong friendships that are essential to an ethical society and may

¹⁹ Feminists are divided on BDSM issues. Oversimplifying for brevity, some hold that BDSM is contradictory to feminism in that it reinforces patriarchy and that women who play a submissive role are being led by sexist power structures to believe that they enjoy these acts. Others argue that consensual BDSM, particularly SM, is an ideal feminist expression of sexual freedom and that women are the real dominants because they have the ultimate control with a safe word. They feel that women should have autonomy to do what they want with their own bodies.

indeed lead to more isolation.” Whitby (2011) writes that, “An individual who consorts with robots, rather than humans, may become more socially isolated.” The reason for isolation, Richardson argues that “intimate relations with robots will lead to more isolation for the human race, because robots are not able to meet the species specific sociality of human beings, only other humans can do that”. Turkle (2011) suggests that real sexual relationships could become overwhelming because relations with robots are easier and for similar reasons Snell (1997) thinks that sex with robots could become addictive. If they are right, the possibly addictive focus on non-human relationships could isolate users from human society.

relationships with robots are fictive and may decrease our ability to interact with other humans.

Kaye (2016) goes further in suggesting that sexual relations with robots will “desensitize humans to intimacy and empathy, which can only be developed through experiencing human interaction and mutual consenting relationships.” There are echoes here in Vallor’s (2015) notion of moral and social deskilling, which can lead to an inability to form social bonds. This ties in with the idea that relationships with robots are fictive and may decrease our ability to interact with other humans.

While there is no empirical data on sex robots and social isolation, there may be something to learn from other contexts where (non-sex) robots are employed. For example, Robins et al. (2005) discuss how robots can be isolators or *mediators* for children with autism. In some cases robots seemed to contribute to social isolation. The goal, they argue, should be to develop robots that create skills in humans that can be generalized to their interactions with *other humans*. This idea with respect to sex robots requires study since they cannot be excluded from the creation of skills.

In a study about robots in the home, Dautenhahn et al. (2005) found that although 40% of participants were in favour of the idea of having a robot companion in the home, they mostly saw their role as being an assistant, machine or servant. Few were open to the idea of having a robot as a friend or mate.

There is some indication that public perceptions on the issue of isolation were mixed. de Graaf and Allouch *ibid* found that 20.5% think that companion robots could decrease loneliness while 14.3% said that robot companions could increase social deprivation or isolation and 38.4% thought that there would be no positive consequences from using them.

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Conclusions for Q5

The scholars cited here are pretty much in agreement that sex with robots could or will lead to social isolation. The reasons given varied: spending time in a robot relationship could create an inability to form human friendships; robot don't meet the species specific needs of humans; sex robots could desensitize humans to intimacy and empathy, which can only be developed through experiencing human interaction and mutual consenting relationships; real sexual relationships could become overwhelming because relations with robots are easier. The 1162 Dutch participants of the de Graaf and Allouch study were not so sure and the survey produced mixed responses to the question of social deprivation and isolation.

To balance the arguments, we need to look at other possibilities. Robot sex machines represent a new technology and much of what has been written is based on our current social norms. Regardless of our own taste, if there is a reasonable uptake of sex robots, there could be social acceptance and people may take their sex robots out on social occasions. We have already seen this emerging with men taking their sex dolls around with them. [A video on the Mirror newspaper's website](#) (Campbell *ibid*) shows 58 year old Phil out on a date night with his doll at his local pub sitting chatting with friends. The landlord of the pub spoke of Phil's relationship with the doll in approving tones, "She doesn't come in dressed up in raunchy underwear or this, that and the other. She comes in very respectable, that's his partner - fine." His expressions show that he finds it acceptable. This is not social isolation. Perhaps, it is a one off example but the point is that we don't know if there will be wide community acceptance or even a cluster of new friendship forming around sex robot owners or users.

Q6. Could robots help with sexual healing and therapy?

Many ideas have been expressed about the ways in which robots could be used for sexual therapy, or for treatment or to open up sexual pleasure for groups that may be otherwise deprived. Some sex therapists have suggested a range of ways that robots could help them with a variety of problems such as: erectile dysfunction, premature ejaculation, and social anxiety about having their first sexual encounter (cf Kerner, 2016). Opinions have been expressed for and against. We cover some of the main suggestions and issues here from sex therapy for those with social or emotional blockages, for the elderly in care homes, and for those with disabilities.

In an interview for this report, Matt McMullen, CEO of RealDolls, made a persuasive argument for the therapeutic use of robots and dolls for a certain sector of the population: "RealDolls, which we have been making for nearly 20 years have helped many, many people deal with social and emotional blockages that they may have, issues which have left them unable or unwilling to form traditional relationships with other people. The dolls have proven

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to be a therapeutic tool to help these people and above all else have made them happy and less lonely. The introduction of technology into this equation is a logical next step for us.” (see Section 8 for the full interview)

David Levy expressed a similar view in his book *Love and Sex with Robots*: “Many who would otherwise have become social misfits, social outcasts, or even worse will instead be better-balanced human beings” (Levy, 2008, p. 304). There have been no empirical studies testing this claim and it is an area that needs further study. If it turns out to be the case that the use of robots could alleviate loneliness and increase the happiness of those with emotional and social difficulties, we should perhaps consider testing them as a therapeutic tool.²⁰ Moreover, if proven effective then perhaps there should be an obligation to provide these tools for those in need.

The same applies to an idea put forward by Dr Kate Devlin, a computer scientist at Goldsmiths University, London who ran the 2016 Love and Sex with Robots conference. She told the Express newspaper (Martin, 2016),

The thing that interests me is the use of sex tech for the elderly in care homes because when we say to old people ‘we’re going to put you in a care home’, it really infantilizes them but these are still grown adults with the same amount of desire for intimacy but it is incredibly taboo to say. You could be talking about someone who has lost a husband or a wife and they’re feeling alone and perhaps that is one thing that we could offer.

This adds a new dimension to the notion of companion robots for older persons. Yes, older persons in care homes do need contact, love and some desire sexual contact. However, whether or not care home residents find robot sex acceptable is another matter. It might suit some but others may find the idea repugnant although that could change over time - we have no data on this. We must also be very careful when dealing with vulnerable older people with dementia to insure that they can give informed consent.

It may also prove difficult to get this idea past care home staff, family members and fellow patients (cf Sharkey and Sharkey 2010). Doll therapy, of the non-sexual baby doll kind, was introduced into long-term care homes in the 1990s to help people with severe dementia. The “Someone to Care For” doll is made especially for the elderly. The manufacturers claim that, “These beautiful dolls offer comfort, care and happiness to senior citizens, especially people

²⁰ The findings of Szczuka and Kramer *ibid* may appear to run counter this idea. They found no relationship between loneliness and attraction to sexy robots. However, that tells us only that people who were not lonely also found the robots just as attractive.

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living with Alzheimer’s disease. Show someone how much you care with a “Someone to Care For doll.””

Despite many anecdotal reports of the benefits that such dolls have in improving their lives, there has been considerable opposition to the use of dolls to help older persons because they infantilise them and violate their dignity (cf Sharkey, 2014).

Medical professionals have also discussed the sexual needs and rights of individuals with a view to sex as a medical therapy. In a publication in the *British Medical Journal* by Joseph Apparel, he states:

once individuals with disabilities have achieved personhood, they should receive the same rights and opportunities as all able-bodied and able-minded human beings.

in the UK Human Rights Act 1998 and the Equality Act 2010, It is illegal not to support disabled people to enjoy the same pleasures as others enjoy in the privacy of their own homes.

For too long, our society has viewed these unfortunate individuals as non-sexual beings, adopting rules in matters such as consent and reimbursement that may serve the interests of able-bodied society, but do a profound disservice when applied to those with disabilities. If we are to overcome these obstacles, and to live in a more just civilisation, we must begin to see sexual pleasure as a fundamental right that should be available to all.

Indeed, in the UK Human Rights Act 1998 and the Equality Act 2010, *It is illegal not to support disabled people to enjoy the same pleasures as others enjoy in the privacy of their own homes.*

Without intimate sexual companionship, people with disabilities could suffer loneliness and unhappiness. These are a target group that proponents of sex robots say would benefit from them. Again this should not be considered as all or none. Some may prefer the anonymity and privacy of having a sex robot in their home as a dignified solution. But sex robots may make others feel worse and more socially isolated. They may prefer alternative services with sympathetic human sex workers specialising in disabilities such as TLC, a UK based charity for disabled men and women to find responsible sexual services.

Conclusions for Q6

It is possible that the use of sex robots in some therapies could potentially help some people with sexual healing such as problems with sexual functioning or social anxiety about having

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sex. For example, it may be helpful to use a robot for private practice. But no one is claiming that sex robots are a panacea for all sexual concerns or difficulties. Once we move into areas of sex robots for the older people or for the disabled we are on ethically more uncertain territory.

Some people with disabilities may like to use the more anonymous services of a sex robot rather than the services of a professional human or other means, but we have no idea of the percentages. This population was not specifically polled. There is no reason to believe that their preferences would be any different and so it may only be for a minority. Sex robots could be offered as an option

The issues are more complex for older people and particularly those in care homes. Special provisions would have to be made to not cause offence to others. If the baby doll therapy caused problems for families, fellow patients and staff, what issues would they have with sex robots? The studies show that those with severe dementia disorders often believed that their baby doll was a real baby and they formed mothering groups. This has raised concerns among practitioners about the wellbeing impact and the ethics of deceiving the vulnerable. This kind of deception with sex robot could have more serious implications and consequences and they need to be thought through carefully if and before they are introduced.

Q7. Would sex robots help to reduce sex crimes?

Sexual desire takes many forms and there are many paraphilias (atypical sexual practices) with people experiencing intense sexual arousal to atypical objects, fetishes, situations, fantasies, or behaviours. The list is long and includes voyeurism, exhibitionism and paedophilia. Some paraphiliae are really normal variants of sexual interest and that has now been accepted by mainstream psychiatry. The U.S. Diagnostic and Statistical Manual of Mental Disorders, 5th Edition 2013 (DSM-5) splits paraphilia and paraphilia disorders. A paraphilia becomes a disorder when an atypical sexual interest causes distress or impairment to the individual or harm to others. While there is disagreement about what should be deemed normal variants of sexual interest and what should be deemed a paraphilic disorder, we focus here on paraphiliae that are clearly disorders that cause harm to others.



There have been controversial suggestions about the use of sex robots in sex therapy for the prevention of sex crimes such as violent assault, rape and paedophilia. For most of us, who are not sex criminals or trained therapists, there is an immediate visceral response and revulsion to

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the notion of child sex robots. But there are a few who believe that they could help in therapeutic prevention to stop paedophiles offending or reoffending.

Shin Takagi set up the Japanese company Trottla to manufacture and market child look-alike sex dolls that he says have been selling globally for more than a decade. According to Takagi they can help would-be paedophiles from offending. Takagi, a self-confessed paedophile, told the Atlantic (2016), “We should accept that there is no way to change someone’s fetishes,” Takagi insisted. “I am helping people express their desires, legally and ethically. It’s not worth living if you have to live with repressed desire.”

The New Scientist (Wilkins & Griffiths, 2012) reported that Ron Arkin, a robotics professor at the Georgia Institute of Technology, argued at a recent event that “people should not only legally be permitted to have such dolls, but perhaps some should be handed prescriptions for them. In his opinion, VR and sex robots might function as an outlet for people to express their urges, redirecting dark desires toward machines and away from real children.” (Rutkin, 2016)²¹

At the same meeting, MIT researcher, Kate Darling, said, “We have no idea what direction this goes in and we can’t research it. Funding is scarce, and it isn’t easy to find a group of paedophiles willing to participate in research. Such a line of inquiry would also be likely to provoke objections from many corners...” (Rutkin, *ibid*)

The Atlantic (2016) reported that, ‘Peter Fagan from the John Hopkins School of Medicine is sceptical that there ever will be therapeutic use for sex robots. Citing cognitive-behavioural theory, the paraphilia researcher believes that contact with Trottla’s products would likely have a “[reinforcing effect](#)” on paedophilic ideation and “in many instances, cause it to be acted upon with greater urgency.”’ (Morin, 2016)

Philosophy professor and robot ethicist Patrick Lin (California Polytechnic) goes further in his response to Ron Arkin’s comments in an email to us (February 15 2017):

²¹ Charles Ess (personal communication) pointed out that this is perhaps an overly simple view of sex and sexuality as something like an extant need or appetite that, like other appetites, such as hunger or thirst, can be sated with no further consequences.

*“Treating
paedophiles with
robot sex-
children is both a
dubious and
repulsive idea.
Imagine treating
racism by letting
a bigot abuse a
brown robot.
Would that work?
Probably not.”
- Patrick Lin*

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Treating paedophiles with robot sex-children is both a dubious and repulsive idea. Imagine treating racism by letting a bigot abuse a brown robot. Would that work? Probably not. If expressing racist feelings is a cure for them, then we wouldn't see much racism in the world. "Fighting fire with fire" may work in very specific contexts—such as treating heroin addicts with methadone—but not generally; that's why the expression is so surprising. This shows that the ethics of sex robots goes beyond whether anyone is physically harmed. There may be other issues at stake, such as moral character, psychological effects, social taboos, the ethical limits of experiments and therapy, and more. It's not as simple an issue as some people think.

The legality of such dolls as pornographic representations of children is also in question. In 2013, one of Takagi's dolls was intercepted at a Canadian airport and the man who had ordered it was arrested. At the time of writing this report the case is on-going. The man is being charged with possessing child pornography and mailing obscene matter. He also faces two charges under the Federal Customs Act for smuggling and possession of prohibited goods. The courts are currently in the process of determining whether or not the child sex doll legally constitutes child pornography given that Canada's Criminal Code says that child pornography concludes "a photographic, film, video, or other visual representation, whether or not it was made by electronic or mechanical means" that shows explicit sexual activity involving anyone who is, or is depicted as being, under the age of 18. This case raises questions concerning the need to update this law in a time of emerging technologies such as this one.

It is different in the United States. In 2002 the US supreme court struck down provisions of a federal law that made it a crime to create, distribute or possess "virtual" child pornography that used computer images of young adults rather than actual children. The US government had argued that material appearing to be child pornography harmed real children by sustaining the market for such pornography and encouraged those who would exploit children. But the court did not agree, saying that "The mere tendency of speech to encourage unlawful acts is not a sufficient reason for banning it,"

Does this mean that child sex robots or dolls would be legal in the US? Robot Law professor Ryan Calo told Forbes (Hill, 2014) that he thinks that it might be although it has not been tested in court as yet. And maybe that is the case in other countries. Although the Trottla child sex robots have been selling globally, there appears to have been no other reported cases of arrests. This shows a gap in policy concerning sexual representations of children. We need clarification on policies on child sex robots at the international level sooner rather than

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later about whether they should be sold legally and what sort of ownership and use should be permissible.

Moreover, developments in new materials for robot bodies could create new problems. It is now possible to cover a robot with a detailed silicon moulding of a real person. Examples include the creation of robotic Scarlett Johansson (Glaser, 2016), and Professor Hiroshi Ishiguro's creation of a robot in the image of his own 4-year-old daughter. Ishiguro is a scientist who created the robot for scientific research purposes and not as a sex robot. However, it demonstrates that it would be possible now to make a realistic representation of any particular child as a sex robot. If these were created as child sex robots, would that still be legal in the US and elsewhere. This is an area that needs attention and perhaps it calls for new prohibitive laws to be enacted internationally.²²

Another dark side to sex robots, is the notion of rape. Of course, sex robot machinery operated by on-board computers cannot grant consent or be raped any more than a soap dish can be raped. However, a life-like humanoid robot could be used to simulate a rape. There was considerable discussion about this in the media during the showing of Sky Atlantic's Westworld where extraordinarily human looking robots, played by human actors, were repeatedly raped by human guests at the Westworld theme park.

Tayag (2016) reported an MIT tech researcher, Kate Darling, saying that she was not concerned about the robots but was concerned about the human behaviour and what might happen after the humans left the Westworld Park: "Either sex robots would continue to serve as a healthy outlet for our unhealthy urges or they would whet people's appetites for unsavoury sexual fare. Both options have their own troubling implications, but the latter is more immediately problematic."

Patrick Lin told us in an email (February 15 2016),

If robots don't have rights, then they don't require consent for us to treat them in a certain way, whether it's kicking them or having sex with them. But again, we could still be obligated to seek consent, even if they don't have rights. If it's important to society that we teach people that sex requires consent, then it's not absurd to build in those norms in human-robot interaction. We're socially conditioning people to act in better ways. So, consent here isn't about the robot per se, but it's about what our action says to society.

²² Despite our attempts to write a genuinely objective consultation document, making realistic representations of children widely available to be used for sexual gratification is not something that we intend to promote.

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This echoes the teachings of Immanuel Kant who believed that although animals were mere things, we could not do to them anything we wished. In his *Lectures on Ethics* he says:

If a man shoots his dog because the animal is no longer capable of service, he does not fail in his duty to the dog, for the dog cannot judge, but his act is inhuman and damages in himself that humanity which it is his duty to show towards mankind. If he is not to stifle his human feelings, he must practice kindness towards animals, for he who is cruel to animals becomes hard also in his dealings with men. (Kant, LE, 212 (27: 45))

Danaher (2014) concurs with this view in discussing the possibility of criminalising what he describes as ‘robotic rape’²³. He provides two arguments. The first focuses on a moralistic premise that acts [of robotic rape] could be prohibited because they harm the perpetrator’s moral character or that they are offensive to others. The second focuses on a wrongfulness premise that there is public wrong inherent to the acts, regardless of any potential harm to others. He is not calling for new laws in his paper but exploring the issue of what would motivate them.

But what would robot consent entail? It would be a considerable technical challenge to develop a robot that could detect that it is part of a rape fantasy. It could have, for example, a locked fake vagina that opens only when consent is given. The difficulty would be in determining what would trigger that consent, “please may I have sex with you?” Or we could install “handled roughly” sensors like the tilt sensors on pinball machines. But perhaps this misses the point that rape is often about power and control as well as taking pleasure in debasing and humiliating victims. An obliging sex robot is unlikely to fulfil these kinds of rapist’s desires.

What seems more likely is that robots would be programmed specifically with rape fantasy in mind, to simulate a resistance to sexual advances. Danaher *ibid* suggests that this may already exist in rudimentary form in True Companion’s sex robot, Roxxy.

It is possible for robots to be created that deliberately mimic signals of non-consent. Such sex robots may even exist today. One of Roxxy’s pre-programmed personalities is called, by her makers, “Frigid Farah”. We are told that if “you touched her in a private area, more than likely, she will not be to[o] appreciative of your advance.” Admittedly, this is a pretty incomplete description of how she interacts with her users, but it does suggest a signal of

²³ Danaher (2014): “anyone who engages in (penetrative) sexual activity with a robot that signals non-consent is engaging in an act of robotic rape.”

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non-consent. Whatever the case may be with Roxxxxy, I take it that anyone who engages in (penetrative) sexual activity with a robot that signals non-consent is engaging in an act of robotic rape.

However, Gutiu (2012) takes a stronger stance that even a passive sex robot that does not resist sexual advances

is an ever-consenting sexual partner and the user has full control of the robot and the sexual interaction. By circumventing any need for consent, sex robots eliminate the need for communication, mutual respect and compromise in the sexual relationship. The use of sex robots results in the dehumanization of sex and intimacy by allowing users to physically act out rape fantasies and confirm rape myths. Of greatest concern is how sex robots will affect men's ability to identify and understand consent in sexual interactions with women.

The difference between building non-consenting and passively consenting sex robots confronts Sparrow (2017) with an ethical dilemma. On the one hand, if a sex robot is designed to resist sexual advances such that their use constitutes a simulated act of rape, then building them puts the user in relationship with the act of raping a woman. It exhorts and endorses rape. On the other hand, building a robot that is passive or elicits sex is ethically problematic for what it communicates to the broader public about women's sexuality

In terms of using the simulated rape of sex robots as a therapy for the prevention of rape or for existing rapists, there is no data to go on. But it is difficult to see how this could help prevention. As feminist writer Megan Murphy puts it cogently,

It is irrational to believe that offering men something that physically looks like a woman — that men are encouraged to engage with as they would a woman — to beat up or rape will discourage men from thinking of women as objects upon which they can act out violent fantasies or project their anger. As we know, the existence of hundreds of thousands of prostituted women around the world and a billion dollar porn industry has not stopped rape or abuse.

Conclusions for Q7

When we look at the question of whether or not sex robots could help to prevent sex crimes, there is major disagreement. On one side there are those who believe that expressing disordered or criminal sexual desires with a sex robot would satiate them to the point where they would not have the desire to harm fellow humans. On the other side, many others believe that this would be an indulgence that could encourage and reinforce illicit sexual practices. This may work for a few but it is a very dangerous path to tread. It may be that

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allowing people to live out their darkest fantasies with sex robots could have a pernicious effect on society and societal norms and create more danger for the vulnerable

Interviews with the CEOs of two sex robot companies

We requested interviews from the three principle players in the sex robot industry: True Companion, Realdoll, and Sex Bots. Only Sex Bots did not respond to our request.

1. True Companion – CEO Douglas Hines - currently sells the intimate robot product Roxxy – a female representation. A male representation, Rocky, is ready for pre-order. There are currently three versions of Roxxy: Roxy Pillow which is a head and torso of a doll attached to a pillow that responds to touch and speaks only sexually, Roxxy Silver which is a full body robot with the same features as the pillow, and Roxxy Gold which adds ‘personalities’ like Frigid Farrah, Wild Wendy or S&M Susan. It is customizable, can recognize speech and respond.

The Interview with CEO Douglas Hines

1. Why do you think sex robots is a good move for your company?

Roxxy, our sex robot, provides what every adult needs - unconditional love and support. The ability to feel the loving embrace of a lover is a right every adult should be granted. We provide a solution to help adults meet their social as well as sexual needs.

2. Where do you see the market going and what markets are you witnessing?

We see the sex robot market evolving into one where our robots will be the assistants of their owners and also provide healthcare services.

3. Do you think that eventually we will see the prices become more affordable for sex robots or will they be more of a leased item?

True Companion is working to keep their sex robots as affordable as possible.

4. What sort of functionality are you planning?

Roxxy helps their owner's sexual desires and fantasies come alive. In addition, a version of Roxxy will also provide services just like an assistant or a concierge at a hotel. We also are expanding into the healthcare arena with a robot to provide healthcare services.

2. RealBotix by RealDoll – CEO Matt McMullen - “The Realbotix project is an ongoing endeavor to integrate emerging technologies with life sized silicone doll artistry, with three main components: Artificial Intelligence, Robotics, and Virtual Reality. These core concepts are outlined below:

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*The Realbotix App: A cloud based application which can run on a tablet or smartphone that will allow a user to create a unique Artificial Intelligence "personality" as well as a customizable 3D model of this avatar on screen. The resulting AI can then be interacted with through speech recognition via the device as a stand-alone platform, and will learn about the user through these interactions and will remember key facts about them, thus creating an engaging simulation of a relationship. The more the AI learns from these interactions, the better the experience will become collectively as the app is continually updated.

*Robotic dolls: The AI app can optionally be connected to our robotic RealDoll system, so that the AI can be interacted with via the robotic doll. This platform is currently being developed as a fully animated head that can be easily attached to almost any RealDoll body, and will include full neck articulation, mouth movement, expressive brows, smiling and frowning, moving eyes and eyelids. We have been granted a patent on the skull and face design, which features the ability to easily change the entire face of the robot using small magnetic attachment points, so the owner will have multiple options for changing the look of their robot. When used in conjunction with the customizable personalities within the AI application, many unique combinations will be possible. In addition, we are creating sensors for the robot's head and body which will allow the AI to respond to intimacy and sexual activity.

*Virtual RealDolls: We are developing a Virtual Reality application in which the user can interact with the AI they have created in Virtual environments of their choice. We are exploring ways to use the tactile simulation of a doll's body or partial body to bring VR to a new level of experience. In other words, the avatar you are looking at in the virtual world could be touched utilizing a doll's body or body parts tracked in conjunction with the user's position. Using the graphics capabilities of a more powerful computer will allow for very detailed graphics and believable experiences which are literally out of this world.

*“Most zoom in on the simple term Sex Robot, while I would prefer to say we are building a robot that will be capable of engaging in intimacy and sex”
- Matt McMullen*

The interview with CEO Matt McMullen

1. Why do you think robot sex robots is a good move for your company

I think the terminology should be slightly modified here: Most zoom in on the simple term Sex Robot, while I would prefer to say we are building a robot that will be capable of engaging in intimacy and sex. RealDolls, which we have been making for nearly 20 years have helped many, many people deal with social and emotional blockages that they may have, issues

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which have left them unable or unwilling to form traditional relationships with other people. The dolls have proven to be a therapeutic tool to help these people and above all else have made them happy and less lonely. The introduction of technology into this equation is a logical next step for us.

2. Where do you see the market going and what markets are you witnessing?

I feel that new technologies like robotics and virtual reality are going to become commonplace in all aspects of entertainment. Higher levels of simulation and immersion are going to propel many industries into new areas.

3. Do you think that eventually we will see the prices become more affordable for sex robots or will they be more of a leased item?

Time will tell on this, but we are hoping that the hardware and software we are developing will be affordable.

4. What sort of functionality are you planning?

The AI is the key to all that we are working on; We hope to create an engaging experience with the AI alone, and from there the user can elect to connect the AI to either a robotic system or a VR system to interact in the Real world and/or Virtual worlds.

Summary and Conclusion

Seven questions were posed here about our sexual future with robots. We have attempted as much as possible to maintain objectivity in reporting expert opinions for and against the various issues raised. To probe public opinion we used a number of public surveys from the US, UK, Germany and the Netherlands²⁴ and we see this as only a first step to broader societal discussion. The main results of the five questions are as follows:

1. **Would people have sex with a robot?** The results from polls in four countries (US, UK, Germany and the Netherlands) indicated that there would be a market for sex robots for both men and women with the numbers significantly less for women. The percentages varied considerably in the surveys with the lowest being the Dutch at 9%. The polls also consistently show that males are at least twice more likely than females to want robot intimacy. Indirect measures also indicated attraction to humanoid robot bodies. All of the survey data were collected from Western countries and it appears that other cultures, such as those in the Islamic nations would be prohibited from

²⁴There is an unfortunate absence of surveys for other regions of the world such as the global south.

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using them. Moreover, detailed research is required to ascertain the impact of loneliness and personality characteristics on the desire to have sex with a robot.

2. ***What kind of relationship can we have with a sex robot?*** It is clear from the current state of technology that the relationship with a robot would be one sided. Robots cannot feel love. Survey results show that people think of sex robots as another form of sex toy. Only one expert proposes that robots behaving *as if* they were emotional is OK while for others the deception could not truly satisfy our emotional needs and may erode human intimacy and empathy. Both scholars and sex workers agree that they desire to be desired is high on the agenda of meaningful sex. But we noted that some people are already having relationships with silicon dolls. It seems that human fantasy enables *fictive* relationship that appear to be psychologically satisfying. But we cannot tell how satisfying without considerably more research.
3. ***Will robot sex workers and bordellos be acceptable?*** Evidence was presented from the use of sex doll hotels both in Asia and in Europe to suggest that there would be a market for robot bordellos and that they could become acceptable. And this was supported by one of the surveys in which US participants gave a high rating to the appropriateness of using sex robots instead of prostitutes. It is likely that the added features provided by robots over static sex dolls could increase demand for the current doll brothels. However, we found no evidence that the use of robots to replace sex workers would stop or reduce sex trafficking.
4. ***Will sex robots change societal perceptions of gender?*** This question revealed some strong opinions against sex robots with authors, in different ways, arguing that sex robots would negatively impact on societal attitudes to women and their body image as well as further objectify and commodify the female body. We also saw a different perspective on objectification from a Jezebel journalist that created a more nuanced view of the issues. This was not part of any of the surveys and so we cannot probe public opinion at this time. An important question is, what additional impact on societal perception this will create within an already the burgeoning adult industry that thrives on such objectification? This is an area worth broader societal discussion that should include less well-represented communities and groups.
5. ***Could sexual intimacy with robots lead to greater social isolation?*** The majority of authors reviewed here agreed that social isolation could result from the use of sex robots. Public opinion appears to be divided according to some survey results with a split in the Graaf and Allouch study of 20.5% v 14.3%. And 38.4% thought that there

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would be no positive consequences. Dautenhahn found that people saw robots more as assistants than as companions. We also looked at how some people were alleviating their loneliness by taking a silicon doll around with them and even taking it out to the local pub with friends. It seems that whether or not a fictive relationship with a sex robot will create isolation could be dependent on social norms and community acceptance.

6. ***Could robots help with sexual healing and therapy?*** It is possible that the use of sex robots in some therapies could potentially help some people with sexual healing such as problems with sexual functioning or social anxiety about having sex. They may help to alleviate loneliness and help those who have emotional or social blockages. For single people with physical disabilities, it is really up to them whether they would prefer the anonymous services of a sex machine or other available sexual services. The most controversial suggestion is for the use of sex robots for the elderly in care homes who still have sexual and intimacy needs. There are ethical concerns here about how this might impact on the dignity of those who may not understand what they are being offered and also about the deception of the vulnerable with severe dementia.
7. ***Would sex robots help to reduce sex crimes?*** This is a question that suffers major disagreement. On one side, there is a small number who believe that expressing disordered or criminal sexual desires with a sex robot would satiate them to the point where they would not have the desire to harm fellow humans. On the other side, there are scholars and therapists who believe that this would be an indulgence that could encourage and reinforce illicit sexual practices. This may work for a few but it is a very dangerous path to tread and research could be very difficult. It may be that allowing people to live out their darkest fantasies with sex robots could have a pernicious effect on society and societal norms and create more danger for the vulnerable. Currently there is a lack of clarity about the law on the distribution of sex robots that are representations of children.

The main information we have used to gauge public perception and attitudes to sex robots is from a number of surveys. These are a useful first step to probe the temperature of the topic and formulate the issues. It is clear overall that men are keener on sex with robots than women. There are different opinions between scholars about the moral issues of using robots for intimate relations. We have also heard the manufacturers put forward a positive case for robots that certainly aligns with some of the public views and points to groups that could benefit from robot intimacy. What is needed now is a broader societal discussion, informed public debate and engagement to decide in what circumstances sex with robots would be permissible. It is the responsibility of our governments and the wider international

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community to determine what is publicly and morally acceptable before stepping into regulatory territory.

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The Foundation for Responsible Robotics at the Hague Global Institute for Justice is a not-for-profit organisation founded on the belief that robots are only as responsible as the humans who build and use them and it is they who are accountable. Our goal is to foster conversations about the human purposes that are implicit in the design of robots to ensure that these human purposes are made as transparent as possible and thus, open for challenge and debate. In robots, we not only project who we are but we come to affect who we will become. These are not just technical matters. They need to be made accessible to the broadest range of citizens and stakeholders.



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