

# Of Dolls and Men: Anticipating Sexual Intimacy with Robots

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Sex and intimate technologies are important in people's everyday lives. A class of technologies that is becoming increasingly more prominent in discussions of the future are sex robots. In this article, we present a qualitative analysis of posts from a forum where people describe their interactions with sex dolls and their motivations for using them through text and photographs. Forum users use dolls as a content authoring interface, imbue them with agency, and construct meaningful sexual relationships with them. Implications for the design of future robots and autonomous agents in humans' everyday lives are discussed. We highlight that sex dolls are used for more than just sex; they provide fertile ground for embodied fictions and care of the self. Future, customizable technologies for sexual intimacy and wellness should account for this use.

CCS Concepts: • **Human-centered computing** → **Empirical studies in HCI**;

Additional Key Words and Phrases: Sexuality, intimacy, wellness, care, embodiment, robots, online forums

## ACM Reference format:

Norman Makoto Su, Amanda Lazar, Jeffrey Bardzell, and Shaowen Bardzell. 2019. Of Dolls and Men: Anticipating Sexual Intimacy with Robots. *ACM Trans. Comput.-Hum. Interact.* 26, 3, Article 13 (May 2019), 35 pages.

<https://doi.org/10.1145/3301422>

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## 1 INTRODUCTION

Much public discourse on sex robots centers around their inevitability [46, 58]. The reasoning is as follows: humans readily establish meaningful relationships with non-human entities such as pets (real, virtual, or robotic), robots, and virtual agents. As robots and other automated embodied agents increasingly become part of our everyday lives, it follows that sooner or later they will become part of our intimate and sexual lives. Probably sooner: surveys have demonstrated a market potential for sex robots [79, 82]. Academics and the popular media have seized on the salacious and controversial nature of sex robots. We are concerned that salaciousness, controversy, prejudice, and taboo have the combined potential to prevent the scientific community from participating in the shaping of near horizon wellness technologies.

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This work was supported in part by the National Science Foundation under award 1513604.

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1073-0516/2019/05-ART13 \$15.00

<https://doi.org/10.1145/3301422>

One way HCI, human–robot interaction (HRI), and health informatics researchers might contribute to the development of these wellness technologies is to investigate the use of precursor technologies to sex robots: sex toys, virtual world/virtual reality (VR) sex, camboys/girls, teledildonics, and so on. As others have argued, one precursor to sex robots are sex dolls [44, 46, 58]. Although they presently lack computation and automation, recent technological innovations in materials and manufacturing have led to increasingly realistic sex dolls. The most prominent brand of sex dolls may be Real Dolls—mostly female, life-sized, detailed, expensive, and anatomically correct silicone dolls with a skeletal frame. Real Dolls have captured the public mind through popular media. Documentaries [80] and films [6] offer real and fictional perspectives into the relationships people form with dolls [1, 16]. And Abyss Creations, their manufacturer, has already taken steps to create sex robots via the Realbotix Project: “The obvious next step in Realdoll evolution is integrating movement with the addition of robotic components” [72]. They have already released the Harmony App, a smart assistant for intimate interactions that will eventually be integrated in physical Real Dolls.

This research direction fits within calls in HCI and CSCW to focus on topics that have been previously taboo in the community [52]: sex and sexuality. Thus far, there has been research on intimate relationships, hookup/dating apps, and even sex toys [7, 8, 22, 45, 90, 94]. Prior to this work were calls for HCI research on pornography [17, 24], though this call does not appear to have been taken up. In part, the slow uptake of this line of research may be due to discomfort of researchers [52]. In addition to the usual taboos surrounding sexuality, there are suspicions that the research is in support of obscenity and perversion or perpetuates the subjugation, objectification, and oppression of women [98]. The possibility of sex robots brings forth a number of additional ethical and moral quandaries identified in research and popular literature stemming from the role they will have in sex work, unusual or taboo forms of pornography, relationships and marriage, gendering, and religious sanctions [4, 15, 46, 58, 63, 73, 75, 78]. Real Dolls raise many of these concerns. The (mostly female) dolls are super sexualized, with realistic sex organs; as dolls, they are inanimate objects, corresponding to the misogynistic trope of the passive female partner; visually, their realism immediately suggests pornography; they have been rented out in ways that have raised negative responses comparing this model to brothels [81]; and starting at US \$6,000, they imply a considerable unmet need on the part of the user that some may not wish to acknowledge.

Without dismissing any of these concerns, we stress that setting aside this topic of research without investigating it may be responding based on preconceived ideas that many of us bring to the topic. For example, the dolls’ visual similarity to pornography immediately activates people’s strong feelings about pornography: but are Real Dolls best understood as a kind of porn? The dolls’ participation in the tropes of misogynistic heterosexual male fantasies is also immediately concerning—but do actual users only *enact* these sorts of fantasies? The (mostly) men who buy them are (mostly) choosing a doll instead of a real woman—but does the trope that they are doing so as a way to objectify women really capture what is going on here? In both scholarly work and popular media, owners of sex dolls are often featured as extreme or unusual, with sex dolls and the future of sex robots sensationalized. This narrative contrasts with research: a survey found that while participants restricted those who knew about their ownership of dolls to a select circle of people, they did not exhibit significantly higher mental-illness nor less satisfaction with their lives than the general US population [89]. People regularly form intimate (both sexual and nonsexual) relationships with, derive wellness from, and engage in fantasies about the technologies around them. Thus, it behooves us to move beyond framing doll users as lying on the fringes of society. As researchers, we are taking a stance in which we respect those whom we study, and we try do so while neither celebrating nor censoring their practices.

Further, we believe that studying sex doll users provides a glimpse of how people in the future might relate to robots and similar technologies and agents. Those technologies can unfold in ways that better support scientific as well as critical understandings of sexual wellness or ways that subvert it. Our strategy of envisioning the design of future technologies based on current usage of “non-” technological artifacts has proven fruitful in areas of HCI like domestic technologies [18, 96]. Moreover, approaches such as futures [51, 64] and “magic machine” workshops [5, 23] speak to a school of thought in HCI that foregrounds user insights unrestricted by current technologies and directed not toward incremental improvements in current technologies, but more forward into the future. Following this, we choose not to follow the tack of studying early adopters of nascent models of sex robots. Due to current technological limitations, sex robots are often designed by individual end users and have limited functionality. Thus, we expect that this approach might result in findings reflecting a tunnel vision centered around the capabilities designed into these dolls and current ways of thinking about sex robots. Real Dolls, on the other hand, offers both a malleable canvas for the user to creatively practice sexual intimacy on a multitude of ways and an artifact that partially renders the future of embodied intimate technologies. This group of users may not represent the majority of future sex robot users. They may not even wish to interact with technologically-augmented Real Dolls. But—by looking at the ways that people bring the inanimate dolls that are the subject of this article to life—we uncover needs of this set of users, such as intimacy unrelated to the sexual body, that were perhaps not imagined by sex doll designers (and do not appear to be conceived of by sex robot designers either). We argue that studying this group of users, though their practices cannot be seen as representative of the larger population or generalizable in any way, do lead us to new ways of thinking about sexual intimacy with embodied technologies.

In this study, we foreground the practices of Real Doll users through a study of participants of The Doll Forum (TDF), an online forum where users discuss their interactions with Real Dolls. As opposed to “a very high form of masturbation,” [85, p. 236], we describe how users imaginatively fashion their Real Dolls, comporting their bodies to make their dolls not just a human-shaped sex appliance but like a real human being with agency. In other words, for the user, the Real Doll becomes a human-like body that inhabits the home with purpose through its motions *with* the owner. On the forum, participants collaboratively illustrate both actual and virtual movement of dolls through visual imagery and texts, shedding light on how they experience the *real* in Real Dolls. At its most basic level, this “movement” is accomplished by positioning the limbs of Real Dolls. However, dolls also move in less literal ways: through the imaginations of their owners, and in visual and textual discourse interwoven into everyday lives.

This article offers two contributions to help support designers in HCI as they increasingly take on the ways that humans live everyday with robots and autonomous agents:

- A qualitative analysis following a constructivist grounded theory approach of Real Doll users’ practices on an online forum. Visual imagery and verbal descriptions, narratives, and recommendations are used by like-minded individuals to imbue the dolls with life. The bodies of users and dolls are discursively coupled in diverse and often surprising ways, constructing subjectivities for both owners and dolls. Despite the outward passiveness of the dolls, they play an active role in the lives of their users.
- Possible directions and implications for future forms of intimacy and self-care as research and development agendas in HRI. Everyday sexual intimacy is seen as contiguous with, not separated from, other forms of social engagement and wellness, and thus, this work has implications beyond the narrow purpose of designing sex robots.

## 2 BACKGROUND

### 2.1 Human–Robot Interaction

In both the fields of artificial intelligence and robotics, researchers have aimed to design technologies that simulate human appearance and interaction [34], including face-to-face conversation [57] and affective touch [33]. Though artificial intelligence research originally saw robots as a “computer on wheels,” a paradigm shift recognized the importance of taking into account the way a robot is “embodied, situated, surrounded by, responding to and interacting with its environment” [34].

One active area of research in HRI has been to examine people’s preferences for the form (e.g., size, shape, color) and function (tasks such as cleaning or providing medications) of service robots [26]. Research has also looked into how robots should act, with social rules for robot behavior, or robotiquette [34]. This includes the study of robot proxemics, or how a comfortable distance between humans and robot depends on their relationship [48, 88, 91]. The concept of robot personality and anthropomorphism has been explored. For example, Hendriks et al. [47] advocate for using a personality model to develop robot behavior. The authors solicited preferences from participants for a robot vacuum that could be, among other traits, calm, jealous, curious, polite, or spontaneous. Though topics such as how robots should appear and interact have been studied in HRI, these topics have largely been limited to the design of service robots that do particular tasks (e.g., vacuuming) [34] and, to a lesser extent, platonic companion robots. Preferences for robots that take on more intimate roles have not yet been fully studied—for preliminary work in this area, see the discussion on the survey conducted by Scheutz and Arnold [79] below.

### 2.2 Sex and HCI

In a 2004 article, Blythe and Jones [24] argued for the study of pornography in HCI with the observation that the proliferation of media such as digital photographs have made sexual imagery commonplace. Since that call, there has been growing interest in sexuality in the HCI and CSCW disciplines [22, 25, 79, 90, 94]. Kannabiran et al. [52] provides a comprehensive critical (Foucauldian) discourse analysis of sexuality in the HCI field. We particularly find inspiration from their call to see sexuality as not simply a special or interesting subject of inquiry but rather an important aspect of everyone’s everyday, lived practices; sexuality in HCI should have implications beyond sex. We also take to heart their mandate to be critically reflexive [30] of our own positions and push back against sometimes subconscious heteronormative notions of sex and gender that pervade our field. Here, we will cover some of the works covered in that survey but also extend to more recent research and other areas of research that have direct relevance to our own work.

The relationships between sexuality and technology offer insights into the tension between novelty and change on the one hand, and more enduring sexual themes and practices on the other. For example, Kannabiran et al. [53] analyzed [ijustmadelove.com](http://ijustmadelove.com), an application built on top of the Google Maps API that allowed users to geolocate and describe their sexual encounters. They found that the application allowed a practice of anonymous exhibitionism that is difficult in the physical world, and that once users discovered it, they began to develop an erotic desire to both produce and consume it, which in turn led to new discursive and social practices. Their results suggest that technology helps to establish new erotic possibilities.

In contrast, other HCI research on sexuality has found that in spite of sometimes exotic new technologies, not so much had changed. For example, sex toys, despite their function and production as a result of digital technologies, remain politically fraught. One study [42] of sex toy entrepreneurs complicates the notion of designing for a certain value, finding that moral commitments become “contingent, localized politics of distribution choices” in practice. Another study [7]

of how design philosophies shape sex toys found that designers communicate and work with users and sex experts, thus mobilizing forces around digital objects as social activism to advocate sex education, health, and wellness. Such designs may face challenges in being accepted due to social taboos [36]. For all that technology has transformed sex toys in the past 15 years, discourses and practices around them remain static.

This tension between technologies' role in transforming and even creating new sexual practices and erotic possibilities on the one hand, and in reproducing earlier sexual cultures on the other is visible across a series of papers about virtual BDSM (bondage, domination, and sadomasochism) in the virtual world of Second Life (SL), by Bardzell, Bardzell, Odom, Pace, and Freeman. This research showed how BDSM practices from the physical world, the art world, and science fiction would become reproduced in a virtual world [9, 14]. Bardzell and Bardzell [11] argue that fetish sex practices can be interpreted as aesthetic experiences, in the same ways that Dewey [35] and McCarthy and Wright [66] characterize aesthetic experiences. They observe that virtual BDSM experiences are constituted out of materials mostly drawn from contemporary culture, including the standardized visual languages of S&M (e.g., leather and steel materials, the colors black and red, and symbols of power and authority drawn from religion and law enforcement). It also built on prior erotic narratives, ranging from common scripts for individual sexual encounters (e.g., the nurse and patient, the maid and the master, the cop and the bad boy/girl), all the way to full blown online simulations of a series of fantasy novels (the world of Gor).

In a later study, Bardzell et al. [8] offer a critical empirical analysis of mediated social intimacy. Drawing from Foucault's identity theory, they examined how SL members were both subjected to external institutions and were, far from being hapless victims of these institutions, themselves subjects that shaped (stylized) their participation in such institutions. They give an example of how volunteering to do cybersexing led a male SL participant to feel an unexpected loss of control and to adopt a "female perspective"—such an analysis foregrounds the social experiences, rather than merely creative practices of online members. They argue that "social creative practices often unfold in intimate experiences; conversely, being intimate with others often demands skilled creativity." In short, participants in SL create and perform narratives that infuse online virtual worlds with extensive repertoires drawn widely from mainstream culture and subcultures alike, resulting in erotic experiences that are best understood as inventively reproducing, but not as disruptively transforming, their existing erotic lives in a new medium.

Given this tension between the novelties that new technologies make possible and the fact that sexual experiences tend to draw richly and even eclectically from culture, it is not surprising that many of the issues identified in the [ijustmadelove.com](http://ijustmadelove.com), sex toy, and SL research also manifest in the present study of Real Dolls. Our work also speaks to fetishes and how users go beyond the design of "real-life" dolls, but in a more, physically, as opposed to virtually, embodied sense. In addition, we are interested in how boundaries between real and virtual mesh in this experience. Whereas the virtual world of SL can serve as a stage explicitly visualizing the entire experience of BDSM, the online forum in this article offers a more focused view into the world of doll owners. We also focus on the ways in which visual and literary aesthetics reinforce gendered stereotypes all the while owners seek to give their dolls agency. Lastly, while SL offers people an opportunity to have intimate experiences with each other (i.e., real people behind virtual avatars), the forum that is the subject of our study offers an opportunity to prod and disclose creative practices in realizing intimate experiences with dolls.

### 2.3 Technosexuality and HRI

Beyond HCI, we also situate the present work in Porn Studies, legitimized by Linda Williams [92] as a scholarly discipline that explores pornography as a cultural form. For example, writing about

pornography consumption in the digital era, Patterson [69] posits that the genre of online “amateur” pornography, aided by technological apparatus, offers opportunities for self-production and interaction between viewer and women-as-spectacle. Using sex via webcam as a case, Alilunas [2] argues that technologies afford not only exuberant exhibitionism and virtual connectedness but new forms of sexual intimacy and eroticism of everyday life that require new discursive mechanism to describe and understand them as they are phenomenologically different. Taken together, we consider the work we survey here in the emergent research area of technosexuality that explores “the ways in which technology has produced or configured sexuality, how technology become sexualized and how sexuality has in turn configured technology in society” [43]. In other words, human sexuality is not fixed but is capable of change, and that technology is partially constitutive of human experience, desire, and self-expression [12].

Though sex robots have been studied in terms of ethical and legal implications [60, 73, 78, 97], Scheutz and Arnold [79] are perhaps the first researchers in the field of HRI to broach the subject. Their survey examined differences between the attitudes of women and men towards the role of robots in sex. Both genders found using sex robots to maintain and protect relationships as well as finding relationships in isolated places as acceptable. However, women rated sex robots as less appropriate than men who overall were more open to the possible forms and use of sex robots. Scheutz and Arnold [79] surmise that these differences stem from media that caters to males as the primary customer and user of submissive sex robots. In another survey, Szczuka and Krämer [87] found no relation between participants’ reported feelings of loneliness and how sexually attractive they rated robots with or without obviously mechanical body parts. These two surveys serve to counter popular perceptions that users of sex dolls or robots are “social misfits” [58, p. 304] and reinforce the need for research to go beyond the mere physical act of sex. Our work complements this social psychology scholarship that identify factors affecting people’s perception of sex robots; drawing from ethnographic methods to empathize with users [95], we identify how the felt and lived experiences that people are currently having with technosexuality, as manifested by Real Dolls, can inform future designs for intimacy and self-care.

## 2.4 Dolls and Real Dolls

The high fidelity and cost of Real Dolls has attracted popular media attention. For example, *Lars and the Real Doll*, a film starring Ryan Gosling, was nominated for an Academy Award in screenwriting and received favorable reviews. Two chapters from Marquard Smith’s [85] book, *The Erotic Doll: A Modern Fetish*, has direct relevance to our work. In one chapter, Smith describes the commission by artist Oskar Kokoschka in 1918 of a life-sized doll modeled on his ex-paramour, Alma Mahler. The account details the private correspondence between the obsessive Kokoschka and the doll creator, a dressmaker. Smith examines Kokoschka’s sheer anticipation of the doll and the ultimate, disappointing reception of the doll. Here, the notion of the doll as a thing or object (or in our terms in this article, as an object in the world) is alluded:

[I]t is not just that the doll embodies the idea of the fantasy, the possibility to act as a surrogate for his lost love, to be Mahler, but rather that the Silen Woman’s [i.e., the doll’s] lifelessness is the very thing that Kokoschka desires...[Kokoschka] is attached to it as a fetishistic object of desire but also and all the more as a desirous thing *to be made use of*. (pp. 128–129)

Smith’s point is that Kokoschka thought he wanted something that would come close to his relationship with Mahler, but, in the end, what he really wanted was a doll—something he could only realize upon receiving the doll. Smith notes that the dressmaker used all her creativity—feminine sensibility—to make a life-like doll (given the limited materials then). Similar to our doll users,

Kokoschka never tells us whether he consummated with the doll. Though a deeply personal account, Smith's description of Kokoschka's doll, and in particular the tension of trying to have both the doll as thing and subject is echoed in our own findings.

This ambiguity that Kokoschka comes to identify has parallels to observations that users of SL have a sexual identity crafted through a dual phenomenon [8]. First, they are subjected to the discourse and the institutions that produce it. Second, they are subjects of their own volition in relation to the aforementioned discourses. For instance, the flexible interactions afforded by SL allows users to engage in acts of intimacy that are impossible to carry out in real life. At the same time, this subjection to the SL eco-system facilitates the user becoming a subject of an experience of intimacy, leading to their own growth and development as a sexual being. The case of the Real Doll, as we will argue in the paper, is a user treating a technology, albeit a non-digital one, as both subjects of their own experiences (e.g., having agency) and as subjected to their needs (e.g., the need to provide and receive care). This treatment of a technology as a self that is subjected to and subject of we believe foreshadows repertoires of practices with ever more forms of customized, personalized technologies for sexuality.

Smith's chapter on Real Dolls is one of few academic works examining these dolls. She draws her data from extant material, four interviews with Real Doll owners from a documentary called *Guys and Dolls*. Some of the findings echo what we found forum members discussing—the companionship of dolls and that dolls are “capable of giving and receiving love without denying that they are passive inanimate (p. 231).” The tension that Smith notes between realism and delusion is touched upon in our main findings as well. Finally, Smith also mentions how photographs of Real Dolls feature them in mundane settings (e.g., domestic spaces), giving the dolls a history (p. 233).

Smith is useful in highlighting a common trope in the social construction of technology [70]: how users appropriate their artifacts, ignoring their original intent. More specifically, we are dealing with how users know that sex is not a soulless act but rather can be about “making love.” Our findings will broadly show that the act of giving a sexual object some verisimilitude, not only via direct modification but the use of narratives and their associated artifacts, is inevitable. While a large body of work in CSCW has shown how online communities give its users social support and knowledge exchange, in this article we highlight how online communities are part of an ecology of artifacts that support verisimilitude.

## 2.5 Sexuality and/in Feminist HCI

Bardzell introduced feminism to HCI [7, 10], calling it a “natural ally to interaction design.” Feminist perspectives take marginalized perspectives into account, understand that science is not value-free, and foregrounds (or at least does not ignore) gender and other qualities that are used as grounds to oppress. Feminism and feminist HCI concerns itself with the body [10, 76], and one vein of feminist scholarship emphasizes somatechnics, or how the body actively plays a part in producing knowledge, explaining that the body is actually a technology for disseminating specific types of cultural and social knowledge [71]. With this perspective, “examining the body as technology means locating the body within technologies of power and the uses to which bodies are put” [71]. Though research has begun to explore how feminism and sexuality/intimacy intersect (e.g., [3, 13, 42]), the demand for and sociocultural impacts of sexual wellness technologies suggest that far more is needed. In particular, as computation becomes increasingly physical, tangible, and embodied, research is urgently needed on body-oriented technologically mediated sexual wellness.

HCI researchers have also investigated how we might design for intimate and sexual interactions. Kaye and Goulding [54] discuss the design of “intimate objects”—artifacts that support intimate conversation between partners. Taking a critical technical approach that fundamentally subverts the core premise of communication devices, they interviewed couples and asked them to

generate designed objects for communicating intimacy. For instance, some designs attempted to replicate the sensation of holding each other's hands (e.g., through a heater). They argue that customization may be an important design concern when designing objects. These aspects—enabling sensations of intimacy via customized objects—are touched upon by TDF participants. Wood et al. [93, 94] used a set of innovative methods to design for sexuality. They developed games supporting particular principles (consent, intimacy, trust, momentum) that facilitate productive interactions [94]. They also utilized the “story completion method” to speculatively have people inexperienced with VR technology explore the use of VR in pornography. Participants described a highly personal future merging sex and VR that nonetheless reaffirmed heteronormative sexual fantasies commonly depicted in pornography. Participants were at times aware of the dangers of such futuristic scenarios of VR use with sexual experiences (e.g., unable to engage in sex with real partners or unintended, undesired sexual encounters). Here, we see parallels to Wood et al.'s [93, 94] work with the personal, customized practices of doll users as well as their discourses around the morality of technologies for sex.

### 3 RESEARCH APPROACH

We collected textual and visual texts from a forum dedicated to Real Dolls. Real Dolls are arguably the most popular life-sized sex doll brand [85]. The forum is a “Meeting Place for Love Doll Owners & Admirers.”

#### 3.1 Data Collection

We developed a screen scraper in Ruby to fetch all posts from the “ABYSS Creations - RealDoll” forum hosted at “TDF.”<sup>1</sup> In total, 5,586 threads or 79,214 total posts ranging from August 14, 2001 to September 9, 2015 were collected. Each thread, on average, contains 14.18 posts ( $SD = 14.76$ ). This represents the entire corpus of postings on this forum as of December 9, 2015.

Posts on TDF are publicly viewable without an account. TDF's terms of service does require users to be an adult (18 years or older). This study was submitted to and approved by our university's ethics review board. The forum is publicly accessible and anyone can access the content (post texts and images) without an account. We also believe with the latest media attention on Real Dolls (born in documentaries and fiction film), members know that their postings are worldwide viewable. However, we acknowledge the topic of the forums may be considered sensitive or offensive to non-members, and posters may not expect their postings to be subject to scholarly research. Thus, we adopt parts of the “moderate disguise” strategy proposed by Bruckman [27]. We reveal the online forum's name as it might be easily found with a cursory search. All quotes have been obfuscated, or altered while preserving the meaning. Each quote is labeled with the notation “[PN]” where  $N$  is the thread ID in our data. Where names (whether they are of a person or doll) are relevant, they have been replaced with pseudonyms. We adopt TDF member terms in this article: we use Real Doll, RD, and doll interchangeably, and we sometimes refer to those who have acquired a RD as “owners.”

To prevent so-called reverse-image searches, we consulted a computer vision expert and chose to obfuscate all figures by distorting their dimensions via a small affine transformation; we changed the image from a rectangle into a slightly non-rectangular, random quadrilateral. We have also chosen to censor aspects of images that may reveal the poster's identity or be considered inappropriate to some. While we cannot claim our methods will foil a determined individual, we believe this obfuscation strategy provides a balance between showing rich data to complement reportage of our findings while not comprising the privacy of forum users.

<sup>1</sup><http://www.dollforum.com>.

The rules of conduct for TDF state that the forum serves to promote “Doll Erotica,” not pornography. Considerable space is devoted to outlining TDF’s policy on photos:

[P]otos of explicit sex with or without a doll are not allowed, this includes photos of body fluids, simulated or otherwise. TDF does not allow photos of real humans showing their genitalia. Only artificial representation of human genitalia are allowed. No photos with anything inserted in the vagina or anus for sexual stimulation. No photos with a penis-shaped object in the mouth. No photos that can be considered violent. No photos of any dolls that may be perceived as under 18 regardless of manufacturer’s stated age are allowed.

Photos occupy a special relevance to TDF users. Not only can members directly embed or link photos in TDF posts, TDF hosts other external websites devoted to photo albums of love dolls.

Due to the primacy of the visual, we are interested in the *visual discourse* of Real Dolls [77]. This social constructivist approach [50] seeks to uncover the taken-for-granted reality we intersubjectively experience [20] as socially constructed by the texts around us and scrutinizes the methods by which such texts are made relevant and indispensable in the world. Real Dolls are tangible objects that can be described with written text, but images are a powerful form of discourse on the bodily form of Real Dolls. That is, we believe that in addition to written text, images are a primary form of knowledge for doll owners; they delimit the body’s place in the world, how it should be comporting, and its legitimate forms of practice. TDF serves as a site by which images (texts) allow members to disseminate and shape intersubjective knowledge about dolls.

For this reason, we opted to analyze posts that contain significant images. In our dataset, the average number of images per thread was 5.46 (MED = 4.00, SD = 6.22), and the average size of images was 7.91kB. We extracted all threads from our original data set that had at least two posts (an initial post followed by a reply), a median number of images greater or equal to 4.00 (the median number of images per thread in our dataset), and an average image size of at least 2kB. This ensured that the threads we would analyze have some back-and-forth dialogue involving images, a certain quantity of images (the upper half of our threads in terms of number of images), and had large and/or higher quality images (e.g., many images used by members were simply graphic emoticons). This reduced our dataset from 5,586 threads to 316 threads (7,775 total posts).

### 3.2 Analytic Lens

After data collection, each researcher first separately analyzed and coded 20 unique threads. Following a constructivist grounded theory approach [30], we iteratively developed our coding scheme together as we found common and emergent themes. We used open coding to code the rest of the threads with our developed codebook, stopping once we reached data saturation. Memoing occurred throughout, and generated codes were continually refined through axial coding. In other words, when new codings arose that did not align with our current codebook, these codes were discussed and integrated or rejected into our codebook. In line with constructivist grounded theory’s maxim for researcher reflexivity, we note that our analysis was also backgrounded by visual discourse analysis [77] whereby we unpack not only the content of visual imagery but the mechanisms by which such imagery serves to legitimize or marginalize certain forms of photography and doll use. Additionally, we actively committed to an empathic approach [95] toward TDF’s members, seeking to know them through their words and images and to convey what it is to be the other through our memoing.

After saturation, we identified practices with the doll’s body as a rich topic of interest. Our initial memos revolved around the creative ways in which the body was co-constructed by members of TDF to become more than just a Real Doll. Employing discourse analysis, this co-construction was

achieved, reinforced, and validated through the discursive activities, both visual and textual, of TDF members. Memos served as the foundation of our empirical findings, which shed light on the reported and depicted practices of Real Dolls forum users, as well as their motivations for doing so.

### 3.3 Limitations

Our research focuses on men's interactions with and around Real Dolls. The data we collected from the "ABYSS Creations - RealDoll" forum was exclusively dedicated to RDs resembling women. We encountered few posts written explicitly by women and even fewer of women who identified as active users of RDs. Some posts we encountered mentioned women but were often in the context of men mentioning their partners.

This article does not specify demographics on posters. Posters in TDF can opt to list demographic information (e.g., location, occupation, website) in their profile but this requires creating an account. Because this added level of security implies a concern for profile privacy (accounts are to be viewed only within a "community"), we decided to not report this information as users might not expect their demographic data to be collated and analyzed. While we have no way to verify with certainty the gender of posters, based on the described uses of RDs, posters' language about themselves, and the key market for RDs, we are confident that the majority of posts in our dataset were written by heterosexual cisgendered men.

Women's voices are largely missing in this study. However, women are significant consumers of sex toys and products [7]. Additionally, other forums on TDF such as "Boy Toy Dolls" are dedicated to male RDs manufactured by ABYSS Creations and may include more diversity in terms of sexual orientation and gender, but we focused on the dominant heterosexual cisgendered male voice in "ABYSS Creations - RealDoll." We acknowledge that this choice omits an already minority voice in the forum and envision that future work will, for instance, focus on women's or LGBTQ experiences with RDs, which may (or may not) suggest different requirements and expectations of embodied, intimate technologies.

Another concern is the demographic diversity of the RDs in the images of our dataset. This has implications on whether our analysis only reflects a small swath of intimate possibilities. We attempted to analyze all the doll images in our dataset, but we found it difficult and potentially problematic to categorize, for example, the race or age of the dolls. Moreover, since posters modified dolls via makeup, clothes, wigs, and so on, it was impossible to accurately identify characteristics like size. Due to these issues and the fact that images posted were often photoshopped, even trying to identify dolls in photos with the catalog of available models was infeasible.

However, we can limit our examination of demographics to the types of dolls sold by Abyss Creations.<sup>2</sup> As detailed in Table 1, Abyss offers a wide range of Real Doll options. The dolls are diverse in the context of allowing customers to choose from a number of skin, hair, and eye colors as well as nipple and hair styles. The doll face options seem to cover a wide range of races and ethnicities (Figure 1). The average waist size ( $M = 23.7$ ",  $SD = 1.4$ "") of the offered RD body shapes is considerably smaller than that of an average American woman (AWW). The AWW wears between a Misses size 16–18, which is equivalent to a Woman's Plus size 20W (37.5" waist size) [32]. According to the American Centers for Disease Control and Prevention (CDC), the average waist size for adult American women aged 20 or older is 38.1" [39]. The average waist-hip ratio (WHR) of the dolls is 0.68 ( $SD = 0.04$ ). Studies have identified a WHR of 0.7 as more attractive to men in Western cultures [84].

Overall, the choices of dolls—all able bodied with small waists and lower WHR—arguably conform to male-centered heteronormative standards of sexual attractiveness. These standards

<sup>2</sup><https://www.realdoll.com>.

Table 1. ABYSS Real Doll options (as of August 2018).

Type	Height	Cup size	Waist	Hip	Body part	Basic colors
Body A	5'3"	33C	24"	35"	Skin	Cocoa, Fair, Light Tan,
Body B	5'1"	32C	23"	32"		Medium, Tan
Body C	5'10"	34A	24"	34"	Eye	Blue, Brown, Hazel,
Body D	5'6"	36DD	24"	38"		Green
Body E	5'1"	32B	23"	36"	Hair color	Light Blonde, Medium
Body F	5'1"	32F	24"	37"		Blonde, Strawberry,
Petite 3	4'10"	32B-32C	22"	32"		Red, Cinnamon,
Petite 4	4'10"	32DD	22"	36"		Auburn, Brunette,
Petite 5	4'10"	32A	22"	32"		Black, Light Brown
Body AA	5'2"	32C	24"	34"		
Body AB	5'6"	34D	26"	36.5"		
Body JD	5'9"	34B	25"	37"		
Body KL	4'11"	32B	25"	34"		
Body LF	4'11"	30B	21"	31.5"		
Body SD	5'7"	36DD	26"	36.5"		
Body SS	5'8"	34DD	24"	36"		

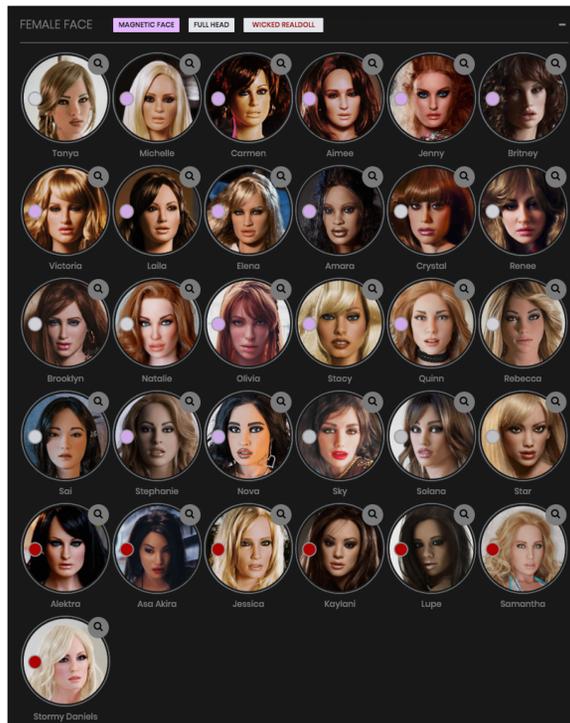


Fig. 1. Real Doll faces (as of August 2018).

reflect the views of the “sexually privileged” that promulgate sex as a means of enjoyment but nonetheless reserves that honor for “normal” forms of sex, not “unnatural,” minority forms of sex [65, p. 53–55]. While we believe that many of the requirements for intimate, embodied experiences with artifacts have aspects shared across all users, future work needs to go beyond the sexually

privileged. This is not only for the sake of equity, but also for the sake of better design: Seibers notes how some sex toy designers have designed for disabled bodies and that such innovations have historically also led to significant benefits for able bodied individuals as well [83, p. 132].

Lastly, our findings are limited by our observations of owners on the public online forum. We have no knowledge of practices “behind” the scenes in the privacy of their homes, and thus cannot claim with certainty that our results are representative of Real Doll owners. In particular, we are unable to comment on the ethical issues regarding edge cases (e.g., physically abusing dolls) of using Real Dolls [85] because they were not observed and were prohibited on the forum.

#### 4 DOLLS AS CONTENT AUTHORIZING INTERFACE

One of the ways that we hope to bring Real Dolls owner practices back to HCI is to relate these practices to research agendas in HCI. One of these is content authoring, a research and development agenda that has for decades concerned itself with supporting users as they produce content. In the 1980s, that meant text editors, but by the mid-2000s HCI researchers were looking at ever-more sophisticated multimedia authoring tools. We argue here that one of the ways that Real Dolls extend beyond their putative purpose as sex appliances is by supporting content creation.

We are only “playthings” for these Dolls,  
They have their own lives.

How did she unhook herself off the hanger?  
How does any doll do what they do?  
They simply do what they want—we just follow along with them.  
—*Poem fragment from [P98]*

Each of these quotes attributes agency to the dolls, which includes both the ability to form intention (“do what they want”) as well as to act on it. Seeing the dolls in this way requires skilled creative labor from their owners.

##### 4.1 Dolls as Skilled Creative Labor

For members of TDF, the doll is a platform upon which creative endeavors can flourish. Real Doll owners construct dolls as subjects whose bodies inhabit and make sense of the world, as real humans do. Owners use a set of skilled creative practices to craft dolls as subjects. These practices involve imagination, physical engagement with the doll, and applying an understanding of the ways that women exist in the world.

*4.1.1 Springboards for Mundane Imaginations.* Significantly, owners’ visual (i.e., photo series) and textual (i.e., posts) discourse provides a means to show that dolls are not merely sex toys or objects for physical gratification.

Let’s assume that the experience of sex really starts and ends in your head. Although the warmth of a RD’s silicone is spectacular, sex with a RD is more than just physical. A wonderful fantasy will always best a middling reality. [P6]

RDs are not merely sexual appliances. Your photo series in fact demonstrates what makes RDs so special: they’re springboards for the imagination. [P40]

I have a real relationship with my dolls. Yes, it is an artificial, but a relationship nonetheless. Everything that I do—the positioning, touching, sex or love-making—is what anyone would do with a woman. If you can accept this and “play” doll, sex transitions from something good to something you’ll never give up. [P6]



Fig. 2. Desiree reading and opening a curtain.

Here, the springboard is an analogy to physical world sex: the Real Doll is a representation of a real sexual partner. Yet this analogy has its limits. In P2, it is explained that though a Real Doll could not completely replace a relationship, the level to which it could approximate one

...depends on your imagination and the “play” effort you’re willing to devote. As with other illusions that command our lives, you get what you put in. [P2]

The concepts of illusion, imagination, and play suggest something a little bit different than literally recreating traditional sex. P6 expands with a metaphor:

We construct an intoxicating fantasy using this doll as our main “prop”; you are both the “movie studio” and the audience. [P6]

Now owner and doll are no longer sex partners; instead, the owner is both producer and audience, and the doll is an actress.

How these fantasies are created is subject to the owner’s own experiences, desires, and skills. Yet, they are also subject to the norms of TDF and society at large within which doll owners are inscribed. It is within these constraints that doll owners can creatively produce their own “movies.”

Owners described using their imagination to construct explicitly sexual fantasies but also romantic and even mundane fantasies in ways that differ from standard pornographic encounters. Owners posed dolls and then posted pictures depicting activities such as reading books. Some went to considerable lengths to engage the dolls in these seemingly humdrum activities, such as attaching a curtain to a window frame (Figure 2). These realistic, everyday contexts affected the lifelikeness of the doll: “Wow, she seems real in your car! [P181]”

Doll owners collaboratively, and even competitively, created rich and innovative stories about Real Dolls. One type of collaborative storymaking was sorting and collecting doll pictures that had been previously posted, according to a new metric. For example, one poster wrote: “We desire [the dolls] to be alive. We wish them to be acting like a realgirl or at least close by to us in every situation. So, naturally, our RDs have experienced many means of transportation.” The poster then uploaded several pictures of their own doll and asked “How about your RDs 😊? [P95]” Many posters responded with pictures that they had previously taken of their dolls on various means of transport (Figure 3). Some recast pictures that did not have to do with transportation in this new light, for instance, saying that a doll lying on an electric blanket was on a “flying electric blanket,” or that “legs” should be considered a mode of transportation, accompanied by a picture of a doll in lingerie standing.

Though dolls and sex toys are sometimes thought of as a solitary hobby between owner and sex toy, TDF is a forum where dolls are jointly constructed as subjects. On this forum, the relationship



Fig. 3. Two separate posts: Doll on car and riding a lawnmower.

with the doll is made public and legitimate. To some extent, this intimacy (as Kokoschka the artist felt [85]) can only be achieved by treating their dolls as a natural, fluid part of one’s world. This naturalness and fluidity however is achieved through significant work.

**4.1.2 Performing Femininity.** In addition to imaginative work put into constructing a Real Doll, owners engaged in planning and daily maintenance. One poster likened their labor in arranging and positioning the doll to the daily self-care activities of women.

*You are in charge of a woman’s creativity: you will choose her wardrobe, accessories, dress (and undress) her, smooth out her hair, keep her cleansed and made up, pose her seductively, and create her vocal script. We’d certainly notice if women didn’t put this effort for all of us! [P6]*

For a powerful, intoxicating fantasy to occur, the owner must learn and apply creative skills that involve learning to style hair, positioning bodies to belie sexuality, and selecting outfits—working with the physical realities of the body (e.g., limb range) that require workarounds and consultation with others in the forum. In posting photographs, the owner may engage in technical work editing images and share or seek advice on making dolls look realistic. A key element of this creative work is engaging with what a “real” woman—a particular construction of a real woman—looks, acts, dresses, and even sounds like.

More often than not the doll was shown doing tasks that are traditionally seen as “feminine.” For example, in Figure 11 the doll is standing in front of the dining table. She is doing laundry with a pile of clothes on the table for her to fold. Comments often allude to dolls “cooking and cleaning,” liking “clothes and shoes,” “getting her beauty rest,” and eating chocolate.

The site of these creative acts is the doll—tangible, physical objects. Crucially, Real Dolls are not merely objects to be manipulated. Rather, they become, as Merleau-Ponty [67] says, enveloped with the user. They are a lived-in body that acts with intention and inhabits the environment. Thus, owners *make* the Real Doll into a body through which they can experience the world.

Dolls are not sex objects but an entity to “*spend time with... laying in bed watching TV, trying different outfits on her, and taking photos. Even though we don’t have sex every night, we do sleep together every night.*” These phrases—“*spend time with,*” “*trying different outfits,*” “*sleep[ing] together*”—are activities *with* the doll. In the owner’s subjective experience, the doll does not have actions done on her. By demarcating the actions that the member does with the doll, they also demarcate the actions that the doll does—that she has her own stance and experiences the world too. The doll is



Fig. 4. Unboxing a real doll.

framed by the owner as a body with agency. Here again, we speculate that this finding applies far more broadly than with sex dolls, and it anticipates what will be common human interactions with robots. Specifically, experiences that arise from anthropomorphization might come to outweigh a robot's intended functionality, narrowly construed.

In part, Real Dolls pose a creative challenge that owners relish—to work with the restrictions of its body form to create something that is both unique and alluring. Doll users want her to “*appear real, just as a real woman might look similar to another woman, but never exactly the same as another. She has her own, unique self.* [P64]” We now turn to examining how members carry out their creative endeavors and how these creative endeavors not only enrich their *own lives* with their dolls but helps to inspire and feed *each other's* (real fantasy) lives with dolls.

## 4.2 Doll as Materializing Social Conventions

Real Dolls present an opportunity for owners to imbue their dolls' bodies with agency. By working with the body, owners are able to make their dolls unique. Like real humans, dolls have their own look and personality. Members of TDF talked about a number of ways to customize their dolls. Some practices parallels those of women, while others go beyond.

**4.2.1 Living Femininity in Dead Weight.** Dolls are shipped in large wooden crate boxes. Akin to iPhone “*unboxing*” videos on YouTube, unboxing pictures on TDF portray the sense of anticipation and joy in the arrival of their dolls (see Figure 4). Owners often celebrated their doll's anniversary—that is, when their dolls were acquired: “*You will never forget this moment of struggling with that behemoth crate, opening it and exclaiming, ‘Wow!’* [P154]”



Fig. 5. Face IDs 18 (left) and 14 (right).

Posters also purchased used dolls. Revealingly, some doll owners call this “adopting” a doll: “If you really want a Real Doll, adopting might be a good alternative. When I adopted Ally in 2013 she was almost four years old. She was made in 2009. I couldn’t afford a new doll, so only adoption worked for me. I bought her for under \$3000. She was well cared by the previous doll owner...I adopted her for photography activities. I have other dolls for playtime. [P297]” Based on our data, adopt does not suggest incest but, rather, infantilizes the doll as something that must be taken care of (we will comment on this later).

Dolls arrive with no clothing (unless specifically ordered). Owners can customize dolls when they place their order. Indeed, as when researching any potential purchase, this is a source of much conversation on the forum. We focus here on one particular issue: the “body part IDs.” As an example, one poster listed the different measurements of each body type. Here, we list the “petite” and “voluptuous” model:

Body 4; US Dress size 4, X-Small; Bra size 32AA; Shoe size 7; Height 4’10”; Measurements (over breast, waist, hip) 30”–23”–33”; Weight 77lb / 35.1kg; Description—Petite

Body 8; US Dress size 8, Small/Medium; Bra size 34B; Shoe size 8; Height 5’7”; Measurements (over breast, waist, hip) 36”–26”–37”; Weight 106lb / 47.9kg; Description—Voluptuous

A number of threads detail lengthy deliberations over exactly what kind of body and face IDs to purchase. Each body type satisfies different preferences. Body 8 “has large hips but just B cup breasts although body 5 has huge tits but smaller hips. [P99]” The Real Doll company allows people to get “breast augmentation for an extra charge. But, I believe you can only go up one cup size. [P134]” Forum members often identify themselves with their doll’s IDs: “I named mine Jody. Jody is a body 5 and face 11 combo. [P174]” Here, the design of a Real Doll sounds like a strange blending of configuring a laptop before buying it and playing with a Mr. Potato Head. The language is objectifying in multiple senses of the word.

But, the languages changes somewhat when owners talk about the different faces available. Figure 5 shows different faces used by dolls posted by members of TDF. These members extol the virtues of the Real Doll brand and their face choices:



Fig. 6. Natural makeup (left) vs. eye shadow and lipstick applied (right).

The most important thing about the face is whether it looks lifelike. Does it have a “soul”? I don’t want a look that is blank and bereft of life. It’s not that hard to get the look you want, but you must to make the right choices. Forget the hoopla about its silicone and skeletons. This is *the* reason why RD is top notch—the wonderful sense of life that their dolls possess. [P64]

The “*sense of life*” or the idea of a doll having a “*soul*” is part of what distinguishes Real Dolls from its competitors, and it outweighs the technical features.

In their unboxed state, dolls are dead weight, but owners are able to assume the role of a female, putting on clothes, wigs, and makeup to alter their experiences. Some dolls come with minimal makeup applied (e.g., eyeliner). On TDF, owners exchange advice on applying and using makeup. As one owner says, “*Certainly, the face is important but I think the ‘variability’ of any doll’s face depends on the makeup, hair color and style, and the lighting conditions under which the photos are taken. [P64]*” For maximum customizability, owners can purchase a doll with “*natural makeup*”: “*That way I can change their appearance whenever I wish. [P126]*” Rhonda is shown on the left-side of Figure 6 with natural makeup; on the right-side Rhonda has had eye shadow, lipstick, and nail polish applied.

Discourse about makeup revolves around the *materiality* of the doll. The doll’s skin is made of silicone, a substance notoriously reticent in taking up other materials. On TDF, members observe that polish does not stick onto silicone; as a workaround doll owners attach fake nails first and then apply nail polish to the fake nails. In the same thread, a poster notes that “*eyeliner pencils are useless*”:

Zoe has light brown eyeliner and natural eyeshadow which is almost invisible. Liquid eyeliners work well, eyeliner pencils are useless, while powder eyeshadow is easily applied with a small brush. It paints directly onto the silicone. [P126]

Members must smartly combine techniques of real women (the discourse almost reads like a beauty magazine) with the materiality of the doll’s bodies. One poster enlisted his adult daughter, a budding cosmetologist, to help him apply makeup to his doll (P16). A female member of TDF recommends a makeup application book by Kevyn Aucoin, a prominent American makeup artist: “*His books are an excellent lesson on the female face, and on changing it through makeup.*”



Fig. 7. Doll with temporary tattoo.

While the application of makeup necessitates an understanding of the materiality of dolls, owners believe it also necessitates an understanding of women. Below, a poster asks that the doll owner imagine wearing the clothes themselves to assess their potential damage to the doll. This excerpt describes both a concern with an embodied experience with the doll and the materiality of the doll's body itself:

Immediately remove anything that could leave marks on the skin. Clothes are always a problem. Use them sparingly for when taking pictures, otherwise, dolls don't mind being stored naked. Avoid embroidery and sequins, hard stuff and patterns. Imagine what it would be like to wear and pose with it for a lengthy period of time. Avoid things that aren't comfortable for yourself. For example, neither you nor the dolly wants to sit for hours on a zipper. The risk of damage increases quickly within a short time. Sitting on a zipper might leave marks on the skin within a few minutes. This mark may or may not be permanent. [P90]

We see complex layers of identification and disidentification. We saw earlier the objectifying language of the dolls' part numbers, how the owner was like a film producer and audience to his doll/movie star, and how silicone is different from human skin—these are all disidentifications. But now we also see identifications: “*imagine what it would be like to wear...it*” and “*neither you nor the dolly wants to sit for hours on a zipper.*” The identification also implies a gender switch, where the man is literally like the doll, and also where men share makeup application tips like female-written and oriented beauty articles.

In another thread, members discuss adding “*realistic or even \*real\* tattoos on a doll's skin.* [P302]”:

I personally would *not* try tattooing your doll. It'll hurt its silicone skin and the results won't be as good as you expected. The silicone skin of a doll has a different texture than human skin. My girls like to have tattoos, but the temporary kinds that don't hurt to get. [P302]

What is interesting above is that though tattoos are often thought of as permanent markers on the skin, members express skepticism of doing a “*real*” (i.e., permanent) tattoo. Figure 7 depicts the kind of temporary tattoos (purchased on Amazon) members applied on dolls.

**4.2.2 Standing on Their Own.** Significant activity on TDF is dedicated to the problem of posing dolls. A major challenge for many owners is the sheer heft of the dolls. In thread P14, a poster

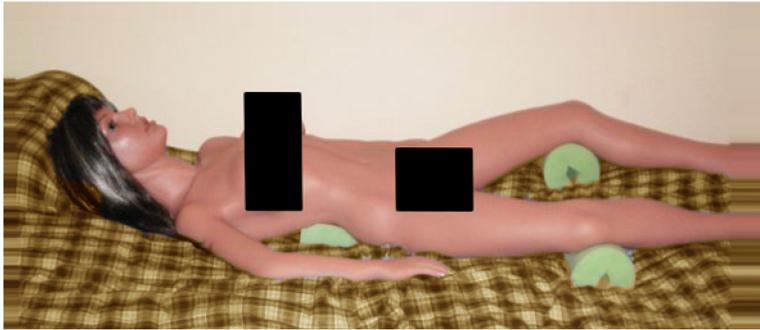


Fig. 8. Foam rollers to protect a doll during storage.

mentions not looking “forward to lifting 100+ lbs.” Another loves the “detail, finishing, and realism of the RD, but I just can’t handle the 78 pounds. [P52]” Indeed, “[t]hese beauties are not light even to be tossed around. [P122]” P99 gives some sage advice to a potential purchaser of a Real Doll:

As a newbie, you need to face the facts, or specs. Weight is a big thing with these dolls. The B10 is heavy at a whopping 112 lbs. and is 5’5” tall. Those 39” hips pack on the pounds. The B1 on the other hand has 34” hips, 1” taller, and weight 96 lbs. The B7 is very popular at 85 lbs. but it is a B cup, 5’3” tall, and has 33” hips. 16 lbs. can feel like a big difference when getting to the 100 lbs. mark, but 27 lbs. will feel even bigger.

Some owners store their dolls on furniture in their homes. However, this storage, whether on the bed or on a chair can lead to damage. “Flattening of the doll’s butt will be noticeable and can be avoided by not leaving the doll sitting in a chair too long...the doll must be treated as delicately as glass. [P90]” Any pressure on these “flat spots [P174]” will potentially cause permanent deformations in the doll’s silicone. Figure 8 shows one solution—using foam rollers on a bed underneath the doll.

Posing dolls is of vital concern to doll owners. If dolls are to become companions, their bodies must navigate the world naturally. To have the doll move to perform sexual acts is relatively easy in the “standard,” missionary style act. However, RD bodies must comport to do everyday tasks that reflect everyday living. By posing the bodies in these important, sometime mundane, tasks, owners give their dolls a sense of vibrancy and intention. The visual capture of these movements allow owners to share this vibrancy.

Dolls are able to stand on their own but need to be stabilized. Figure 9 shows Lina, a 120 lb Real Doll standing against a desk. This is one of the rare cases in our data of a silicone doll standing on her own. However, this sort of posture looks unnatural to some and may damage the hands (due to excessive weight on the hands). To accomplish more fluid movements, RD users rig up various contraptions of which the most utilized is the *stand*. RDs have a bolt in their neck that allows it to connect to these stands. The stands are also called stance modifiers:

I invented the “stance stand” so that I could photograph Clara Miller from any angle without having to later resorting to photoshopping out the stand and back support. The beauty of the stance stand is that the girl can have a natural stance on stairs, for example without the need for something to push her back to keep her upright. [P92]



Fig. 9. Real Doll stabilized against a desk with owner.



Fig. 10. Real Doll stands.

Schematics for building your own stand can be found on TDF; parts are easily obtained at local US hardware stores like Home Depot. Figure 10 shows examples of stands.

Not only do members of TDF share tips on constructing stands, they also describe how to hide the stand for more realistic photos. Creative positioning can help occlude the stand (Figure 11). Most popular, however, is to Photoshop away the stand (Figure 12). On the right, Figure 12 shows a doll whose body is engaging with everyday activity, a hobby of guitar playing. Using a stand and then applying Photoshop or occlusion techniques lets the doll engage with the world unencumbered.

Posters also worked on photographic techniques, praised other users for their skill in dressing and positioning dolls and editing photographs:



Fig. 11. A Real Doll stand occluded.



Fig. 12. Real Doll stands photoshopped away.

Woah. She is **\*\*so\*\*** sexy. Your skills in photography are SO amazing, at this point you are quite the pro.

Your pictures have great lighting, I love to see how you are growing as a photographer and I can't wait to see your work as time goes on!

I love this work you've done. It brings her alive! Great job! [P121]

The ones who had posted the photos were often appreciative of the praise and asked for input:

...just tell me if you want something different, i had a lot of fun doing this last set, i do them for all of you because i want to keep this dream alive, the dream i had, which is now a reality and fantasy that has come alive. [P39]

Using DIY rigs and post-processing, owners relished the chance to find inventive and skillful ways to bestow dolls an embodied life with them.

**4.2.3 The Gaze of Dolls.** While the positioning of the overall body garners most space, owners also find ways to articulate the body to achieve realism. When shipped, the doll's face is relatively immobile. Below a member discusses turning the doll's head:

Your doll should have the ability to turn the head and hold this pose to an extent, but she can't hold the pose in some positions (like looking over or past her shoulder). If she can't, tighten the joint of the neck like [other poster] said. [P91]

The role of *gaze* is important for the dolls and their presentation in the forum. Research in film studies [19] focuses on the gaze as a primary source of pleasure in cinema, distinguishing among three different gazes: that of the camera operator gazing at the actors (the pro-filmic gaze); that of the characters within the story gazing at each other (the diegetic gaze); and that of the viewers gazing at the film (the spectator gaze).

All three are operational with these photos. The pro-filmic gaze is not only accessible to us by means of the photographs themselves, but also in the posters' explanations of why and how they constructed the images as they have. The diegetic gaze is materially difficult to achieve—the dolls are stiff and this threatens to break the illusion of the situation depicted in the photo. The threads below make it clear that effort spent on improving the dolls' gaze are key to establishing a “*sense of sentience*”:

I have had a hard time getting the eyes in different positions, but this is needed to give that sense of sentience that we are trying to find in our photography. I have found it helpful to use the end of a pencil eraser to prod and poke the eyes to the right place. [P133]

I...chose to move the eyes so they look off to the side just a little bit to avoid the two-thousand-yard-stare that dolls without movable eyes have. So, like a lot of people, she will naturally have a side that looks better in photographs. [P38]

A convincing diegetic gaze is presented as an aesthetic achievement, and it is viewed as such within the spectatorial gaze. For example, in Figure 13, we see Jaiden apparently gazing adoringly into the eyes of the forum member. Jaiden, writes one viewer, “*looks like a RG [real girl], looking straight into your eyes!* [P162]” The diegetic scene has come to life in the spectator's gaze. One criterion of a successful photo, then, is where the pro-filmic, diegetic, and spectatorial gazes are all in alignment: the view offered by the photo effectively presents the diegetic gaze, which brings the narrative characters to life in the eyes and minds of the spectators on the forum.

Another thread describes how removing the eye from the Real Doll and inserting a dowel can allow the eyes to be articulated (Figure 14): “*The eyes aren't solid and open in the rear. So I fixed a wood dowel with silicone in the eye and then cut out openings. Now I can move the eyes with my fingers. I shaved the dowel to allow me to move the eye a wider range.* [P172]” As with the stand, the eyes further signal that the doll inhabits its space around it, acting with intent, rather than being lifeless. Other posters responded with techniques to apply lube to make eyes easier to move, using suction cups or darts from nerf guns, prosthetic eye removers, photoshop to alter the eye position after the picture was taken, and cutting some material out of the face and applying dowels to the



Fig. 13. A gaze and then a kiss.



Fig. 14. Hacked eye with dowel (left), back of head with hacked eyes (right).

eyeballs. The posters noted the techniques that were more challenging or involved more skill, and the individual who posted the dowel technique (Figure 14) acknowledged that “*Lubricant is still the easiest. [P133]*” Throughout this section, we again see the oscillation between doll-as-subject (the gaze and its meanings) and doll-as-object (manipulating the eyes).

## 5 CONSTRUCTING MEANINGFUL, SEXUAL RELATIONSHIPS

On first glance, Real Dolls are inflexible, inanimate objects. However, we have shown that users vividly and creatively scaffold their dolls to create a reality where dolls are subjects with agency. Here, it is also instructive to examine that while dolls are constructed as subjects, doll users *themselves* are constructed as subjects. In other words, the particular ways in which dolls are constructed as subjects reveals much about how users see themselves. For instance, by seeking a life companion, users implicitly frame themselves as more than sex-hungry, objectifying subjects.

This tacit construction of dolls as subjects of their own experiences (e.g., having a voice, intentions, a perspective) and as subjected to their needs (e.g., the need to provide to receive care and the need for self-expression and actualization) is done because owners downplay the asymmetry of their relationship. Like Prometheus, owners want to empower dolls with the ability to experience the world—while these experiences seem fabricated, they are, as shown in Section 4, subjectively

experienced as real because the bodies of dolls fluidly participate with their owners' everyday practices. The dolls' apparent reciprocation of feelings and desires give their owners great satisfaction. Qualities of emotional reciprocity, apparent participation, and implied symmetry appear to be design implications of these results—though the ethics of these qualities are clearly complex.

Sexual intimacy is important to many relationships. And, indeed, the dolls have been designed by Abyss Creations as sexual beings. The mobility of dolls is restricted from the moment they are conceived. A poster more concerned about using the doll for photos (P168) asks, *“Why do dolls look like they’re laying an egg when they stand?”* The explanation is that *“[T]he dolls are manufactured to be partly seated. From what I know, this prevents them from straining during sex. Many dolls have a neck bolt which shifts their weight such that they tend to lean forward.”* This purposeful, physical deformity of the doll's body gives it its “bow-legged” appearance in servitude to its sexual function. The doll thus sacrifices mobility for sexual function, but the bow-leggedness comes to mean more than mere functionality; their sexual functionality at least in this regard compromises their beauty.

While explicit sexual acts or stories were rare on the forum (as mentioned in Section 3.1, TDF prohibits photography of owners having sex with dolls), discussions often turned to the doll's sexual performance. Specifically, the doll is constructed as a sexual subject. We emphasize that a sexual subject can also be about constructing meaningful relationships. Objectification of the body is an act people carry out in real relationships and everyday activities. For instance, power and domination are key elements of many intimate relationships [11]. While it may seem paradoxical, a sexual subject is one who has the freedom to suspend their own agency to satisfy the sexual user.

The doll as sexual subject has an unequaled sexual prowess. For example, the potential for the doll to give oral sex like a machine is often alluded to:

To be honest - I keep Sandra around because this doll can suck the bricks off a chimney. If you take this face and put it on a 5 body you'll get a sex bot that can contribute days of oral stimulation. [P58]

In thread P90, a discussion of materiality arises but around the durability of the doll due to the continued stress of sex: *“I’ve heard that the vagina can be a too tight with a new doll. But owners tell me that it does slowly expand due to constant stretching over time.”* In a thread about wigs for dolls, an owner specifically notes what is for posing (i.e., “artistic” photos) and what is for sex: *“The golden rule is: long wigs are for posing but short wigs are for play! [P88]”*

Stories of hacking can be about maximizing sexual performance. Here, a poster creatively uses a fleshlight. Again, note the hallmarks of previous discourse—concerns about damage, going beyond the Real Doll's body, and the ways dolls may be better than the “real deal.”

I sliced a substantial piece from a fleshlight and got it into the vagina of my real doll. It's incredible and I honestly am unsure if anything can compete with this, aside from the “real deal.” I thought it might stretch out the vaginal opening but it didn't. I left the edge of the fleshlight out so it didn't get mashed up inside. When I finished, the piece came out with no damage to my RD at all. [P72]

The clinical manner in which owners “operate” on dolls subjects the doll to objectification. This sort of objectification has parallels to the ways doctors and nurses learn to have emotional detachment by objectifying patients and their bodies [59]. However, just as doll owners would emphasize, emotional detachment is not a strategy to create a callous person. Instead, this detachment serves to allow doctors (analogous to doll owners) to accurately understand and empathize with someone's emotions [55]. Thus, while the detached manner in which owners play doctor and treat their dolls may on first glance seem cold, when seen in the guise of detached concern, these actions actually

represent a pragmatic form of care by owners that seeks the most effective, risk-free procedures for their dolls.

Comparisons of Real Doll and the “real deal,” and often what are referred to as “real girls,” come up on this forum. Women, “the real deal,” serve as a creative resource for owners; the needs and intentions of real women is a design material that owners project and perform with Real Dolls to create a live woman with her own needs and ability to fulfil her desires. More specifically, this newfound existence—one with agency—depends on the manipulation of her owners. Another poster explained that Real Dolls are actually superior in some sense:

I would actually say, “A real woman has the ABILITY to deliver more satisfaction and pleasure than a doll can.” But whether a given girl will DELIVER on that ability is a different thing. [P122]

Unlike real girls, dolls can always deliver on their potential as it is the owner who brings that potential to fulfillment.

### 5.1 Personas of Sex

When Real Dolls are interpreted and presented in a sexual situation, there are certain ways that the dolls (putatively) stylize or perform their sexual desires. In other words, there are an infinite number of ways that the Real Dolls could be constructed as sexual beings, but they are actually constructed in particular ways.

Dolls are not simply sex objects: they are sexually desirable, but they are also *themselves* interested in sex. Intrinsic physical qualities of the dolls were interpreted as signaling desire for sex. Pictures where the doll’s skin was shiny due to the silicone were described as “*wet and moaning*. [P93]” Dolls were frequently photographed in poses that implied that they were pleasuring themselves. With another pose, an owner explained that “*RDs are open and ready*. [P73]” Owners constructed the desiring doll for other owners: “*Gotta scurry as Lucy is getting frisky again* 😊. [P149]” Here, it is the owner who is being subjected to Lucy’s desires and sexual initiations.

In addition to the desiring persona (also often seen in pornography), dolls were constructed as having a playfully mischevious side. In one “unboxing” story, a poster writes:

The most beautiful of the dolls removed her garment, and guided the fellow’s descent into the bed...with the voice of a seraph she whispered, “Let’s play sweetie!” [P97]

Posters responded to pictures with descriptions of dolls as “*a shade mischevious* [P103]” and “*not totally naive* [P103],” as having an “*aggressive demeanor* [P101]” that “*bewitches you, but also makes you consider hightailing it*. [P101]”

In Section 4, we highlighted how owners form rich narratives with their dolls on TDF through visual imagery and textual stories. These narratives subject dolls to a life that simultaneously weaves the mundane with a sexual life. For example, scenes of domesticity in Figures 2 and 3 feature dolls with skimpy outfits, underwear, lingerie, or nothing at all. The presence of genre scenes with sexualized subjects again emphasizes that dolls, while sexualized, are part of the owners’ world. Certainly, these sexual personas subjected by owners to the dolls are informed to some degree by traditional pornographic tropes which portray women as ravenous and submissive. However, doll owners often engage in particular pornographic tropes that may arguably be seen in a positive light in which their partners have their own sexual desires and preferences. In this sense, owners may draw not simply on pornographic tropes, but visions of what it means to have a relationship, to have a “girlfriend experience” [68]—experiences that include friendship, companionship, and partnership.

## 5.2 Needing to Be Needed

Whenever I get my doll from one room to another or get her dressed—not a trivial thing given how much she weighs—I feel as if I am engaging in an almost spiritual practice, involving some sacrificing of myself for another. I am spending my self, my time, my sweat, for this other entity, because this will give us time to be together. She is not technically "real," but she is alive in my imagination and the work I put in to taking care of her makes the whole thing feel even more real. Seriously, every single time I put in effort for my doll I fall more in love... [P89]

Earlier, we saw that dolls serve as a sexual companion. Certainly this role helps owners fulfill basic sexual needs. But, more importantly, just as sex is part of any relationship, they fulfill the psychological needs of owners. The quote above shows that many owners feel love for their dolls and that this love is made more real by feeling needed. The owners "sacrifice" themselves, imaginatively toiling away to care for dolls in ways that are immensely satisfying. For owners there is a crucial link between work—both physical and mental—and the relationship with the Real Doll. In this sense, the owners' efforts are reciprocated, physically and mentally, by the dolls.

Dolls were seen as vulnerable and in need of protection, both from physical harm and from other men's gazes—the spectator gaze. One poster explained that:

The realistic and gorgeous nature of these top of the line real dolls cause the owner to form a bond to the real dolls just like he could with a real girl. Owners frequently speak to their dolls and interact with them physically in a way that is both devoted and respectful. Some won't even post a naked picture of their doll. They can be very protective of their dolls, and not because of the high cost of getting one! Like a stunning real girl, real dolls connect with something that is deep down in a man's subconscious... [P89]

The last part of this quote is emblematic of how dolls do not merely satiate instrumental sexual needs. They address a deep need to *be needed* by their owners.

Dolls, with their life-like, expensive, and sophisticated bodies are thus an ideal medium by which to give care and to receive the feeling of being wanted and, indeed, of being depended upon. Engaging with a body that require significant caregiving provides owners with the opportunity to express love and devotion:

When I was first thinking about getting a real doll, I knew that sex was not reason enough to purchase one. I looked at the real doll forum and saw how much work it is to care for a doll, I stopped thinking of them as dolls and began to consider them helpless real girls. They need a well of dedication just like someone who cannot move or communicate what she needs - and that is why I got her. [P89]

Here, we see again the link between work—both physical and mental—and the relationship with the Real Doll. In particular, imaginative work is key for satisfying owners' needs.

In caring for dolls, owners became caregivers. In Figure 15, an owner is repairing his doll, and using the opportunity to become her doctor. The owner finds meaning in giving more of himself to take his doll from passive to active, if only in his mind. The doll must be passive for the owner to care for her in this way—if the doll could move herself from room to room and dress herself, the relationship would look very different. The doll needs a man to exist. As with any intimate human relationship, there is a psychological desire to feel needed by the other.



Fig. 15. Doll surgery.

## 6 DISCUSSION

From the onset, we have suggested that Real Dolls may hint at the future of embodied interaction with new forms of intimate artifacts such as sex robots. Academic and popular discourse have both emphasized the inevitability of robots designed for sexual intercourse. Yet, this prediction does not consider the *relationships* people will have with robots beyond merely instrumental sex.

Real Dolls are designed for sex, and users value the physical intimacy achieved with sexual intercourse but also relate to dolls in ways that go far beyond sex. We have highlighted two key aspects of this relationship with Real Dolls. First, Real Dolls support creative self-expression and self-actualization in highly personal ways. This creation and reinforcement of personal repertoires of intimate relationships is done with the dolls themselves and the spaces, both digital and physical, that surround the doll's bodies. The particular fantasies, analogous to embodied intimate fictions, enacted with dolls show that owners envision living with dolls in the world. Interaction through TDF between owners and, by proxy, dolls enriches these intimate interactions.

Second, users express themselves as subjects of, and subjected to, their dolls. This observation highlights that owners on TDF express a need to be needed. This psychological desire has parallels to many healthy, real-life relationships—many of us have a desire to feel wanted. Thus, owners want with dolls what people often want with their partners, sexual intimacy and long-term companionship. And, just as people have specific likes and dislikes, owners enact particular intimate fictions of dolls, within the confines of the discourses of intimacy that surround them and the doll itself, to their desires and the doll's desires.

We turn to discussing how these two key themes in our work point to new ways of thinking about the design of sex robots.

### 6.1 Embodied Intimate Fictions

Real Dolls come alive not only because of their lifelike faces but also because of the imaginative stories their owners construct and tell about them. The dolls become diegetic props. As we have learned from research on design fictions, diegesis refers to the fictional universe created in a story. In design fictions, diegetic technologies are rendered plausible because the characters of the world

interact with it, use it, and think about it [61]. In other words, it is the diegetic prototypes that bring a design to life, and therefore they serve an important cognitive purpose, helping readers to understand the fictional world and also its implications for everyday life. In a similar sense, owners use Real Dolls to create a sort of *embodied intimate fiction*. Textual narratives, doll personalizations, photographic poses, and doll modifications serve as a creative platform to create this fiction both personally and online. It brings the dolls to life, but it is not limited to the dolls: it brings the whole *world* of the dolls to life, allowing the owner to enter into, experience, and tell others about it.

Though these embodied fictions give depth to the experience of intimacy for each individual owner, intimacy is not always a solitary endeavor. Just as in “real” relationships, the men in TDF share stories about their lives with their doll partners with other men. These stories of intimacy are proudly posted online and then heightened through extended conversation with other owners and their dolls. Thus, these fictions are meant to be read, viewed, and—indeed—fantasized upon further by others.

Moreover, as we move to sex robots, we need to consider that intimate fantasies are more persuasive if they are customizable. Although Real Dolls do not come in infinite shapes, appearances, nor sizes, customization begins at the online order form (cf. Section 3.3). To what extent will the “base model” of sex robots offer customization? Sex robots offer both possibilities that limit or extend customization. The complexity of sex robots may limit the functionality available while the possible programmability of robots offers new, exciting ways to further customize robots. Recent work [31, 74] on roboticists suggests that they sometime too narrowly define what constitutes legitimate use of their robots; sex roboticists may similarly too narrowly define the legitimate acts of intimacy with their robots.

Sex robots are envisioned as having artificial intelligence. This artificial intelligence will be tied to both the voice and movement of the robot. While advances in machine learning have increased the accuracy of voice recognition and performance of path finding, we are far from realizing robots that can be involved in convincing, natural conversation and fluid movement with the world. Thus, robots with a limited range of vocal inflections, phrases, and movements may provide little room for customization—a vapid fiction. Certainly, we can imagine that users *will* find ways to go beyond the limitations of sex robots, difficult though it may be. Therefore, the design challenge is whether sex robots properly offer a space from within which users can enact their embodied intimate fictions. Real Doll owners, for example, seemed to enjoy the challenge of “authoring” their dolls, yet this was only enabled because of the wide range of directions one could take with the Real Doll. Additionally this challenge is not something to be shameful of—owners relish the chance to share, support, and critique each other’s fantasies. Supporting creative self-expression and self-actualization in highly personal ways without disparagement—ways that allow people to intensify their relations with themselves through anthropomorphic roleplay with another—arguably has an important place in any sexual wellness agenda moving forward.

## 6.2 The Care of the Self

The men we have described own an ostensibly inanimate doll that they seek to bring to life, to imbue with freedom and the ability to engage *with* the world around her [67]; owners want a doll they can live with and understand the real world, together. These findings point to what Foucault and Sennett [38] call technologies of the self:

In all societies there is another type of technique: techniques which permit individuals to affect, by their own means, a certain number of operations on their own bodies, their own souls, their own thoughts, their own conduct, and this in a manner so as to transform themselves, modify themselves, and to attain a certain

state of perfection, happiness, purity, supernatural power. Let us call those kinds of techniques technologies of the self.

Thus, while working within the institutions that have shaped societal norms of sexuality and intimacy, Real Doll owners have the freedom to work within these constraints, sometimes reinforcing extant norms of sexual intimacy and sometimes pushing against them—these actions constitute “the care of the self.”

Certainly, passivity is part of the intimate fantasies owners create. However, this is not a passivity that is totally disconnected from freedom. Forum users enact a specific kind of passiveness by protecting dolls from the repercussions that result from the dolls construction (e.g., joints that bend during storage), intended use (e.g., tears in skin from intercourse), and creative additions (e.g., makeup that damages the skin). Yet the helplessness of the doll appears to contribute to the feelings the owner has for it, and even was described by one owner as his motivation for buying the doll. This can be seen as a human desire to nurture another and hence care of the self.

Commercial technologically-enabled toys designed for long term relationships often require care from humans (e.g., Tamagotchi, Furby toys), which is highly effective for promoting relationships as it taps into human needs to provide nurturance [21]. Studies have shown that many children [37] and older adults [56] enjoy the fact that preternatural robots [86] need maintenance. The nurturing that these owners do involve some activities that might be seen as going against the traditional roles prescribed to men, such as bathing and styling the hair. There is the potential for men to experiment in non-traditional gender roles in the kinds of care they give to dolls, in a space (TDF) where it is sanctioned. Indeed, taking care of dolls requires men to understand embodied experiences traditionally practiced by women (e.g., with makeup and clothing).

Thus, the meaningful, intimate relationships doll owners have established fall in line with how technologies, far from being tools, are becoming our partners and subjects of our attachment (e.g., becoming attached to service robots in the military [29] and hospital [62]). More importantly, however, this attachment to robots speaks to how we desire robots who need us for care. Design ought to consider the needs of users beyond physical sex (or any other robot “functionality,” narrowly construed) and that the embodied nature of robots coupled with sexual functionality cannot be entirely disentangled from emotional and psychological aspects of intimacy.

### 6.3 Alternative Viewpoints

In the popular discourse—just as with pornography—people have been concerned with how sex robots reinforce heteronormative, unrealistic expectations of women and relationships. Indeed we do not wish to dismiss or devalue these important discussions. However, because this has been discussed in such depth by others (cf. Section 1), we have chosen instead to highlight the complex voices and practices of Real Doll owners. Instead of simplistically depicting owners as a different kind of doll—a sex-hungry, objectifying caricature, we offer a perspective that owners are seeking an intimate relationship *with* dolls that are perhaps not so different than so-called real relationships.

Randell-Moon [71] provides a somatechnical perspective (for an HCI perspective on somaesthetics see Höök’s [49] work) on how the body is discursively produced not as an apolitical artifact, but rather a “technology of and for the dissemination of particular forms of cultural and social knowledge.” Importantly, her analysis suggests technologies give the illusion that we are free to mold artifacts without outside influence but, in fact, this illusion makes us docile to the social structures that discipline us to use our artifacts in certain legitimate ways. These social structures come both from the people and institutions that surround us and the designs of the artifacts.

Gill critically describes a shift in the representation of women in advertisements from a passive, sexually desired object to savvy female empowered with sexual agency. This brand of feminism conveys an agenda that is outwardly progressive and authentic but, Gill argues, an ultimately limited and predictable enactment of traditional male sexual fantasies. For instance, the “midriff character” is a canonical figure in advertisements who deliberately plays with her sexual power and is always “up for it” (that is, sex) [40]. Such figures are powerfully, yet subtly oppressive to women because they present women as responsible for choosing to be gazed upon as an object of desire. Both Randell-Moon and Gill make an argument that technologies of media can seem to offer freedom to women while normalizing existing gendered perspectives and practices. These potentially harmful representations are rendered even more insidious because they are cloaked in a veneer of progressiveness.

Just by looking at the available Real Dolls one can purchase (cf. Section 3.3), it is obvious that they *do* propagate tropes that can be considered harmful representations of women—unrealistic expectations for women’s bodies and idealized, regressive roles for women in relationships. For instance, the behaviors of doll owners arguably fit into larger societal framing of women as in need of protection from men. Moreover, by highlighting how doll owners go beyond physical sex, but towards intimacy, it is reasonable to say that our findings may be framed in terms of how owners, through their creative activities and construction of meaningful relationships, are insidiously oppressing women, even if not explicitly. This can be considered a form of “benevolent sexism,” where women are seen as “pure creatures who ought to be protected, supported, and adored and whose love is necessary to make a man complete” [41]; this constrains the roles of women to domains that are considered safe by men and further reinforce gender inequality [41].

Moreover, even the owners’ “performances” of femininity are themselves problematic. While we may marvel at the owners for their deft performance—applying makeup on and dressing the doll—of a gender that they do not themselves identify as, these performances are nonetheless limited and *a priori* shaped by gender stereotypes. This is not surprising—for Butler, gender is nearly always performed as a stylized repetition of acts that are consistent with dominant heterosexual ideals [28, p. 140–141].

In this research, we have striven to understand the phenomenon of Real Dolls on its own terms to anticipate the direction that designers and users appear to be taking intimate, embodied artifacts such as sex robots, rather than to produce a moral statement about the use of these dolls. We have found RDs a fruitful example of how people experiment and experience sexuality with new forms of intimate objects. However, while we do not adopt a particular moral stance towards Real Doll users, we do not claim to support a neutral stance on sex dolls and sex robots as they currently exist. Indeed, as discussed above, we find that users of Real Dolls are enacting many of the problematic conceptualizations of gender and sex found in society, from popular films to pornography, such as via benevolent sexism, unrealistic and limiting views of women. By bracketing out popular discourse around RD users, we were able to make progress on our research goals. This move, while partially a pragmatic one, also implicitly legitimizes RDs as a way to experiment with and experience sexuality. We believe that our findings may move forward future work on the on-going ethical dialogue on sex robots.

## 7 CONCLUSION

Foucault and Sennett [38] note that by continually examining ourselves as sexual beings, “we experience our sex in the head.” Our analysis of Real Doll users on an online forum support this assertion. Narrowly construed, Real Dolls appear to be designed for sexual intercourse. However, the results of our study suggest that Real Doll owners use them for much more. Owners creatively find means to create fantasies around dolls—embodied intimate fictions. These fictions

gives owners the freedom to choose and stylize meaningful relationships. They bring to light that sexual intimacy, even with “inanimate” dolls, is more than just physical, mindless sex, but something where the owner is psychologically invested in.

If the future is a world with robots, including sex robots, our results suggest that designers will need to support not only sex with robots, but embodied intimate fictions with robots. Our results also suggest that designers will need to think about how their sex robots imply a system of governance—one that prescribes particular sexual norms and relationships. Users do not want to have a sex robot that is a pristine, clean slate. At the same time, a sex robot that is so narrowly prescriptive will stifle the space of possible embodied intimate fictions, rendering an unsatisfactory experience. The sexual wellness approach seems to offer a wider and richer design framing, but we need to understand the practices and experiences that will contribute towards sexual wellness.

## ACKNOWLEDGMENTS

We are grateful to Carman Neustaedter and our anonymous reviewers for their constructive feedback. David Crandall provided valuable advice on image obfuscation strategies.

## REFERENCES

- [1] Martha Alexander and AFP. 2017. The Japanese Men Who Choose Sex Dolls for Rubber Romance. Retrieved July 2, 2017 from <http://www.dailymail.co.uk/~article-4653208/index.html>.
- [2] Peter Alilunas. 2018. Far away, so close: Technology, spectatorship, and the pasts and futures of pornography studies. *Porn Studies* (2018), 1–13. DOI : <https://doi.org/10.1080/23268743.2018.1435405>
- [3] Tamara Alsheikh, Jennifer A. Rode, and Siân E. Lindley. 2011. (Whose) value-sensitive design: A study of long-distance relationships in an arabic cultural context. In *Proceedings of the ACM 2011 Conference on Computer Supported Cooperative Work (CSCW'11)*. ACM, New York, NY, 75–84. DOI : <https://doi.org/10.1145/1958824.1958836>
- [4] Yusuff Jelili Amuda and Ismaila B. Tijani. 2012. Ethical and Legal Implications of Sex Robot: An Islamic Perspective. SSRN Scholarly Paper ID 2008011. Social Science Research Network, Rochester, NY. Retrieved August 22, 2017 from <https://papers.ssrn.com/abstract=2008011>.
- [5] Kristina Andersen. 2013. Making magic machines. In *Proceedings of the 10th European Academy of Design Conference-Crafting the Future*. Retrieved October 17, 2016 from [http://www.academia.edu/download/39154759/019\\_magicmachine.pdf](http://www.academia.edu/download/39154759/019_magicmachine.pdf).
- [6] Sarah Aubrey, John Cameron, Sidney Kimmel (Producers), and Craig Gillespie (Director). 2007. *Lars and the Real Girl [Motion Picture]*. Metro-Goldwyn-Mayer (MGM), Beverly Hills, CA. <http://www.imdb.com/title/tt0805564/>.
- [7] Jeffrey Bardzell and Shaowen Bardzell. 2011. Pleasure is your birthright: Digitally enabled designer sex toys as a case of third-wave HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI'11)*. ACM, New York, NY, 257–266. DOI : <https://doi.org/10.1145/1978942.1978979>
- [8] Jeffrey Bardzell, Shaowen Bardzell, Guo Zhang, and Tyler Pace. 2014. The lonely raccoon at the ball: Designing for intimacy, sociability, and selfhood. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI'14)*. ACM, New York, NY, 3943–3952. DOI : <https://doi.org/10.1145/2556288.2557127>
- [9] Shaowen Bardzell. 2008. Enchanted artifacts: Social productivity and identity in virtual material ecologies. *Artifact 2*, 2 (2008), 123–136. DOI : <https://doi.org/10.1080/17493460903020141>
- [10] Shaowen Bardzell. 2010. Feminist HCI: Taking stock and outlining an agenda for design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI'10)*. ACM, New York, NY, 1301–1310. DOI : <https://doi.org/10.1145/1753326.1753521>
- [11] Shaowen Bardzell and Jeffrey Bardzell. 2007. Docile avatars: Aesthetics, experience, and sexual interaction in second life. In *Proceedings of the 21st British HCI Group Annual Conference on People and Computers: HCI...But Not As We Know It - Volume 1 (BCS-HCI'07)*. British Computer Society, Swinton, UK, 3–12. DOI : <http://dl.acm.org/citation.cfm?id=1531294.1531296>
- [12] Shaowen Bardzell and Jeffrey Bardzell. 2016. Technosexuality. In *The Wiley Blackwell Encyclopedia of Gender and Sexuality Studies*. American Cancer Society, 1–3. DOI : <https://doi.org/10.1002/9781118663219.wbegs469>
- [13] Shaowen Bardzell and Jeffrey Bardzell. 2011. Towards a feminist HCI methodology: Social science, feminism, and HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI'11)*. ACM, New York, NY, 675–684. DOI : <https://doi.org/10.1145/1978942.1979041>
- [14] Shaowen Bardzell and William Odom. 2008. The experience of embodied space in virtual worlds: An ethnography of a second life community. *Space and Culture* 11, 3 (2008), 239–259. DOI : <https://doi.org/10.1177/1206331208319148>

- [15] Laura Bates. 2017. Opinion | The trouble with sex robots. *The New York Times. Opinion* (2017). Retrieved August 12, 2017 from <https://www.nytimes.com/2017/07/17/opinion/sex-robots-consent.html>.
- [16] Julie Beck. 2013. Married to a doll: Why one man advocates synthetic love. *The Atlantic* (2013). Retrieved January 6, 2016 from <http://www.theatlantic.com/health/archive/2013/09/married-to-a-doll-why-one-man-advocates-synthetic-love/279361/>.
- [17] Genevieve Bell, Mark Blythe, and Phoebe Sengers. 2005. Making by making strange: Defamiliarization and the design of domestic technologies. *ACM Transactions on Computer-Human Interaction* 12, 2 (2005), 149–173. DOI: <https://doi.org/10.1145/1067860.1067862>
- [18] Genevieve Bell and Paul Dourish. 2007. Back to the shed: Gendered visions of technology and domesticity. *Personal and Ubiquitous Computing* 11, 5 (2007), 373–381. DOI: <https://doi.org/10.1007/s00779-006-0073-8>
- [19] Raymond Bellour. 1975. Le blocage symbolique. *Communications* 23, 1 (1975), 235–350. DOI: <https://doi.org/10.3406/comm.1975.1360>
- [20] Peter L. Berger and Thomas Luckmann. 1967. *The Social Construction of Reality: A Treatise in the Sociology of Knowledge* (1st ed.). Anchor, New York.
- [21] Timothy W. Bickmore and Rosalind W. Picard. 2005. Establishing and maintaining long-term human-computer relationships. *ACM Transactions on Computer-Human Interaction* 12, 2 (2005), 293–327. DOI: <https://doi.org/10.1145/1067860.1067867>
- [22] Jeremy Birnholtz, Irina Shklovski, Mark Handel, and Eran Toch. 2015. Let’s talk about sex (Apps), CSCW. In *Proceedings of the 18th ACM Conference Companion on Computer Supported Cooperative Work & Social Computing (CSCW’15 Companion)*. ACM, New York, NY, 283–288. DOI: <https://doi.org/10.1145/2685553.2685557>
- [23] Mark Blythe, Kristina Andersen, Rachel Clarke, and Peter Wright. 2016. Anti-solutionist strategies: Seriously silly design fiction. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI’16)*. ACM, New York, NY, 4968–4978. DOI: <https://doi.org/10.1145/2858036.2858482>
- [24] Mark Blythe and Mark Jones. 2004. Human computer (sexual) interactions. *Interactions* 11, 5 (2004), 75–76. DOI: <https://doi.org/10.1145/1015530.1015570>
- [25] Johanna Brewer, Joseph ‘Jofish’ Kaye, Amanda Williams, and Susan Wyche. 2006. Sexual interactions: Why we should talk about sex in HCI. In *Proceedings of the CHI’06 Extended Abstracts on Human Factors in Computing Systems (CHI EA’06)*. ACM, New York, NY, 1695–1698. DOI: <https://doi.org/10.1145/1125451.1125765>
- [26] E. Broadbent, R. Stafford, and B. MacDonald. 2009. Acceptance of healthcare robots for the older population: Review and future directions. *International Journal of Social Robotics* 1, 4 (2009), 319. DOI: <https://doi.org/10.1007/s12369-009-0030-6>
- [27] Amy Bruckman. 2002. Studying the amateur artist: A perspective on disguising data collected in human subjects research on the internet. *Ethics and Information Technology* 4, 3 (2002), 217–231. DOI: <https://doi.org/10.1023/A:1021316409277>
- [28] Judith Butler. 2006. *Gender Trouble: Feminism and the Subversion of Identity*. Routledge, New York, 236.
- [29] Julie Carpenter. 2013. *Just Doesn’t Look Right: Exploring the Impact of Humanoid Robot Integration into Explosive Ordnance Disposal Teams*. IGI Global Platform, Hershey, PA, 609–636. DOI: <https://doi.org/10.4018/978-1-4666-2211-1.ch032>
- [30] Kathy Charmaz. 2006. *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. Pine Forge Press, Thousand Oaks, CA, 223.
- [31] EunJeong Cheon and Norman Makoto Su. 2017. Configuring the user: “Robots have needs too”. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing (CSCW’17)*. ACM, New York, NY, 191–206. DOI: <https://doi.org/10.1145/2998181.2998329>
- [32] Deborah A. Christel and Susan C. Dunn. 2017. Average American women’s clothing size: Comparing national health and nutritional examination surveys (1988–2010) to ASTM international misses & women’s plus size clothing. *International Journal of Fashion Design, Technology and Education* 10, 2 (2017), 129–136. DOI: <https://doi.org/10.1080/17543266.2016.1214291>
- [33] Martin D. Cooney, Shuichi Nishio, and Hiroshi Ishiguro. 2012. Recognizing affection for a touch-based interaction with a humanoid robot. In *Proceedings of the 2012 IEEE/RSJ International Conference on Intelligent Robots and Systems*. 1420–1427. DOI: <https://doi.org/10.1109/IROS.2012.6385956>
- [34] Kerstin Dautenhahn. 2007. Socially intelligent robots: Dimensions of Human–robot interaction. *Philosophical Transactions of the Royal Society B: Biological Sciences* 362, 1480 (2007), 679–704. DOI: <https://doi.org/10.1098/rstb.2006.2004pmid:17301026>
- [35] John Dewey. 2005. *Art as Experience* (Perigee trade pbk. ed ed.). OCLC: 600952451. Perigee, New York, NY, 371.
- [36] Anna Eaglin and Shaowen Bardzell. 2011. Sex toys and designing for sexual wellness. In *Proceedings of the CHI’11 Extended Abstracts on Human Factors in Computing Systems (CHI EA’11)*. ACM, New York, NY, 1837–1842. DOI: <https://doi.org/10.1145/1979742.1979879>

- [37] Ylva Fernaeus, Maria Håkansson, Mattias Jacobsson, and Sara Ljungblad. 2010. How do you play with a robotic toy animal?: A long-term study of pleo. In *Proceedings of the 9th International Conference on Interaction Design and Children (IDC'10)*. ACM, New York, NY, 39–48. DOI : <https://doi.org/10.1145/1810543.1810549>
- [38] Michel Foucault and Richard Sennett. 1981. Sexuality and solitude. *Humanities in Review* 1 (1981), 3–21.
- [39] Cheryl D. Fryar, Qiuping Gu, and Katherine M. Flegal. 2016. Anthropometric reference data for children and adults: United states, 2011–2014. *Vital Health Stat. National Center for Health Statistics* 3, 39 (2016), 1–46.
- [40] Rosalind Gill. 2008. Empowerment/sexism: Figuring female sexual agency in contemporary advertising. *Feminism and Psychology* 18, 1 (2008), 35–60. DOI : <https://doi.org/10.1177/0959353507084950>
- [41] Peter Glick and Susan T. Fiske. 1996. The ambivalent sexism inventory: Differentiating hostile and benevolent sexism. *Journal of Personality and Social Psychology* 70, 3 (1996), 491–512. DOI : <https://doi.org/10.1037/0022-3514.70.3.491>
- [42] Elizabeth Goodman and Janet Vertesi. 2012. Design for X?: Distribution choices and ethical design. In *Proceedings of the CHI'12 Extended Abstracts on Human Factors in Computing Systems (CHI EA'12)*. ACM, New York, NY, 81–90. DOI : <https://doi.org/10.1145/2212776.2212786>
- [43] Ángel J. Gordo-López and Richard Cleminson. 2004. *Techno-Sexual Landscapes: Changing Relations between Technology and Sexuality*. OCLC: ocm55086964. Free Association Books, London, 144.
- [44] George Gurley. 2015. RealDoll Sex Toys: The Making of Sexbots (NSFW) | Vanity Fair. Retrieved January 6, 2016 from <http://www.vanityfair.com/culture/2015/04/sexbots-realdoll-sex-toys>.
- [45] Oliver L. Haimson, Jed R. Brubaker, and Gillian R. Hayes. 2014. DDFSeeks same: Sexual health-related language in online personal ads for men who have sex with men. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI'14)*. ACM, New York, NY, 1615–1624. DOI : <https://doi.org/10.1145/2556288.2557077>
- [46] Lynne Hall. 2016. Sex with robots for love free encounters. In *Proceedings of the International Conference on Love and Sex with Robots*. Lecture Notes in Computer Science, Springer, Cham, 128–136. DOI : [https://doi.org/10.1007/978-3-319-57738-8\\_12](https://doi.org/10.1007/978-3-319-57738-8_12)
- [47] Bram Hendriks, Bernt Meerbeek, Stella Boess, Steffen Pauws, and Marieke Sonneveld. 2011. Robot vacuum cleaner personality and behavior. *International Journal of Social Robotics* 3, 2 (2011), 187–195. DOI : <https://doi.org/10.1007/s12369-010-0084-5>
- [48] Zachary Henkel, Robin R. Murphy, and Cindy L. Bethel. 2012. Towards a computational method of scaling a robot's behavior via proxemics. In *Proceedings of the 7th Annual ACM/IEEE International Conference on Human-Robot Interaction (HRI'12)*. ACM, New York, NY, 145–146. DOI : <https://doi.org/10.1145/2157689.2157727>
- [49] Kristina Höök, Martin P. Jonsson, Anna Ståhl, and Johanna Mercurio. 2016. Somaesthetic appreciation design. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI'16)*. ACM, New York, NY, 3131–3142. DOI : <https://doi.org/10.1145/2858036.2858583>
- [50] Marianne W. Jørgensen and Louise J. Phillips. 2002. *Discourse Analysis as Theory and Method*. SAGE, Thousand Oaks, CA, 244.
- [51] Robert Jungk and Norbert R Müllert. 1996. *Future Workshops: How to Create Desirable Futures*. OCLC: 611538477. Institute for Social Inventions, London.
- [52] Gopinath Kannabiran, Jeffrey Bardzell, and Shaowen Bardzell. 2011. How HCI talks about sexuality: Discursive strategies, blind spots, and opportunities for future research. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI'11)*. ACM, New York, NY, 695–704. DOI : <https://doi.org/10.1145/1978942.1979043>
- [53] Gopinath Kannabiran, Shaowen Bardzell, and Jeffrey Bardzell. 2012. Designing (for) desire: A critical study of technosexuality in HCI. In *Proceedings of the 7th Nordic Conference on Human-Computer Interaction: Making Sense Through Design (NordiCHI'12)*. ACM, New York, NY, 655–664. DOI : <https://doi.org/10.1145/2399016.2399116>
- [54] Joseph 'Jofish' Kaye and Liz Goulding. 2004. Intimate objects. In *Proceedings of the 5th Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques (DIS'04)*. ACM, New York, NY, 341–344. DOI : <https://doi.org/10.1145/1013115.1013175>
- [55] Angeliki Kerasidou and Ruth Horn. 2016. Making space for empathy: Supporting doctors in the emotional labour of clinical care. *BMC Medical Ethics* 17 (2016), 8. DOI : <https://doi.org/10.1186/s12910-016-0091-7>. pmid: 26818248
- [56] Amanda Lazar, Hilaire J. Thompson, Anne Marie Piper, and George Demiris. 2016. Rethinking the design of robotic pets for older adults. In *Proceedings of the 2016 ACM Conference on Designing Interactive Systems (DIS'16)*. ACM, New York, NY, 1034–1046. DOI : <https://doi.org/10.1145/2901790.2901811>
- [57] Min Kyung Lee, Sara Kiesler, and Jodi Forlizzi. 2010. Receptionist or information Kiosk: How do people talk with a robot? In *Proceedings of the 2010 ACM Conference on Computer Supported Cooperative Work (CSCW'10)*. ACM, New York, NY, 31–40. DOI : <https://doi.org/10.1145/1718918.1718927>
- [58] David N. L. Levy. 2007. *Love + Sex with Robots: The Evolution of Human-Robot Relationships*. OCLC: 191866790. HarperCollins e-books, Pymble, NSW; New York, NY.
- [59] Harold I. Lief and Renée C. Fox. 1963. Training for “detached concern” in medical students. In *The Psychological Basis of Medical Practice*. Harper & Row, New York, NY, 12–35.

- [60] Patrick Lin, Keith Abney, and George Bekey. 2011. Robot ethics: Mapping the issues for a mechanized world. *Artificial Intelligence* 175, 5 (2011), 942–949. DOI : <https://doi.org/10.1016/j.artint.2010.11.026>
- [61] Joseph Lindley, Dhruv Sharma, and Robert Potts. 2014. Anticipatory ethnography: Design fiction as an input to design ethnography. *Ethnographic Praxis in Industry Conference Proceedings* 2014, 1 (2014), 237–253. DOI : <https://doi.org/10.1111/1559-8918.01030>
- [62] Sara Ljungblad, Jirina Kotrbova, Mattias Jacobsson, Henriette Cramer, and Karol Niechwiadowicz. 2012. Hospital robot at work: Something alien or an intelligent colleague? In *Proceedings of the ACM 2012 Conference on Computer Supported Cooperative Work (CSCW'12)*. ACM, New York, NY, 177–186. DOI : <https://doi.org/10.1145/2145204.2145233>
- [63] Eric Mack. 2017. Not all sex robots will look human, sexpert Dan Savage says. Retrieved August 22, 2017 from <https://www.cnet.com/news/dan-savage-sexbots-future-sex/>.
- [64] Jennifer Mankoff, Jennifer A. Rode, and Haakon Faste. 2013. Looking past yesterday’s tomorrow: Using futures studies methods to extend the research horizon. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI'13)*. ACM, New York, NY, 1629–1638. DOI : <https://doi.org/10.1145/2470654.2466216>
- [65] Maria Marcus. 1981. *A Taste for Pain: On Masochism and Female Sexuality*. Trans. by Joan Tate. St. Martin’s Press, New York, NY, 276.
- [66] John McCarthy and Peter Wright. 2004. *Technology as Experience*. MIT Press, Cambridge, Mass, 211.
- [67] Maurice Merleau-Ponty and Taylor Carman. 2013. *Phenomenology of Perception*. Trans. by Donald Landes. (1st ed.). Routledge, Abingdon, Oxon; New York, 696.
- [68] Christine Milrod and Martin A. Monto. 2012. The hobbyist and the girlfriend experience: Behaviors and preferences of male customers of internet sexual service providers. *Deviant Behavior* 33, 10 (2012), 792–810. DOI : <https://doi.org/10.1080/01639625.2012.707502>
- [69] Zabet Patterson. 1999. Going on-line: Consuming pornography in the digital era. In *Hard Core: Power, Pleasure, and the “Frenzy of the Visible”* (Expanded pbk. ed ed.). Linda Williams (Ed.), University of California Press, Berkeley, 104–123.
- [70] Trevor J. Pinch and Wiebe E. Bijker. 1987. The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each other. In *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. MIT Press, Cambridge, MA, 17–50.
- [71] Holly Randell-Moon. 2012. I’m Nobody *Feminist Media Studies* 12, 2 (2012), 265–280. DOI : <https://doi.org/10.1080/14680777.2011.597105>
- [72] Realbotix. 2017. For the last 20 years, Realdoll has been creating the world’s most realistic silicone dolls. Retrieved August 22, 2017 from <https://realbotix.systems/>.
- [73] K. Richardson. 2016. Sex robot matters: Slavery, the prostituted, and the rights of machines. *IEEE Technology and Society Magazine* 35, 2 (2016), 46–53. DOI : <https://doi.org/10.1109/MTS.2016.2554421>
- [74] Kathleen Richardson. 2016. The asymmetrical ‘relationship’: Parallels between prostitution and the development of sex robots. *SIGCAS Computers and Society* 45, 3 (2016), 290–293. DOI : <https://doi.org/10.1145/2874239.2874281>
- [75] Jennifer Robertson. 2010. Gendering humanoid robots: Robo-sexism in Japan. *Body & Society* 16, 2 (2010), 1–36. DOI : <https://doi.org/10.1177/1357034X10364767>
- [76] Jennifer A. Rode. 2011. A theoretical agenda for feminist HCI. *Interacting with Computers* 23, 5 (2011), 393–400. DOI : <https://doi.org/10.1016/j.intcom.2011.04.005>
- [77] Gillian Rose. 2001. *Visual Methodologies: An Introduction to the Interpretation of Visual Materials*. SAGE Publications, Thousand Oaks, CA, 246.
- [78] Anna C. B. Russell. 2009. Blurring the love lines: The legal implications of intimacy with machines. *Computer Law & Security Review* 25, 5 (2009), 455–463. DOI : <https://doi.org/10.1016/j.clsr.2009.07.003>
- [79] Matthias Scheutz and Thomas Arnold. 2016. Are we ready for sex robots? In *Proceedings of the 11th ACM/IEEE International Conference on Human–Robot Interaction (HRI'16)*. IEEE Press, Piscataway, NJ, 351–358. <http://dl.acm.org/citation.cfm?id=2906831.2906891>
- [80] Rock Schroeter (Director). 2002. *Guys and Dolls* [Motion Picture]. <http://www.imdb.com/title/tt0445980/>.
- [81] Joel Shannon. 2018. Proposed ‘sex robot brothel’ blocked by Houston government: ‘We are not Sin City’. *USA TODAY* (2018). Retrieved October 15, 2018 from <https://www.usatoday.com/story/news/nation-now/2018/10/03/sex-robot-brothel-blocked-houston-texas/1518298002/>.
- [82] Noel Sharkey, Aimee W. Wynsberghe, Scott Robbins, and Eleanor Hancock. 2017. Our Sexual Future With Robots. Foundation for Responsible Robots, The Hague, Netherlands. Retrieved July 5, 2017 from <http://responsiblerobotics.org/2017/07/05/fr-r-report-our-sexual-future-with-robots/>.
- [83] Tobin Anthony Siebers. 2016. *Disability Theory*. University of Michigan Press, Ann Arbor, MI, 238.
- [84] Devendra Singh. 1993. Adaptive significance of female physical attractiveness: Role of waist-to-hip ratio. *Journal of Personality and Social Psychology* 65, 2 (1993), 293–307. DOI : <https://doi.org/10.1037/0022-3514.65.2.293>
- [85] Marquard Smith. 2013. *The Erotic Doll: A Modern Fetish*. Yale University Press, New Haven, 376. Retrieved May 8, 2016 from <http://westminsterresearch.wmin.ac.uk/12409/>.

- [86] Norman Makoto Su, Leslie S. Liu, and Amanda Lazar. 2014. Mundanely miraculous: The robot in healthcare. In *Proceedings of the 8th Nordic Conference on Human-Computer Interaction: Fun, Fast, Foundational (NordCHI'14)*. ACM, New York, NY, 391–400. DOI: <https://doi.org/10.1145/2639189.2641216>
- [87] Jessica M. Szczuka and Nicole C. Krämer. 2017. Not only the lonely—How men explicitly and implicitly evaluate the attractiveness of sex robots in comparison to the attractiveness of women, and personal characteristics influencing this evaluation. *Multimodal Technologies and Interaction* 1, 1 (2017), 3. DOI: <https://doi.org/10.3390/mti1010003>
- [88] Leila Takayama and Caroline Pantofaru. 2009. Influences on proxemic behaviors in human–robot interaction. In *Proceedings of the 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'09)*. IEEE Press, Piscataway, NJ, 5495–5502. Retrieved August 7, 2017 from <http://dl.acm.org/citation.cfm?id=1732643.1732940>.
- [89] Sarah Valverde. 2012. The Modern Sex Doll-Owner: A Descriptive Analysis. *Master's theses and project reports*. Retrieved August 1, 20012 from <http://digitalcommons.calpoly.edu/theses/849>.
- [90] Chad Van De Wiele and Stephanie Tom Tong. 2014. Breaking boundaries: The uses & gratifications of Grindr. In *Proceedings of the 2014 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp'14)*. ACM, New York, NY, 619–630. DOI: <https://doi.org/10.1145/2632048.2636070>
- [91] Marynel Vázquez, Aaron Steinfeld, Scott E. Hudson, and Jodi Forlizzi. 2014. Spatial and other social engagement cues in a child-robot interaction: Effects of a sidekick. In *Proceedings of the 2014 ACM/IEEE International Conference on Human-Robot Interaction (HRI'14)*. ACM, New York, NY, 391–398. DOI: <https://doi.org/10.1145/2559636.2559684>
- [92] Linda Williams. 1999. *Hard Core: Power, Pleasure, and the "Frenzy of the Visible"* (Expanded pbk. ed.). University of California Press, Berkeley, 380.
- [93] Matthew Wood, Gavin Wood, and Madeline Balaam. 2017. “They’Re Just Tixel Pits, Man”: Disputing the ‘reality’ of virtual reality pornography through the story completion method. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI'17)*. ACM, New York, NY, 5439–5451. DOI: <https://doi.org/10.1145/3025453.3025762>
- [94] Matthew Wood, Gavin Wood, and Madeline Balaam. 2015. Talk about sex: Designing games to facilitate healthy discussions around sex. In *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play (CHI PLAY'15)*. ACM, New York, NY, 795–798. DOI: <https://doi.org/10.1145/2793107.2810270>
- [95] Peter Wright and John McCarthy. 2008. Empathy and experience in HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI'08)*. ACM, New York, NY, 637–646. DOI: <https://doi.org/10.1145/1357054.1357156>
- [96] Susan Wyche, Phoebe Sengers, and Rebecca E. Grinter. 2006. Historical analysis: Using the past to design the future. In *Proceedings of Ubicomp'06*. Springer-Verlag, Berlin, 35–51. Retrieved December 13, 2007 from [http://dx.doi.org/10.1007/11853565\\_3](http://dx.doi.org/10.1007/11853565_3).
- [97] Ian Yeoman and Michelle Mars. 2012. Robots, men and sex tourism. *Futures* 44, 4 (2012), 365–371. DOI: <https://doi.org/10.1016/j.futures.2011.11.004>
- [98] Iris Marion Young. 1980. Throwing like a girl: A phenomenology of feminine body comportment motility and spatiality. *Human Studies* 3, 1 (1980), 137–156. DOI: <https://doi.org/10.1007/BF02331805>

Received May 2018; revised November 2018; accepted November 2018