Exploration of Relational Factors and the Likelihood of a Sexual Robotic Experience

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Abstract. As technology progresses, robots will become increasingly involved in our everyday lives. Robots are already available for individual purchase and are starting to appear in our homes and offices. Robots specifically built for sexual experiences are presently available on the market. There is no current research on sexual robots or how it will affect our previous, current, and future sexual relationships. This study asked 133 participants to understand what relational factors could contribute to the likelihood of participants having a sexual episode with a robot. Results indicate one is more likely to have a sexual episode with a robot the more sexual fantasies and risky behavior one partakes in. Additionally, one is less likely to have sex with a robot the more they view robots negatively. Findings are discussed with future research directions.

Keywords: Sexual robot · CASA · Lovotics · Human-robot interaction

1   Introduction

Joel Snell [26] was the first academic to publish on the likelihood of sex robots, that he termed "sexbots" (p. 1). According to Levy [18], human-robot relationships will become normal by 2050 and may even exceed that of human-to-human connection. "The idea of robotic companionship is growing stronger. Given sociable robots, and the fact that people already anthropomorphize robots with human-like characteristics, it will be no surprise if people start to feel an attachment to them" [29] (p. 103). Humans are in favor of having a robotic companion as an assistant or servant [5]. Currently, robots are tasked with doing the 'three D's" jobs that are dull, dirty or dangerous [19].

Roxxxy the first female sex robot, and Rocky the first male sex robot was revealed to the public and have been available for purchase since 2010 [12]. These robots are made to look almost human in order to appeal to their audience. Roxxxy is not only 5 feet 7 inches tall, 120 lb but has synthetic skin and artificial intelligence allowing her to learn the likes and dislikes of her owner [13, 14]. Roxxxy is capable of having simple conversations, express love, and feel the touch of her owner with an expansion of possibilities to come via software updates [28].

2 Literature Review

2.1 Robots in Today's Society

A robot's social ability allows them to divulge into our society at an alarming rate. "A sociable robot is able to communicate and interact with us, understand, and even relate to us in a personal way. It is a robot that is socially intelligent in a human-like way" [1] (p. 149). Robots have already been accepted into a multitude of societal areas; Roomba a vacuum cleaning robot, Pleo an entertainment robot, KittyCat a robotic pet, Baby Alive a robotic doll, and Paro a therapy robot [8, 10]. Japan is leading the way on robotic production, including sexual robots [19]. As they lead world production in robots, local businesses are capitalizing on this aspect of a future with sex robots. *Doll no Mori* (Forest of Dolls) is a 24/7 doll-escort service in Tokyo, according to the owner, Hajime Kimura, "originally, we were going to run a regular call girl service, but one day while we were surfing the Net we found a business offering love doll deliverers. We decided the labor costs would be cheaper and changed our line of business" [3] (p. 1). However, we know very little (if anything at all) about the potential impact sex robots will have on our romantic relationships. Sex robots are already available and will become more popular, desirable and accessible but because they are still new, the possible impact they will have on our personal relationships is unknown. The unknown impact is the motivation for this current project.

2.2 Computers Are Social Actors

Computers Are Social Actors (CASA) [21] is a theory of social response and explains humans tend to attribute normal social responses to computers and treat them as humans. Previous human-robot interaction tested this assumption on guilt, face threatening [27], attributions of gender [17], and flattery [9]. Humans tend to treat computers with social, sometimes even personal, qualities without thinking about it. The next step in our evolution with computers is to have emotional and even intimate relationships with robots. Technological advancements with robots include the realistic look, feel, and functionality of their structure and appearance. It is believed that by 2050 people will be married to robots [18]. Based on previous research, the following research question is proposed:

RQ: What relational factors contribute to the likelihood of having sex with a robot?

3 Methodology

3.1 Participants

Participants in this study included 133 adults (63 males and 70 females) within the United States. Majority of the participants identified as White (87.2%, $n = 116$), followed by Black or African-American (7.5%, $n = 10$), Asian (4.5%, $n = 6$), and American Indian or Alaska Native (0.8%, $n = 1$). Participants' age ranged from 19 to 67, with a mean age of 36.3 ($SD = 12.09$). The highest level of education obtained was diverse: bachelor's degree

(35.3%, $n = 47$), high school diploma (25.6%, $n = 34$), associate's degree (19.5%, $n = 26$), master's degree (9.8%, $n = 13$), and general education development (GED) (7.5%, $n = 10$). Participants identified prominently as heterosexual (87.2%, $n = 116$) and either married (46.6%, $n = 62$) or in a dating relationship (27.8%, $n = 37$).

3.2   Procedures

To test the research question offered in this study, a nationwide survey was conducted. Data was collected via Amazon.com's Mechanical Turk (mTurk) service. mTurk allows for research to recruit from a diverse pool of potential participants or "workers". Much like a job board, workers see a list of tasks to be performed along with the rate of pay and a short description based on what they are qualified to do, determined by mTurk. Upon securing informed consent, participants responded to the below instruments and a short demographic survey.

3.3   Instruments

Participants were asked to complete a survey examining their own perceptions of their relationship, fear of intimacy, sexual sensations, sexual experiences, sexual fantasies, attitudes toward robots, and likelihood to have sex with a robot.

Relationship Satisfaction. To measure the satisfaction participants felt toward their most recent romantic partner participants responded to Lawrence and Byers' [16] 5-item relationship satisfaction scale. Participants responded to "In general, how would you describe your overall relationship with your current or most recent partner?" in terms of (bad/good, unpleasant/pleasant, negative/positive, unsatisfying/satisfying, and worthless/very valuable). An acceptable reliability was achieved ($M = 28.24$, $SD = 7.57$, $\alpha = .96$).

Sexual Satisfaction. Lawrence and Bryers' [16] sexual satisfaction scale was used to measure the sexual satisfaction participants felt from their most recent romantic relationship. The instrument includes 5-items asses on a series of 7-point bipolar scales. Participants responded to the question "In general, how would you describe your sexual relationship with your current or most recent partner? In terms of (bad/good, unpleasant/pleasant, negative/positive, unsatisfying/satisfying, and worthless/very valuable). An acceptable readability was achieved ($M = 28.56$, $SD = 7.19$, $\alpha = .96$).

Fear of Intimacy. To evaluate participants level of emotional involvement participants responded to Descutner and Thelen [6] fear of intimacy scale. This scale includes 5-item on a 5-point Likert-type scale from 1 (not at all characteristic of me) to 5 (extremely characteristic of me). The scale asked questions like "I have held back my feelings in previous relationships" and "I have done things in previous relationship to keep me from developing closeness". A reliability of $\alpha = .86$ ($M = 12.32$, $SD = 5.03$) was achieved demonstrating acceptable reliability.

Sexual Sensation Seeking. The sexual sensation seeking scale was assessed with a modified version from Gaither and Sellborn [11] to assess participant's sexual behavior based on their current or most recent partner. The instrument included 11-items measured on a 4-point Likert-type scale from 1 (not at all like me) to 4 (very much like me) and made statement like "I like wild "uninhibited" sexual encounters" and "my sexual partners probably think I am a "risk taker". The instrument achieved acceptable reliability ($M = 28.86$, $SD = 6.89$, $\alpha = .87$).

Sex Drive. A 4-item modified version of the Arizona sexual experience scale measured participant's sex drive [20]. The four items included were measured using a 6-point Likert-type scale based on the last week including today and included: "how string is your sex drive?" (extremely strong to no sex drive), "how easily are you sexual aroused (turned on?" (extremely easy to never), "how easily can you reach and orgasm?" (extremely easy to never), and "are your orgasms satisfying?" (extremely satisfying to can't reach orgasm). Items were scored such that higher values represent higher amounts of sex drive. The instrument achieved an acceptable reliability of $\alpha = .84$ ($M = 17.61$, $SD = 3.92$).

Sexual Fantasy. The sexual fantasy scale [15] measured participant's erotic fantasies by 6-items on a 5-point Likert-type scale (never to quite often). The instrument asked questions like "I think about an imaginary lover" and "I imagine that I am having sex with multiple partners simultaneously". The scale achieved acceptable reliability ($M = 15.17$, $SD = 5.71$, $\alpha = .83$).

Negative Attitude Toward Robots. The negative attitude toward robots (NARS) by Nomure, Suzuki, Kanda, and Kato's [22] measures particpants overall attitude toward robots. The instrument includes 14-items assessed on a 7-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree). The instrument asks questions like "I would feel uneasy if robots really had emotions" and "I would feel paranoid talking to a robot". The instrument achieved an acceptable reliability ($M = 53.33$, $SD = 14.83$, $\alpha = .87$).

Likelihood to have Sex with a Robot. The likelihood to have sex with a robot was measured by the authors' creation of a 10-item 7-point Likert-type scale ranging from extremely unlikely/unaroused to extremely likely/aroused. Sample questions that were asked consisted of "how likely are you to engage in sexual activity with a humanoid robot?" and "how likely would you be to use a sex robot to fulfill any sexual fantasies?". Higher scores represent more likely to have a sexual episode with a robot. An acceptable reliability of .97 ($M = 34.89$, $SD = 21.20$) was obtained.

4   Results

In order to determine what, if any, relational factors were correlated with the likelihood to have sex with a robot, seven bivariate correlation analyses were conducted. Using the Bonferroni approach to control for Type I error across the seven correlations, a p value of less than or equal to $.007$ ($.05/7 = .007$) was required for significance.

Results indicated a significant medium-to-large positive relationship between sexual sensation seeking and likelihood to have sex with a robot (r(133) = .445, $p < .001$). Results indicated a significant medium-to-large positive relationship between fantasy and likelihood to have sex with a robot (r(133) = .494, $p < .001$). Results indicated a significant small-to-medium negative relationship between Negative Attitudes Toward Robots and likelihood to have sex with a robot (r(133) = −.234, $p = .003$).

Results indicated no significance between the likelihood to have sex with a robot and relationship satisfaction (r(133) = −.170, $p = .025$), sexual satisfaction (r(133) = −.190, $p = .014$), fear of intimacy (r(133) = .183, $p = .018$), and sex drive (r(133) = −.183, $p = .017$).

5   Discussion

The study examined how relational and sexual satisfaction and attitudes toward robots could possibly be correlated to one's likelihood to have a sexual episode with a robot. A significant positive relationship was found between likelihood to have sex with a robot sexual sensation seeking and sexual fantasy. Simply speaking the more, one seeks out risky sexual behavior and has sexual fantasies the more one is likely to have a sexual episode with a robot. Additionally, a significant negative relationship was found between the likelihood to have sex with a robot and negative attitude toward robots. It is easily assumed if you view robots in a negative way you are less likely to have sex with one.

While the Bonferroni approach to control for a Type I error was utilized, the non-significant results are worth attention. If the standard .05 value was used for significance instead of the .007 used in this study. Significance would have been found between the likelihood to have sex with a robot and relationships satisfaction, sexual satisfaction, fear of intimacy, and sex drive. Future studies should consider interpersonal variables such as these as it relates to future behavior, e.g. livelihood to have sex with a robot.

Due to the future phenomenon of sexual robots and the exploratory nature of the project, it does have limitations. Human-robotic interaction (HRI) and social robotics in society is still growing from the early 2000's, thus potential participants may be unfamiliar with robotics let alone sexual robots. Although it is a potential limitation, it does offer a future research direction to further understand how participants envision a sexual robot. Humanoid robots are increasingly being built for our own benefit or well-being [4]. Additionally, like many survey-based studies, self-identified information was utilized. Although the information questioned in the survey is personal in nature related to sexual content. Participants discussing sexual content usually give socially desirable responses to research, although utilizing web-based surveys minimized this effect [7, 24]. Future research should consider other methodology to cross reference the findings from this study. The field of Lovotics could benefit greatly by forwarding this literature and addressing the limitations.

Additionally, participants were majority Caucasian (87.2%), heterosexual (87.2%) middle-aged ($M = 36.3$), and educated with a higher-level education degree (64.6%). These participants offer an insight into their demographic and future analysis is needed to see if differences exist between cultural and age groups. Beyond demographical issues, it is unknown what participants pictured as a "sex robot" when answering the

likelihood to have sex with a robot measurement. Future validation of the scale is needed to continue the current line of research. Furthermore, future research should include a theoretical framework to further understand the motivation and likelihood for future sexual episodes with a robot. However, further exploratory data may be necessary to arrive at a theoretical standpoint. If Levy [18] is correct, and sexual robots and humans will marry 2050, a deeper understanding of the potential impact they will have on our current sexual lives is needed.

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