DESIGNING DATING APPS FOR SEXUAL VIOLENCE PREVENTION AND CONSENT MEDIATION THROUGH THE PROMOTION OF WANTED EXPERIENCES

by

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To all victims of sexual violence and the LGBTQIA+ community

ABSTRACT

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Content Warning: Sexual Violence.

This thesis reports on a participatory design study to gain insight from anticipated users of dating applications and sexual consent technology. Dating apps are used as a context to explore sexual consent technology which could assist users in mediating consent to sex, with the goal to reduce the prevalence of non-consensual sexual contact. This work was motivated by the inadvertent effect that current dating app design plays on their users' perceptions of sexual consent. I conducted participatory design sessions with 17 women and LGBTQIA+ stakeholders due to their increased risk of being victims of sexual violence when compared to the general public. Participants advocated for technology being used across online and offline modalities, technology which normalizes candid conversations about boundaries, sexual preference and sexual consent, and explicit informed verbal consent. Findings demonstrate opportunity for dating applications to assist users in following an affirmative consent progression process though design. Discussions include design guidelines which focus on the promotion of wanted experiences to design consent technology to prevent sexual violence.

TABLE OF CONTENTS

TABLE OF CONTENTS - Continued

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

HCI	Human Computer Interaction
PD	Participatory Design

1 INTRODUCTION

Online-to-Offline harms present unique problems that require solutions based on user experience design. Online-to-Offline harms refer to negative experiences that start online but propagate into direct harm in real life. These harms require careful examination of their causes and possible solutions. One online-to-offline harm that has been gaining attention in the literature is sexual violence. We have seen research aimed at examining the problem of sexual violence and its possible solutions online [69,102] and offline [4,23,118]. For example, dating apps have been repeatedly linked to an increased risk of sexual violence [31,56,57,103,114,119,127]. Even more troubling is that sexual violence as a result of dating applications is sometimes due to ambiguous consent, including some fearing for their safety if they were to turn down sexual advances [138].

Sexual violence is, by most definitions, defined by the lack of *consent* from at least one party. Consent in this context refers to a mutual agreement to engage in a sexual act. Given that the exchange of consent is at the core of the problem of sexual violence, research is needed to explore the possible benefits of technology which assists or intervenes in some way during the process of giving and receiving consent. This thesis will explore technology which assists in mediating consent to sex between users and how such technology could be designed to mitigate some forms of sexual violence, particularly those which arise from dating applications. I will refer to such technology as Consent Technology for the duration of this thesis. Research questions which motivated this work include:

RQ1: What role(s) should consent technology play when intervening in how users give and receive consent to sex?

RQ2: When and where should consent technology be used?

RQ3: What intervention points could be used by consent technology?

To explore the possibilities of such technology, I conducted a focus group study conducted in the United States (n=17) about how technology could mediate the practice of sexual consent exchange. I present online dating as the focal point due to prevalent use of dating apps and social media applications for augmenting sexual encounters [6,20,36,46,48]. These applications may provide various intervention points across the online-to-offline modalities that participants could leverage for envisioning consent technology. Participants identified as LGBTQIA+ and/or women, both demographics that are disproportionally victims of sexual violence.

Findings of this thesis examine the feature ideas generated by participants. Participants advocated for designs which assisted users in mediating their consent to sex with others met on dating apps. They wanted this process to include intimate disclosures about expectations, honest and open conversations about sex, boundaries, and consent, and explicit verbal consent to all sexual acts being performed. They emphasized that the app should intervene during multiple stages of the online dating process, from messaging to in-person encounters to. To address current barriers to consent, participants advocated for designs which prioritize user comfort and reduce anxiety. They also emphasized the need for user agency in these designs so that the users maintain control over their interactions.

The designs envisioned by my participants elucidate the possibility of dating applications to design features which assist users in the process of giving and receiving

consent to sex. By designing features with the goal of promoting consensual sex, some types of sexual violence could be mitigated, especially cases where the perpetrator incorrectly believes they received consent. Based on the designs envisioned by my participants, I suggest three design guidelines for consent technology: Consent technology should normalize, not replace verbal consent, prioritize user comfort, and intervene before situations where sexual acts may occur. These guidelines aim to inform future designs for consent technology. Future works should investigate more potential intervention points for consent technology, how user comfort can be further improved through design, how stakeholders from other demographics want consent technology to work, and design prototypes which can be tested with anticipated users.

2 BACKGROUND AND RELATED WORKS

In this section I will review literature from the HCI community which discusses various online-to-offline harms; a topic which has seen increasing interest in recent years. I then will discuss online-to-offline harms related to sexual violence specifically, some proposed solutions, and some critiques of those solutions. In order to fully explore the causes and effects of sexual violence, I then review literature which discuss consent to sex. I conclude by reviewing literature which discusses online-dating and the effects it has had on the prevalence of sexual violence.

2.1 Online-to-Offline Harms

HCI has often sought to address harms that are perpetuated through computer-mediated communication. Many of these investigated harms are purely online harms. These harms include harassment through online messaging or public posts, spam messages, phishing, hacking, disinformation and more [30,52,68,72,75,79,91,96,115,128,137]. Interviews with Twitter users found that harassment was so pervasive that many users leverage blacklists to block accounts that have been known for harassment [75]. On anonymous social media sexual harassment was found to be common among women[1]. Phishing scams have caused massive data breaches and loss of resources [79]. Spam Detection plays an important role in this space, and we've hence seen literature examining detection different frameworks [68]. Detection and blocking technologies are often seen as the solution to these online harms, but this approach does not translate to online-to-offline harms.

Online-to-offline harms are defined by their ability to pervade from online spaces into the physical world and cause harm. This can include deliberate acts perpetrated

online and offline, as well as inadvertent harms caused by online interactions which result in physical harm. We have seen some research into some of these harms, such as harassment [1,22,30,52,75,118], sexual violence from dating apps [32,58], cyber bullying [8,86,99], unsolicited nude photos [67,99,109,113], grooming [25,84,86], sex trafficking [53,124], and stalking [69,99]. Sexual violence and intimate partner violence have seen documented levels or normalization on dating applications [58,83]. Stalkers have been shown to use online tools to enable their behaviors and pursue their victims [69]. We have also seen reports of Cyber-grooming; An act in which a sexual predator builds false trust and uses desensitization of sex for the purpose of sexual abuse in real life. Cyber-grooming has been a tactic used against both adults and children [86].

Cyber-bullying is often the first type of harm mentioned when discussing online harms. Mladenovic and colleges found that cyber-bullies generally target others on the internet based around factors surrounding their victim's culture, nationality, intelligence, race, religion, ideology, gender, sexual orientation, ethnicity, or disabilities [86]. Cyber bullying can include sending messages, videos, or audio recordings that include harassment, blackmail, starting rumors, or creating fake profiles of the target on other websites. In some cases, a Cyber-bullying aggressor antagonizes their victim for long periods of time, opposed to a single altercation [86,99]. Similarly, cyber-stalking - which can include but is not limited to cyber-bullying – has shown a cause for concern. Cyber-stalkers use the internet to obtain information which they can use to harass other people [69]. Much of this harm occurs online through unwanted contact, threats, and manipulation, but some cyber-bullies and cyber-stalkers take it offline. There have been reports of people who were killed by assailants utilizing the internet to track their victims,

whose addresses were posted on dangerous internet forums, and a business who was deliberately sent graphic pornography magazines from an ex-employee [99]. While cyber-bullying and cyber-stalking are defined by their existence online, there are concerns about these techniques being used to perpetrate offline harm to their victims.

Grooming can be defined as "a premeditated behavior intended for securing the trust of a minor, the first step toward future engagement in sexual conduct." If a pedophile attempts to build a relationship leading to a sexual relationship with a minor on the internet, that act is referred to as cyber-grooming. One goal of a predator who engages in cyber-grooming is to coerce their victim to send them sexual messages and photos through the internet; the ultimate goal being to meet the victim in person and abuse them [86]. Some cyber-grooming detection methods have been researched and developed to attempt to mitigate the practice. These methods aim to detect messages and interactions between users that could constitute cyber-grooming [25,84,85]. Bours and Kulsrud combined 5 different classification algorithms to create a system that could accurately determine if the user was speaking to a predator withing 26-161 messages [25]. Michalopoulos and colleges created a system called The Grooming Attack Recognition System (GARS) which used document classification, personality recognitions, user history, and exposure time to calculate specific risks children are exposed to during chat conversations. This data is then fed through fuzzy logic controllers which calculates the corresponding risk value as a function of time. If certain thresholds are reached, an alarm is triggered which sends an email to the parents. While detecting predators through their messaging and app usage habits is a good start to

reducing cyber-grooming, none of these strategies attempt to address or solve the issue before a predator has had contact with a child [84].

Ringrose and colleges performed focus groups with 144 teen girls ages 16 and under in England regarding their experience with unsolicited nude photos or “dick picks”. They found that over 70% girls had received unsolicited dick picks and had been asked for nude photos. Most girls reported that snapchat was where they say their first unsolicited dick pick. These girls noted that they did not want to receive these pictures and that it was easier to block the sender than reporting them to the authorities. Ringrose also explains that Snapchat’s gamified point system encourages adding friends, which in turn incentivizes turning off privacy settings so that others can add you more easily. This means anyone could add a user with these settings and send them a dick pick without them ever approving the friend request. Many of the girls interviewed explained that grown men they did not know had added them on snapchat and sent them dick picks [113]. Such behaviors are associated with early stages of cyber-grooming as discussed above. Hartikainen and colleges analyzed posts from over 700 adolescents who posted on a social media website looking for advice about sexting (sending nude photos to someone). They found that most posts were aimed at acquiring information from others about how to sext safely. Many other posts were looking for advice for issues they had while sexing, including various forms of sexual violence [67]. Teens are not just involved in both consensual and nonconsensual exchange of nude photos, but they have organized online communities to learn how to do it safely.

Such acts can affect personal safety in ways purely online harms do not. This is cause for alarm as technology is being leveraged for more than just online harm, but to

cause physical harm in the real world. For this reason, I chose to examine online-to-offline harms as the focal point for my research.

2.2 Theories and Practices of Consent to Sex

Consent to sex has been a research interest in fields beyond HCI for over 30 years, pursuing three general areas: theories of what consent is, models of what consent should be, and empirical research into how the general public understands and practices consent to sex. In this section, I review literature across these themes to lend context for sexual consent technology. Definitional theories of what consent is have been inconsistent, with the literature generally subscribing to one of two interpretations: consent is a strictly behavioral act independent of one's actual willingness to have sex, and consent is behavior that is reflective of, and thus dependent on, one's willingness to have sex. Of note, literature across these perspectives tends to discuss consent primarily in the heteronormative context of a woman giving consent to a man, thus their applicability to the reverse dynamic or LGBTQIA+ partnerships can be unclear.

Literature pertaining to the first definition understands consent as a purely behavioral or "performative" act of agreement to sex [7,132], independent of whether the performer of the act wants sex to occur [97,133], including when force or coercion is used to elicit the performative act [39,94,129]. Some work categorizes different types of consent on the basis of whether coercion or force is used [7,78,95,122], although these categories still imply that sex is consensual if the performative act is manipulated [16]. The literature generally leaves the acts which constitute consent up to interpretation of the recipient [89,93], with some scholars [39,93] asserting that there are certain actions or inactions, including silence, that are commonly understood as consent—leading to the

conclusion that one can accidentally give consent to sex if they inadvertently perform such a behavior [16].

The other, and more popular, theoretical perspective understands consent as behavior representing evidence of a "particular mental state" corresponding to willingness to have sex [82]. For such behavior to be a reflection of internal willingness to have sex it must be voluntarily given [61,70] and free from force and coercion [61,70,73]. Although, there is some debate over whether ubiquitous social, economic, and gender power imbalances qualify as coercion—and thus whether sex between a man and women can ever truly be consensual [81,88,104] (see West [133] for critique of this position). Scholars have recognized that willingness to have sex may change during a sexual encounter, leading some to characterize consent as an ongoing negotiation of giving and assessing signs of "active participation" [15,17,73]. In this thesis I adopt a definition of consent following the "mental state" theorists: as behavior indicative of willingness to have sex.

Along with attempts to describe consent as an already-occurring phenomenon, extensive work has pursued new models of what consent *should* mean. The motivations behind these works have been to reduce the prevalence of sexual violence through adoption of consent behaviors that prevent unwanted sex, as well to differentiate legal from illegal sexual activity in a court of law (an example to the latter would be morally transformative consent which argues that consent should render any sexual act legal [132]). Consent models designed to reduce sexual violence include communicative sexuality [100] and affirmative consent [106], both of which seek to shift responsibility for receiving consent onto the initiator of a sexual advance instead of on the recipient to

refuse. Core tenets of affirmative consent include freely given agreement to sex, the ability to revoke consent during a sexual act, and informed agreement to specific sexual acts to reduce misinterpretation over what is consenting to [101]. These tenets have been condensed into promotional campaigns and slogans to encourage public adoption such as "yes means yes" [49] and Planned Parenthood's FRIES model (Freely given, Reversible, Informed, Enthusiastic, Specific) [101].

Affirmative consent has been widely advocated in literature and public policy [14,27,43,45,89,92,101,106,134], yet it has been critiqued for ignoring social dynamics that influence consent decisions [54,106] and for being too burdensome and unrealistic for widespread practice [62,135] (see [89] (p. 464) for an extensive review of affirmative consent criticisms and open questions). At least some of this critique is supported with empirical study: affirmative consent is not widely practiced [89,106,135].

The third line of consent research, empirical study of how the general public understands consent, has found consent practices to be inconsistent with many susceptible to misinterpretation. Per Muehlenhard et al.'s review of sexual consent practices: *"Most individuals do not discuss sexual consent […] explicitly, however; instead, they usually rely on more indirect cues and signals, which others might interpret as indicative of willingness"* [89] (p. 462). Consent practices are socially learned behaviors according to sexual script theory [50,71,123], which can obfuscate realization that one is perpetrating or becoming victim of a nonconsensual act. For instance, sexual scripts can challenge sexual agency (one's right to not give consent) through socially learned perceptions that women must oblige the sexual advances of a partner they are in a

relationship with [34,74] or that men always want sex and thus automatically consent [14,71].

2.3 Online-to-Offline Sexual Violence and Prior Solutions

Sexual Violence has been recognized as an issue by the HCI community as many have called for more research [1,5,22,26,32,43,67,69,76,77,87,91,102,110,117,126]. Most of the technology envisioned as solutions or as a remedy for this issue have focused on how someone who may be targeted can keep themselves safe. These methods are often focused on detecting in-person sexual violence. Razi and colleges found that 93% of designs discussed in the literature which aimed to detect sexual predators online were only able to detect them after-the-fact, with most of this detection happening online [110]. They also found that only 4% of such literature evaluated these systems with real users [110]. Mohan created smart sensors on clothing to detect when sexual violence is occurring and respond by calling emergency services[87]. Sakhuja created an app that would analyze women's voices to detect sexual violence when in a rideshare [117]. There have also been a few applications developed with the goal of helping women navigate urban areas safely by helping them avoid areas where past sexual violence has occurred [4,23,118]. We have also seen '*Panic Button'* apps that allow users to press a software button to alert authorities of their location if they are in trouble [9].

Much of these prior solutions discussed in HCI are focused on *detection* and *reaction* to sexual violence. This contrasts with literature seen from public health which advocates for Primary Prevention [29]. Casey and Lindhorst advocate for the design of sexual violence prevention strategies that target peer networks and community-level factors. Others have also examined the efficacy of current primary prevention strategies

and advocated for more research into additional strategies [37,38]. This Approach aims to *prevent* sexual violence from occurring in the first place, opposed to reacting to it. Using the Socio-Ecological Model as a framework for prevention, this framework considers the complex dynamics at play between individual, relationship, community, and societal level factors. Each level allows for tailored understanding of the variables at play when discussing violence [140]. Each of these levels offers unique intervention opportunities for design. There is more research needed into how HCI can use primary prevention and the Socio-Ecological Model to design preventative solutions for sexual violence, including Consent Technology.

To my knowledge, there have been few attempts at deliberately designing technology which aims to prevent sexual violence by intervening in consent to sex. Those that we have seen generally do not follow the recommendations of the public health literature which advocates for strategies which *prevent* sexual violence. Consent Apps such as *LegalFling, We-Consent,* and *Good2Go* gather a single input from the user regarding if they want to consent to sex in that moment. Nguyen et al and Petter critiqued this design stating that it restricts sexual agency by failing to accommodate users who may become uncomfortable during a sexual act [90,98]. Nguyen et al suggests that sexual consent apps could draw on designs used for consent exchange in videogames where players engage in sexual activity with non-player characters [90]. These designs include creating a slight burden to begin by holding down a button for a few seconds to confirm, enabling the withdrawal of consent during the sexual activity, and having specific phases in which discussions regarding sexual boundaries - and later post-sex

reflections - can be had. While the literature has seen a large uptick in designs aiming to prevent sexual violence, few have involved the anticipated users in their design [51].

The potential exists for the use of primary prevention strategies for sexual violence through the design of dating applications. VR and AR have been recently discussed in the media as they pertain to online dating. Such technologies could facilitate online dating interventions before meeting face-to-face. AI-Mediated communication for example has commonly been used for predictive text and spell-check [63], but the potential exists for AI-MC to be used more broadly on dating applications to mediate interactions [139].

2.4 Online-to-Offline Sexual Violence and Online Dating

Match.com came online in 1995 as the world's first online dating service. Since then, online dating has become one of the most prevalent ways that people meet romantic and sexual partners. Mobile dating applications are currently the most popular way people access online dating. In the US, 49% of adults under the age of 30 have used a dating app [6]. Online dating services offer a way to meet other people through the internet. These services require the user to create a profile which includes photos of user as well as a text-based portion called a bio. Bios vary from platform to platform, but most encourage the user to put some amount of personal information forward that will be displayed to other users on the platform. These text-based portions of the bio can be free-form and/or utilize prompts generated by the app in which the user types their answer. Users also disclose their sexual orientation and gender so that the app can match them with others who fit their sexual orientation. On some services, text-based surveys and other information gathered from the user are used to narrow down the pool of potential

candidates which are shown to the user. Some platforms opt to not filter users based on profile information, but instead show users at random. Most services provide a view which shows profiles of other users one at a time. The user can then choose to indicate interest in another user (often done by swiping right on their profile). If both users indicate that they are interested in each other the app will indicate to both users that they have "matched". Once two users have been matched, they are able to send each other text-based messages on the app. This allows users to converse with each other before meeting in real life. These systems were popularized by services such as Match.com, eHarmony, and PlentyOfFish but have been iterated on more recently by Tinder, Bumble, OkCupid, and Hinge. Some platforms - notably Grinder - do not use this type of matching system, but instead display all users to each other and allow anyone to message anyone else.

Online dating has been a prominent context for research into online-to-offline harms in HCI. HIV and STI transmission risk has been found to be greatly increased amongst users of Grindr [3,35,64,80,111,112,130,131,136]. Multiple studies have examined the impact on users of being outed when using men-seeking-men applications [18,21,35]. Transgender users have also been shown to put themselves at risk when disclosing their trans stratus online [47]. They often do this to avoid an altercation in person, as they would rather experience the harm online. Online harassment is a popular theme in this type of research. Such research has shown that women and members of the LGBTQIA+ community are disproportionately harmed [2,6,33,121] by such acts as unsolicited pictures of genitalia and threatening or sexually aggressive messages. Some works advocated for avoiding dating app users that didn't have profile pictures and

searching matches names in search engines to investigate them prior to meeting in person [21]. Duguay has also highlighted the need for better platform moderation [40]. Despite the abondance of research on safety on dating applications, safety still appears to be an issue of concern.

Online dating has been shown to inadvertently perpetuate sexual violence. Numerous quantitative studies have linked dating app use with sexual violence [32,55,58,69,114,120,127]. Studies have shown that Australian dating app users were more likely to report sexual violence than non-users [69,114]. Choi found that dating app users were 2.13 times as likely to experience sexual violence than non-users [32]. Similarly, Shapiro found Tinder users were more likely to report sexual violence than non-users [120]. According to the UK National Crime Agency, reports of rape where perpetrators were met through a dating app increased six-fold in five years [127]. Gilbert interviewed women and found that most of their experiences with sexual violence from people they met on dating apps were perpetrated with either sexual coercion or force [55] further showing the capacity for online-to-offline harm with dating applications. Many have also reported on situations where people engage in unwanted sex due to social pressures, fear of retaliation of rejection, and other factors [14,94,107,129,138]. In these situations, the perpetrator is not always aware the act is nonconsensual due to acquiring ambiguous consent, such as interpretating matching on a dating app or body language as consent to sex[138]. The online systems which facilitate user matching are often perpetuating user's ambiguous consent behaviors, which can result in nonconsensual sex. In this way, online dating systems are perpetuating harms online, which is then translated offline by the user.

Today, dating apps are not explicitly involved in the discussions around consent to sex between users, but that doesn't mean dating apps don't affect the ways users give and perceive to receive consent. As we discussed, sexual scripts and rape myths play a large role in how individuals perceive consent. Zytko and colleges found that many men (specifically heterosexual cisgender men) believed that everyone on a dating app was actively looking for casual sex, even if they state explicitly otherwise in their bio [138]. This perception is misaligned with fact that many people use dating apps to find non-sexual and non-romantic relationships [19]. This myth is similar to the rape myth that all women are promiscuous [44,116]. This belief then influences how these men view matches. Men who believed that everyone on a dating app is looking for casual sex also often believed that a match on a dating app was affectively consent for sex [138]. This can create problems when these men meet with a match in real life. Women that Zytko and colleges spoke to discussed being afraid to speak up when a match proceeded with a physical sexual advance without asking while on a date. They were fearful that if they asked their match to stop, that they may be physically harmed [138]. The imbalanced power dynamic that dominates these situations is perpetuated by rape myths and sexual scripts, which in turn are perpetuated by the dating applications which do little to dispel or combat these myths given that the app does not actively get involved in conversations around consent, and one party is almost always going to have more power (physically, social, or otherwise). This dynamic puts all burdens of safety on to those with the least power, those that are at the most risk of being victimized.

Dating apps have included safety-oriented features, including the ability to block and report other users. Bumble has attempted to address safety issues by only allowing

women to start messaging conversations. Pruchniewska has critiqued Bumble's unique design by pointing out that this creates a system that enforces unequal gendered labor by giving women the full responsibility in vetting men [105]. More recently Tinder added a new suit of features called Noonlight. These features include the ability to show your contacts information regarding in-person meetings, a panic button which contacts the authorities in case of an emergency, and a badge on the profile of users to show they are using Noonlight [141,142]. These features, while well intentioned, still follow the paradigm discussed above. These solutions do not aim to *prevent* sexual violence, but to *react* to it' s occurrence.

This study aims to investigate computer-mediated consent to sex in the context of online dating because of previous literature establishing its use as a risk factor for sexual violence, but also because of the wide adoption of these services. Now that 49% of US adults under age 30 have used a dating app [6], they offer a unique opportunity for designing interventions for mediating consent to sex and preventing sexual violence at scale. Such designs have the potential to mitigate sexual violence which stems from ambiguous consent practices, which is often perpetrated unintentionally.

2.5 A Review of Participatory Design

Participatory design (PD) is a research method involving anticipated users of an application into the design process. The roots of this method were created in the 1970's in Scandinavia. During this period PD was aimed at building on the experiences of the users to provide them with the resources to perform an action in a given situation [24]. In the mid 90's, BØdker advocated for working with a "small group" or "microcosm" of the anticipated users for them to provide anecdotes that could help to quantify their

experiences and problems into solvable problems [24]. These early methods of PD have since been further expanded upon by the HCI community.

More recently, Hansen et al. examined PD to identify guidelines for how to use the method most effectively [65]. They advocate that PD should aim to work towards empowerment and democracy, use collaborative reflection to gain context for the uses and practices of the design, and to use organizational structures, knotworking, and networking to pursue outcomes [65].

The HCI community has seen an increase in interest in studies using PD in recent years. We have seen studies which have used PD to work with marginalized and/or at-risk communities, such as with forced migrants [28], the LGBTQIA+ community [59,60,66], and children[8,9]. These studies attempt to answer calls from the HCI community to involve marginalized communities in participatory design [65], some of which specifically call for the involvement of at-risk communities in PD studies to investigate sexual violence and sexual agency [11–13,42,76,77]. Badillo-Urquiola et al. held participatory design sessions with children to discuss their perceptions of online danger, particularly sexual solicitations and cyberbullying [10]; further showing the efficacy of this method when working with vulnerable populations and sensitive topics. Another study worked with youth (13-21) who donated their sensitive online data from Instagram with the goal of analyzing the data to improve adolescent online safety [108]. This highlights the willingness of at-risk users to provide sensitive information to researchers with the hope of progress being made to make them safer.

In the following section, I will outline how I attempt to use PD as a response to these calls to examine possible designs for consent technology, while adhering to the recommendations and guidelines outlined by the HCI community.

3 METHOD

Participatory Design is an approach to designing technology that intentionally includes users in the design process of new technology to ensure that user experience and perspectives are considered. This method allows users to proactively inform design. This is in contrast with the current practice of reactive design based on user feedback. Participatory design is highly informative during the early conceptual stages of development due to its ability to highlight goals and challenges of a specific design and for its proactive user feedback.

To better understand the roles that users want dating applications to play regarding their consent to sex, we held participatory design sessions with women and members of the LGBTQIA+ community. These communities were selected due to being disproportionally affected by sexual violence on dating apps and having historically been proponents of affirmative consent practice. Each session was focused around having participant generate feature ideas for what roles a dating app would play in assisting users in communication regarding and including consent. This study was approved by the Oakland University Institutional Review Board. Recruitment, session moderation, and data analysis were performed by a research team consisting of myself and two undergraduate research assistants.

3.1 Position Statement

The motive, planning, and conduct of the study were unavoidably affected by the personal identities of the research team. Recruitment, the design of the session protocol, moderation of all sessions, and data analysis was led by a pansexual non-binary person. The team also consisted of a heterosexual cisgender man, and heterosexual

cisgender women who acknowledged that their motivation to be involved with the study came in part by their experiences with sexual violence. Research was supervised by a heterosexual cisgender man with experience studying technology-facilitated sexual violence.

3.2 Recruitment

We recruited participants through advertisements on Facebook and Twitter, by emailing LGBTQIA+ and Women's organizations on campus, by making posts on our personal social media accounts, via our individual social networks, and via snowball sampling. These posts included information about the studies purpose, the duration of sessions, compensation, and directed potential participants to a screening survey. The survey was used to collect demographic information, contact information, and to ensure they were available for one of our upcoming sessions.

All recruitment materials included warning that sessions would include conversations surrounding sex, consent, and sexual violence. The research team worked with a certified Sexual Assault Nurse Examiner and a Psychology researcher with experience in sexual violence perpetration and prevention in order to inform best practices when discussing sensitive topics with participants.

Each session was held online via a private Discord server. For each session, all participants would join a voice call with the researchers. Anonymous names were chosen by participants and video was disabled on all calls to protect our participants privacy. Participant's pronouns were also included in their names to ensure each participants identity was fully respected.

A total of five sessions were held with 2-6 participants per session. A total of 20 participants attended a session. All participants resided in the United States. Participants were 50% cisgender women, 20% cisgender men, 15% non-binary, 10% questioning, and 5% transgender women. Regarding race; 80% were Caucasian, 5% Vietnamese American, 5% Asian, and 5% African American. Regarding location; 55% were suburban, 30% were urban, 10% were rural, and 5% did not specify. Regarding age; 55% were between the ages of 24 and 29 and 45% were between the ages of 18 and 23. Following the first session, all participants received a $25 target gift card.

3.3 Participatory Design Protocol

To start each session, we went over introductions of the researchers present. We the went over the ground rules for the session including, no offensive language, don't raise your voice, critique ideas not people, and to respect everyone's pronouns. We then went over the goals of our research which read "We want you to influence the design of dating applications by assisting all users of the application in mediating consent with sexual partners, with a focus on safety and sexual agency" and "We want to discuss technologies that you would want to use to exchange consent."

For the first activity, we started with first group discussion prompt; How do you think someone should give consent for a sexual encounter? Participants were asked to type out a few sentences and post them in a Discord channel. Once everyone had submitted their ideas, we asked each participant to explain and expand upon what they wrote in the channel. Other participants were encouraged to engage in conversation regarding what others said and posted.

We intentionally chose not to impose a framework or theory of consent to sex on our participants; we wanted them to design technology which mediates consent in a way that aligns with their preferred consent practice. If we were to impose a framework of consent, it could limit their ideas to what they believed would fall under said framework. By allowing them to express their preferred consent practice through their features ideas, they created features which express the nuances formed by their experiences. This was especially important due to the nuanced consent practices previously documented within this demographic.

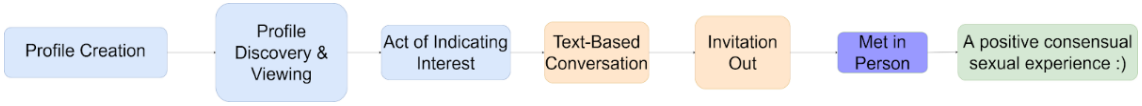

Figure 1. The timeline for an arbitrary user's experience on a dating app used during participatory design sessions.

For the second Activity, we showed participants a timeline we created of an arbitrary user's experience on a dating app. Participants were told to imagine a user who starts by making a profile and continues through this process to a positive sexual encounter. We then explained each step in the timeline. The timeline contains main three stages: The profile stage (blue), the messaging stage (yellow), and the in-person stage (purple and green). During profile creation, the user fills out personal information about themselves to create their dating app profile. Profile Discovery and Viewing refers to the users evaluating other profiles on the app. An act of indicating interest consists of choosing whether to match with another user. Text based conversation happens on the app between our user and another user after matching. An invitation out is when one user asks another to meet in person. Meeting in person (in this imagined scenario) optimally ends with a positive consensual experience. We told participants to imagine how a dating

app could be designed to assist our arbitrary user find a positive consensual sexual experience.

Participants were then broken up into groups of two to generate ideas for how a dating app could assist our user to find a positive consensual sexual experience for a main stage of the timeline. Each user pair joined their own separate voice channel to discuss their ideas. After 5-10 minutes we would reconvene as a group. Once everyone was back, we would ask each pair to discuss their design ideas with the group. Other participants would give thoughts, feedback, and expand on ideas presented. In the case of a two-person session, both participants would be asked to generate ideas for all three stages. We would then add each idea to the slide with the timeline diagram under its corresponding stage. After the second activity we would take a ten-minute break.

The third activity started by discussing what dating apps could be like 10 or more years from now. We gave participants examples of future technologies that could be used by dating apps; Virtual/Augmented Reality, AI, Robotics, and Wearable Tech. We also gave multiple examples of how each of these future technologies are used today. Participants were then asked, “How would a dating app in 10 years use these technologies to help users mediate the exchange of consent?” Participants broke off into their 2 person groups again with the instruction to brainstorm a few ideas and sketch what they imagined it would look like for someone to use their design. After about 10 minutes participants would be brought back to the group channel. Participants then uploaded their sketches to the discord channel for everyone to see. After all the sketches were uploaded, participants were asked to explain and expand upon their design idea. Other participants then provided feedback and opinions about the design being presented.

When speaking, researchers were careful not to influence the participants' feature ideas or opinions. Instead, we focused on asking participants clarifying questions, answering questions from participants regarding terminology or protocol, and keeping participants on task. We would often ask participants to clarify or re-explain their thoughts to make sure we documented them accurately. When a participants would present off topic feature ideas, we would ask questions like "*How does this feature help users with consent or intimate conversations?".* As researchers, we tried to avoid influencing our participants though our conversations during the sessions.

3.4 Data Analysis

All sessions were audio recorded and all artifacts from the discord servers were saved to a private cloud share. Researchers first transcribed all the audio recordings using Otter.ai and manual review. Then each transcript was coded using an open-coding technique by three researchers. To do this, we manually reviewed the transcripts from the sessions and saved excerpts with codes (keywords or phrases) which were associated with themes we saw arise between focus groups. This allowed us to break up the transcripts into discrete parts that could be analyzed for thematic similarity with other experts across the data, as described by Strauss [125]. Three rounds of coding were done on each session's transcript. Visual data such as participant illustrations were then coded using the same codes that were used for the transcripts. All coding was reviewed by the principal investigator. Three researchers including myself then discussed the codes and organized them into an axial coding. Axial coding involves grouping and organizing codes together to see how they may relate to one another. By creating abstract categories, we were able to how our codes are related, which allows us to see larger encompassing

themes at play [125]. All three authors discussed the axial coding to identify themes, resolve disagreements about code assignment, find exemplary quotes for each code, and determine how the codes and themes relate to each other. Throughout the analysis the main themes that arose centered around the idea of making the communication surrounding consent to sex more accessible to prevent non-consensual experiences.

4 FINDINGS

Through our coding of participatory design session data, we found that our co-designers' ideas for transforming dating apps into consent apps broadly reflected a motivation to reduce or circumvent the barriers to practicing their preferred process of exchanging consent to sex.

Co-designers generally envisioned sexual consent exchange as a *process* of sequential events rather than a one-time momentary agreement to a sexual activity right before it occurs. While there were some variations in individual co-designers' preferred events or steps in exchange, most involved the following three components, which I refer to as *consent communication progression* (CCP).

Step 1: Intimate Disclosure. Our co-designers advocated for open and honest disclosures about one's interests, relationship expectations, and level of interest in sexual activity on one's dating app profile and in private messaging. They believed that disclosing such information on one's profile and through in-app messaging indicates a predisposition to honest and open communication.

Step 2: Honest and Open Communication. Many of our co-designers advocated for having conversations about boundaries, sexual preferences, intimacy, and consent before engaging in intimate or sexual acts. This was done online before and after meeting in person, but before engaging in sexual acts. They explained that *"Specifics should be talked about" -Alec* and that each party should *"write it out [and] be explicit" -Emma* when discussing sexual preferences and boundaries. They felt that discussing these topics with their potential partner before engaging in intimate or sexual activity was a vital part

of the consent process. Most co-designers expressed a need to have such conversations through messaging in order to feel comfortable enough to meet in person.

Step 3: Explicit Consent to Sex. When meeting in person before commence intimate and sexual acts, our co-designers advocated for explicit verbal consent for specific sexual and intimate acts. They wanted unambiguous verbal consent for all sexual and intimate acts because *"both parties should know exactly what's going to happen"*. They also felt it important that both parties *"should also be open to changing those boundaries and specifics during the actual encounter"* to reaffirm their previous conversations. During sexual encounters our co-designers advocated for consistently reaffirming consent for sexual and intimate acts explicitly and verbally. They wanted to make sure that they were "*checking in with them to see if that yes, is still yes*" regarding their partner. This allows them to ensure that all parties are comfortable with whatever is taking place. These types of consent practices are consistent with other literature's definition of Affirmative Consent.

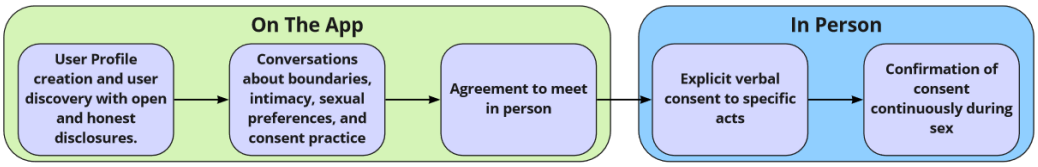

Figure 2. A chronological view of the Consent Communication Progress process. Users include intimate disclosures in their profiles, engage in intimate disclosures and open and honest communication through messaging, and then agree to meet in person. In person, explicit verbal consent to specific acts is given by all parties. This consent is then reaffirmed while the acts are taking place.

4.1 Barriers to Consent Communication Progression

Some co-designers expressed how other users' consent practices often resulted in fetishization and harassment instead of open and honest communication. As Alec explained:

"*As a black person, I can't even tell you how many times I've had people come into my DMs and specifically comment on the fact that they wanted to have sex with somebody who was black, without even talking to me, or calling me a slur. … Like, I don't want to be called the N word. When I'm trying to find a boyfriend, you know?"* -Alec

Alec describes how other users have fetishized them for being a person of color and expressing that outwardly and explicitly, as if it were an expression of sexual interest. They also explain how responding negatively to such advancements can result in them being harassed with racial slurs. These experiences largely reside from the matching algorithms which Alec wishes would filter out people with these views and consent practices *"if I could stop them from getting to me before it even happens, like, I will pay so much money".*

Sabrina described how broaching the topic of having sex with someone can feel uncomfortable, which is the first step in having open and honest conversation about boundaries, sex, and consent. *"[When] one of the two people know [the other is interested in having sex], it's more comfortable to have that discussion in the first place. Like, once you know, that weight is lifted off your shoulders and you can have the conversation openly and honestly with somebody"* Sabrina describes feelings of discomfort regarding the social taboo of proposing sex as an option and having conversations about boundaries, sex, and consent. She explains that once she knows that

the other person is interested in sex, it allows them to feel more comfortable opening up and having open and honest discussions. Their frustration comes from this first burden to open and honest communication, subverting social taboos by starting such an intimate conversation.

Some co-designers discussed putting information about their preferred consent practices in their bios on dating apps. Sophia was concerned about this social taboo stating that *"I think that there's also a degree to which I just know, from my own experience with someone who is more on like a prude side that it would be kind of jarring".* They were concerned adding such content in their bio could turn away other users who they might connect with, who may prefer to have those conversations with more privately. This highlights the issue around discussions about sex and consent being considered a social taboo, as opposed to a required part of the consent process. They also stated that they did not find reading about someone's consent preferences on their bio to be sufficiently useful, stating that "*I feel like that would be something you would want to have a conversation with someone about rather than just reading that about them."*. In this way, they felt like the only way to currently exchange information on dating applications was through direct conversation, as she did not find other ad-hoc methods to be sufficient.

Multiple co-designers acknowledged that social pressures play a role in consent during in-person sexual encounters. *"One thing I know that is an issue that I've encountered is when you make out and then you feel bad for saying no, so you don't say no."* Susan describes how during an intimate sexual encounter with someone, after kissing them, they have been made to *"feel bad"* about saying no to further sexual

advance, so they just go along with it. This pressure that Sabrina feels is likely based on sexual scripts and social expectations. Sabrina elaborates further saying *"I definitely agree that there's a safety and a guilt issue. Mainly with women and heterosexual relationships. I've definitely felt that myself as well."* Sabrina highlights that there is a "safety issue" in saying no to sexual advances, in that rejecting further advances could result in their partner doing harm to them. They both felt that external pressures created barriers to their preferred consent practices and sexual agency.

Themes	**Applicable Step of CCP**	**Main Takeaways**
Redirecting the Burden of Awkwardness	Step 1 Step 2	• Users must feel comfortable in order to have open and honest communication. • If the app provides sensitive topic suggestions with AI, it allows the users not to have to broach them themselves. • Users can supply information about their preferences which can inform the AI to create customized prompts for user pairs.
Transparency, User Agency, and privacy: A Careful Balance for Maximizing comfort	Step 2 Step 3	• The promotion of conversation prompts must retain user agency of conversation topics. • Participants advocated for allowing users to veto prompts from being shown. • Participants advocated for designs which focus on user agency as their primary feature.
In-Person Consent Communication Interpretation	Step 2 Step 3	• Participants advocated for technology which affirms verbal consent, not replaces it. • Participants advocated for wearable technology which could reduce ambiguity, provide real time information about their partner, and provide them with ways to avoid accidental non-consensual sexual acts.

Table 1. A table which displays the main findings, their applicable step of the CCP, and a summary of each finding.

4.2 Redirecting the Burden of Awkwardness: Technology Facilitated Discussions about Sex, Boundaries and Consent.

One of the ways in which our co-designers proposed designing dating apps to address barriers to CCP, was making users more comfortable with engaging in open and honest communication during online messaging. They believed that taboo surrounding the discussions of sex made others uncomfortable discussing sex, boundaries, and consent. Such a stigma could prevent users from participating in the first two steps of the CCP.

"If at any point [during conversation], one person in the party does not feel comfortable, or they feel like they're not able to express themselves, there should be a way like, like, let's say, an app where they could just press a button, and it will notify their partners that they're uncomfortable. And that something needs to change." -Heidi

Heidi furthers the importance of feeling comfortable. This manifested in the form of a button, which when pressed by a user would notify their partner that they are uncomfortable. This would allow users to easily notify a partner of their comfort level to change certain aspects of the situation without the need to speak up. She emphasizes that intimate discussions require comfort and trust to be effective. She believed that having a way to non-verbally notify partners of discomfort would make it easier to express such feelings, thereby allowing their partner to make changes to their approach to the situation.

Heidi did not envision this replacing for Open and Honest Communication, but to augment it. Such a tool would be used to supplement intimate conversations, not replace them. She believed this supplementation would make it easier to express one's emotions honestly, but without the discomfort of a verbal confrontation.

Another way our co-designers envisioned increasing user comfort was by taking some of the pressure of broaching these topics off the user and putting them onto the app. This allows users to discuss these sensitive topics without one of them needing to broach the topic themself. They believed that by removing the burden of being the first one to bring up an intimate topic, it would provide a more comfortable environment for users to engage in Intimate Disclosures and Open and Honest Communication.

"I feel like it should be like, you have like introductory questions. And then as you guys are further along in [messaging], then it can get more inclusive. And then like, if you want to skip [the upcoming prompt], you know, like red cards, you know, you can always skip those, and then come back to them later. If you feel more comfortable later." – Sarah

Sarah speaks to wanting the app to help them progress their conversation in a natural way by providing conversation prompts. She wants the app to make it easier and less awkward to discuss sensitive and intimate topics by having the app broach the topics directly. She also advocates for user agency by envisioning a system that would allow users to skip or veto suggested prompts with the option to come back to them later. This way, the users are not at complete mercy of the app for their conversation prompts.

Our co-designers discussed several feature ideas which used AI as a tool to scaffold the consent process. They envisioned AI being used to increase user comfort when discussing sensitive topics, while encouraging such conversations. This way, the burden of awkwardness regarding who will *"make a move"* is redirected onto the app. The AI in these situations, is to be used as a tool to encourage communicating about boundaries, sex, intimacy, and consent while providing a more comfortable environment for the user.

4.2.1 AI Generated Conversation Prompts. Our co-designers wanted the app to provide prompts to them and their messaging partner that could naturally progress the conversation towards discourse about sexual preferences, intimacy, boundaries, and consent.

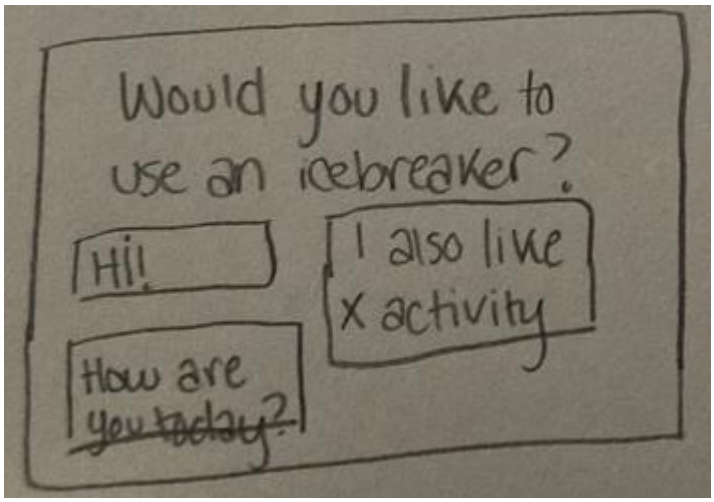

Figure 3. An illustration of what one co-designer envisioned the AI generated prompts looking like in a dating app interface.

Participants wanted the app to provide prompts to them and their messaging partner that could naturally progress the conversation towards discourse about sexual preferences, intimacy, boundaries, and consent. They emphasized the importance of providing a natural pace of escalation to such topics through the prompts.

"You could have like the categories of conversation starters. So ones that are like light hearted ones that are a little bit more suggestive, and then ones that are like explicit, and that could get into kind of, like, especially if you were looking for something that is not vanilla. Then you also have consent questions in there. You know, like, it would be more of like, something to laugh about, but also to have like, those deep conversations." - Sophia

Sophia explains how conversation prompts should start off lightheartedly as to not be overly personal, but that said prompts should progress as the conversation progresses. This allows for the introduction of more intimate topics without unnecessary stress. Sabrina envisioned an array of prompt categories the system could leverage. This would allow the users to become comfortable communicating with each other before more serious prompts are introduced. She goes on to suggest that these prompts could get explicitly into sexual preferences if the conversation progresses to that point. She envisioned users' reactions to more sensitive prompts as that of humor and comradery as opposed to discomfort, since both users are being given the prompt from a third party. Overall, she wanted the conversation progression to feel natural without being forced.

4.2.2 Providing AI With User Data for Prompt Generation. Our co-designers expressed the need for AI generated prompts to be highly tailored to the user pair. One

way this data was envisioned being collected was with a virtual Want-Will-Won't list. Want-Will-Won't (WWW) lists are a tool used by people to establish sexual preferences, especially between sexual and romantic partners. They have historically been promoted by LGTQIA+, BDSM, and sexual health organizations. A WWW list has three categories based on what the person wants to during sex, what they are willing to do during sex, and what they won't do during sex. This has commonly been used to establish boundaries with sexual partners before sexual activity occurs.

Our co-designers advocated for a private WWW list integrated into profile creation. Such a list could be leveraged by the app in multiple ways. Our co-designers envisioned the WWW list being extended to topics beyond sex such as other aspects of the relationships one is looking for (e.g. Romantic acts, dates, cuddling, public displays of affection, friends with benefits, monogamy, polyamory). Our co-designers envisioned the WWW list being leveraged by the AI for prompt generation. They believed that the data from the WWW list would allow for more specific and tailored prompts for any user pair. This data would be much more granular and specific than just profile information, it would allow for highly specific insights which could be leveraged to gauge relationship and sexual compatibility between two users through custom prompts. As the users message each other, the AI could leverage the WWW list to ask specific prompts about matching entries on their lists. They envisioned this being useful for generating prompts for discussing specific sexual preferences and boundaries as well. Most participants were open to disclosing this personal information to the app, given that the app used the data to better tailor their results when looking for others to match with on the app. They believed

that providing such data to the application would provide a benefit that would be worth the intimate disclosure.

"It'd be nice if the app just straight up told you like, how do you want to talk about anything? How do you wana talk about friendship? How do you want to talk about any of this? And that'd be cool. If it then gave you usable ways to do that, because I feel like most dating apps just assume and are like, okay, you matched with someone now send them a text message. And it's like, oh, well if you're matching with someone with the expressive intent of something like sex, and that's not what they want to talk about." - Pablo

Here Pablo explains how a WWW list could be used to assess compatibility and drive conversation prompts. They want the app to help them figure out what kind of discussions and interactions their match is open to. The app could give them information on which topics to bring up and "how" to bring up and discuss these topics. By leveraging this information, such an AI could maximize user comfort. Pablo highlight this by describing the frustration of matching with someone on a dating app, only for you both to have different expectations that do not align. In this example, the WWW list could be utilized for both analyzing compatibility as well as augmenting user communication on the app. This augmentation could assist users in having discussions with others while avoiding sensitive topics or language that could offend the other user.

4.3 Transparency and User Agency: A Careful Balance for Maximizing Comfort.

While AI conversations prompts allow us to redirect the burden of awkwardness from the user to the app, AI which dictates conversation topics has the potential to limit user agency. In order to maximize user comfort, such a system must retain user agency over conversation topics. Participants advocated for systems which promote transparency with open and honest communication but allow the user to decide if they are ready to have those conversations with a given match.

4.3.1 Encouraging Open and Honest Communication Through Design.

"With dating apps, I feel like there is not so much of a clear consent discussion going on. Not necessarily in an erotic sense, maybe just general intimacy of like, kissing, hugging that kind of thing. There's never really any of those boundaries discussed prior to meeting up. But it should be like, you know, Can I kiss you? Can I hug you? You know? That kind of stuff" – Sophia

In this excerpt, Sophia discusses her frustration with the lack of open and honest conversations being had about intimacy, sexual preferences, and boundaries before meeting up. She explicitly clarifies that she not talking about sending sexual messages to each other ("Sexting"), but is referring to the explicit conversations about one's boundaries pertaining to intimate, romantic, and sexual contact. She wants to have these conversations with her matches prior to meeting in person, but rarely has the opportunity. She would prefer if her partners provided more verbal confirmation on their boundaries, while getting the opportunity to clarify her own.

"So pretty much I found through dating apps, like no one ever really talks about consent, or, uh, you know, talks about boundaries before they meet up. So I would think it'd be a good idea to either talk on the phone like when you're facetiming, or to message prior so that there's clear rules." – Sara

Sara also expresses frustration with the rarity of conversations about consent or boundaries with her matches before meeting up. She emphasizes that it would be better for matches to clarify such boundaries with each other prior to meeting in person in order to clarify the "*rules"* of the encounter. The *"Rules"* Sara is talking about are related to discussions and definitions of Affirmative Consent. As we have discussed, some forms of affirmative consent require all parties to discuss their boundaries, expectations, wants, and needs before engaging in intimate or sexual physical acts. Most of our co-designers advocated for such dialog with their partners. Many of which expressed the need to have these conversations before ever meeting up. Our co-designers expressed that not only do they advocate for discussing boundaries around sex, other romantic or intimate physical acts, but also having transparent and up-front conversations about their expectations, wants, needs, and boundaries regarding the nature of the relationship they may have with their match. This belief is the foundation of Step 2 of the CCP, Honest and Open Communication.

"It could be in the messaging stage, after you initially match. You can like choose to like,' Yes, I'd like to reveal this [personal information about myself]'. So that could be like a talking point of like, maybe, like, say you have to like text for a certain amount of

time before being able to reveal if you want to, or like if this is going to be an app for good positive sexual encounters, and rather like not have anyone who sees my profile who may know me possibly also say, 'Oh, so-and-so likes to be used as a human toilet', which is not me. But like, maybe some people don't want that out there." -Amy

In this excerpt, Amy is discussing a feature idea that would involve users giving personal information about their wants, needs, expectations, and boundaries. The app would then allow them to display this info to their match through an in-app prompt. They believed this would be a way to allow users to easily and explicitly provide information to their matches while minimizing time waste and anxiety due to the message being pre-defined and sendable with the tap of a button. Amy acknowledges that the nature of Open and Honest Communication involves disclosing highly personal and potentially sensitive information. She believes the user should have complete agency over what information is shared with their matches. She would want very granular control over this information. Amy is directly encouraging transparency while maintaining user agency and maximizing user comfort. Amy is recognizing that Open and Honest Communication can be challenging and anxiety provoking but believes that this can be partially overcome thoughtful through design.

4.3.2 Retaining User Agency with AI Systems. When discussing AI generated conversation prompts, our co-designers advocated for maintaining user agency over conversation topics and prompts. They wanted to have control over weather a prompt is presented during messaging. They explained that they wanted such a system to assist in their CCP, but without forcing users to have specific conversation prompts. They

believed it important for users to be able to veto any given prompt to provide users with a comfortable experience.

When working with AI mediated communication, providing users with agency over their conversations requires special consideration. Our co-designers were clear that they would want to be able to veto AI generated conversation prompts. They wanted to retain some agency over the conversation because they wanted to have the final say in what prompts are presented. They believed user agency to still be possible by not giving the AI total control over their conversation topics.

"You would have like, questions that are goofy. Like, what's the most embarrassing moment of your life? You know, like questions that would inspire laughter. if it was like, more of like a swiping feature, like the questions that you don't want to answer, you can just swipe away from as well." -Sabrina

Sara is promoting user agency through a veto system; allowing users to opt out of the next question before it is proposed. She envisioned this working similarly to the swiping feature seen on dating apps to obtain matches. This override acts as a failsafe when the user is not interested or not ready to have the proposed conversation with their match. This would allow certain conversation prompts to be dismissed on a match specific basis, thereby providing increased user agency.

"like it's the tap to reveal, maybe like a two-factor identification type thing, like you have to click that they like that you consent to them viewing that question, and that would that

way like, you know, if you've talked about something before, or like you don't really like, say you're having a bad date experience and don't really want to talk about explicit stuff. away. They can't actually tap to reveal personal." -Sophia

Sophia also spoke about vetoing AI generated prompts. She envisioned it as a prompt that would allow either user to deny the prompt and generate a new one, or consent to that conversation prompt being shown. She explains how this is important for cases where one is not comfortable having certain discussions with their match. She also discusses the possibility of using the AI generated prompts in person to spark conversation. In that situation, she felt it was important to be able to control the level of intimacy in the prompts. If she didn't think the date was going well, there would be no point in having such intimate discussions, as things weren't going to work out. In which case, such a prompt could give the other user the wrong idea about her intentions. Automated AI systems inherently take away some user agency, but it is important to allow user intervention when possible. This way, the AI is being used and controlled by the user, opposed to user's interactions with others being controlled by the AI.

4.3.3 Retaining User Agency Through User Preferences. One group of co-designers envisioned a dating app messaging interface similar to Slack or Discord, where users have different channels, or conversation threads, for different discussion topics. They envisioned different channels listed while messaging their matches that would corelate to different conversation topics. This way, the conversation topic would be dictated by which channel they were messaging in.

"If you know how in discord there's like, different text channels and you can label them, like different things, we were thinking that but for like, a dating app, and maybe like, you know, all the channels, except for the not-safe-for-work channel, would have like, one channel, you can't send pictures at all." -Kat

Kat discusses how a channeled messaging interface could allow users to have control over the conversation topics. They could allow the users to determine their conversation topics by typing a message in its corresponding channel. These topics could include conversations about boundaries, intimacy, and sexual preferences as well as less intimate topics such as hobbies and politics. Kat envisioned a channel for exchanging nude photos as well. This way, explicit phots are contained to a single channel, giving the user agency by allowing them to decide whether to use this channel at all. This type of system could allow the users to easily convey conversation topics to their matches, giving them total agency over the conversation topics.

"You start messaging said person, like, you'll see like your tabs, and you'll see if they're, like, locked or unlocked." -Kat

Kat further elaborates that to chat in a specific channel, both users would have to "*unlock*" it. This gives the users agency over what conversation topics can be broached. Both users would need to unlock a channel for it to become active. Users could individually choose what channels would be unlocked when first matching with someone and could unlock more channels after further conversation. This allows the users to drive

the conversation progression at their own pace. Once a user is ready to discuss a specific topic, they would "unlock" the corresponding channel. Once both users have unlocked the channel, they would be able to message each other about that topic. This allows for granular user control over the conversation topics. Both users must consent to a conversation topic for it to be brought up.

Our co-designers envisioned a feature that would enable them to share explicit photos safely and securely with their matches. They wanted to have a lot of control over how this is done to ensure they couldn't be sent explicit photos without consenting first. They also wanted it to be impossible for other users to take such images off the platform.

"Then in one channel, you can send pictures, but it has like a safe for work filter on it. And then there's like, a not safe for work channel." -Kat

Kat is describing a channel as discussed before, but specifically for images. They wanted to have one for "safe for work" or non-explicit images, and one for intimate photos. This allows for granular control over not just if their matches can send them images, but what types of images they can send. Restricting images to specific channels could reduce the risk of users sending unwanted pictures to one another through the platform. This could be accompanied by image recognition software that could help enforce the use of these channels. Such systems are in use on social media platforms today.

"Making sure that there was a way that after you have shared anything that could be considered not safe for work, that there was not a way for whoever you shared it with to take it off of that platform." -Pablo

Here Pablo emphasizes that they would want the app to do a lot of work to ensure taking nude photos off the app would not be possible. They didn't want other users taking advantage of the nude photo sharing feature to share their intimate photos publicly. Protecting user privacy was very important to them given the inherent risk that such photos could be taken and published online without their consent. It is important to provide not only the freedom to share such content, but also to protect user's rights over their images and providing ways to share them without them being exported by another user.

4.4 Maximizing Comfort and Reducing Ambiguity During In-Person Encounters

Participants also discussed intervention points and feature ideas applicable to in-person consent, the third step of the CCP. Many of the solutions envisioned by the participants involved augmenting communications and consent itself. It's important to distinguish this from *replacing* explicit verbal consent. In this way, these solutions differ from those which intervene during steps one and two of the CCP. The envisioned technologies were gathered using a future making exercise, meaning their ideas are not limited by what is possible today, but what could be possible in the future. While being largely un-implementable today, these ideas provide us with insight into what kind of technologies and intervention points our participants would be comfortable with using.

Some of our co-designers expressed frustrations with not understanding social cues and flirting, or having trouble understanding how their partner feels while on dates. They explained that body language and social cues were key to communicating while in person, but that interrupting such cues can be difficult. They wanted a way for those social cues to be relayed to them explicitly. This was envisioned to work with wearable tech which would report what social cues and important conversational context were detected and what they meant to the user in a discrete way. This would allow them to better understand what their partner is communicating to them; such technology would help provide context which would allow them to more effectively and comfortably converse with their partner.

Our co-designers envisioned a piece of Augmented Reality technology that could use emoticons, emojis, or other symbols to indicate one's mood and general feelings at a given time. It was envisioned by one co-designer as a crystal (similar to the one's from the video game series *The Sims)* or an emoji that would change to express different emotions.

"We could all have little Sims crystals, or like emoji things above us, you know, so we can all know what's going on in our heads. ... It would really give the other person like 'I'm pissed' or 'I'm happy' or 'All right', I'm feeling like 'you need to change something' would be helpful." – Susan

Susan envisioned the AR mood symbols helping her understand how to direct her actions and conversations when on a date. The visualizer would communicate basic

emotions which would allow Susan to change her behavior depending on the output of the other person's virtual mood ring. Having such information about their date's state of mind allows them to tailor their behavior in order to make their date more comfortable as well as themself. She believed this could be used to augment verbal communication in a way that would make it easier to avoid upsetting their partner. This would allow both parties to have more information they could use to provide a comfortable interaction with the other party.

Different types of wearable technology were discussed, but they all had the same main purpose: to provide more information about the thoughts and feelings of their partner during an in-person encounter. These wearables were often envisioned as discrete ways technology could provide context to conversation, interpret body language, and social cues.

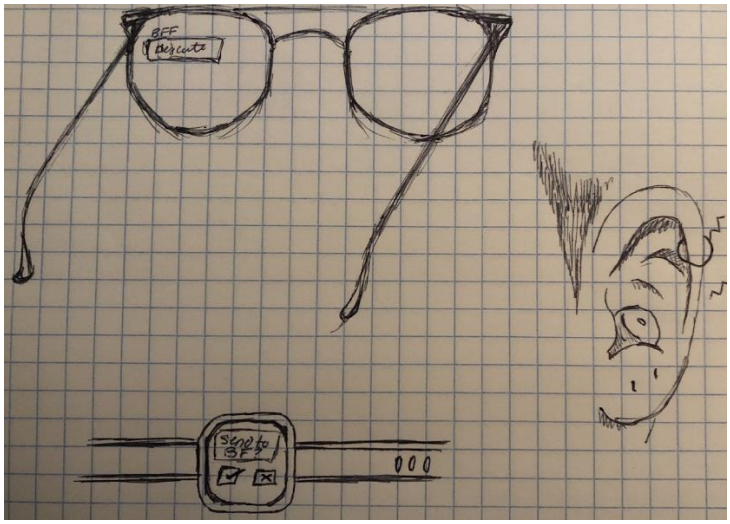

Figure. 4. Sabrina's illustration of the types of wearable technology that could be used to report social cues that were found by the social cue detector.

"I'd hoped that they could, like, read people, like almost like a Sherlock Holmes inside of a little of a little robot, like, reading body language better than I could. and then it's like, mash it with the wearable tech. And somehow like I'm like, alerted like, whether I'm wearing glasses or like a watch. Like, I'm alerted when it has like a scan. And I have like the option to look at it or not." -Sabrina

Sabrina envisioned such a technology as a tiny robot that could go with her on dates and read her dates' body language and social cues. She envisioned this robot "*scanning*" her date for social cues, and then reporting the results to her via wearable tech such as a smartwatch, glasses, or earpiece. She also wanted the ability to decide whether to check the results of the scan. Sabrina believed this would allow her to communicate more effectively. She believed this would create a more comfortable environment for herself as well as her date.

"Like a monitor for enjoyment or pleasure. Like, if something is occurring on or near your body that is good, and you want to keep that going, like that could be a green light, so to speak. Whereas if something's not feeling good, or you want to stop that could really like give a flashing signal to the person." -Sophia

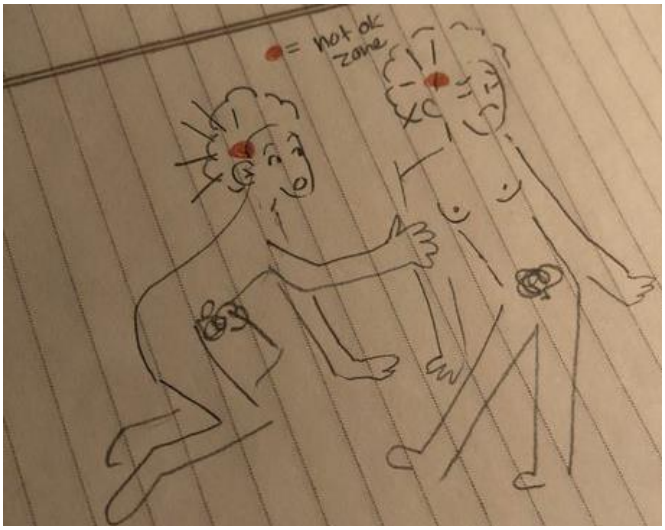

Figure 5. Sophia's illustration of what the *Sexual Consent Indicator Light* would look like in real life when in use.

One co-designer envisioned a small light-up device placed on someone's head that would flash different colors to show how someone felt about a certain physical action. The light would help to convey physical comfort nearly instantly. Sophia envisioned this technology being useful to mitigate unnecessary discomfort with physical and sexual acts, but not as a replacement for explicit verbal consent. The light would act as an intermediary guide between verbal consent confirmation. She believed that if someone was performing an act that made someone else uncomfortable, this device could alert them faster than a verbal response, which would allow for the opportunity to re-affirm consent for the given act.

5 DISCUSSION

Dating applications are currently affecting the ways their users conceptualize and practice consent. Dating apps are not yet designed with a consent process in mind, meaning that designers do not include features that encourage open and honest communication or explicit consent exchange. This may seem like a neutral stance at first glance, but by not including such features they are actively pushing their users towards ambiguous consent processes and practices. This can assist in creating a culture where open and honest communication about boundaries, intimacy, sexual preferences, and consent practice is not the norm. The experiences that users have on the app and with those met on the app, will inevitably affect the ways that they conceptualize and practice consent. As the number of people on dating apps continues to grow, this will continue to have a larger effect on how society views consent every year.

5.1 Harm Reduction Through the Promotion of Wanted Experiences

Most features introduced by dating applications that aim to reduce sexual violence between users on their apps have focused on things that the *targets* of such abuse can do to *prevent* certain situations. This does not do anything to solve the root problem, but instead acts as a stop-gap solution. Such features do not reduce sexual violence as much as they react to it. To properly address the issue of sexual violence, solutions must move away from *preventing* unwanted experiences in favor of *promoting* wanted experiences. Consent Technology provides a novel avenue for promoting behaviors which lead to wanted experiences which provides indirect sexual violence mitigation. Solutions must also engage not just the targets of violence, but the perpetrators of such violence.

5.1.1 Designing for Consent. If dating applications were to start designing for consent, there is a possibility for both harm reduction and larger adoption of honest, open communication and affirmative consent amongst the user base. When analyzing the ways our co-designers described how they give and receive consent to sex, we noticed that it largely aligned with practices that fall under the umbrella of Affirmative Consent in the literature. This consent practice has been advocated for by legal, public health, and sex and gender publications. This is due to its unambiguous nature which lends itself to ensuring that all parties consent to a given act with little room for misinterpretation. I believe that implementing designs which actively promote a CCP which follows the main tenants of affirmative consent is the best way to reduce harm, as it addresses the root cause of the problem. This could have reaching effects for the adoption of consent processes across the user base, which could in turn reduce the occurrence of non-consensual experiences, especially in situations where the perpetrator is unaware that consent was not properly obtained. If users are practicing affirmative consent as promoted by a CCP system, then they would be less likely to engage in unwanted sexual activity due to guilt and social pressures.

Given the large adoption of dating apps, they sit in a unique position to begin normalizing open and honest communication about boundaries, intimacy, sexual preferences, and consent practice. This could cause a shift in the societal understanding of consent. Such a shift would hopefully result in more people understanding the nuance of consent and personal sexual agency, which in turn could result in a reduction of sexual violence. This shift in culture around consent helps to promote positive sexual and intimate experiences.

The messaging stage of the dating app process (Step 2 of the CCP) presents an opportunity for intervention. Our co-designers explained that many of the conversations they have about boundaries, intimacy, sexual preferences, and consent practice happen in the dating apps built in messaging interface. Dating apps already offer a space for these conversations to take place, but they do not do anything more to facilitate these conversations. With the ever-expanding use cases of AI, facilitating these conversations between users is feasible today. This intervention point is crucial because it allows the application to play a role in preventing harm *before* the users ever meet in person. This goes in contrast to the most current safety features which are mostly used *after* violence has taken place. By having the app involved in their conversations before meeting up, there is a possibility of preventing such violence from occurring as often.

The in-person stages of the consent process (Step 3 of the CCP) also offer unique opportunities for dating apps to step into a new role. Dating applications have traditionally only been used for discovery and basic communication with others. The potential exists for dating applications to be used by their users in person as well as online. Our co-designers advocated for dating app design that assists them throughout the CCP, including the 3rd stage. By facilitating aspects of the user's interactions when in person, the dating application would have more intervention opportunities to assist users in facilitating their conversations and interactions. These intervention points would be vital to any system that aims to assist users with Consent Communication Progression as two of the three steps of this process happen in person. It is important to note that I am not advocating for dating apps to directly record consent between users, but to assist

users in feeling more comfortable when in-person so that open and honest communication can occur, as our co-designers discussed.

5.2 Design Guidelines for Sexual Consent Technology

Technology created for the mediation of sexual experiences has existed for over a century, going back to the 1910 Sears Roebuck Catalog [26], but we do not see many examples of technology which aims to directly mediate consent to sex. I believe sexual consent technology presents a novel approach for harm reduction through the promotion of wanted experiences. To my knowledge, this study is the first to provide insight into how anticipated users would specifically want such technology to mediate their sexual experiences and the interactions leading up to them.

While the specific design ideas of my co-designers may vary in practicality, it is important to see the bigger picture as to *why* they advocated for those designs, and how this could inform future works. This section will discuss 3 design guidelines I propose for those researching or designing consent technology. These design guidelines are motivated by the data provided by my co-designers.

5.2.1 Design Guideline 1: Consent Technology should normalize, not replace verbal consent.

In the literature and through our study, we identified 2 primary functions of consent technology; applications that aim to record sexual consent as a contract between two people, and technology that seeks to normalize conversations about sex, consent, and boundaries between users. The co-designers in this study clearly advocated for the latter of these 2 design patterns.

"Consent Apps" as they have been colloquially referred to, are applications such as *Legal Fling*, *Good2Go*, and *We-Consent* offer an interface where two users certify

their consent to a sexual act that is about to occur. This design pattern has received critique in the literature [90,98], and this study provides further evidence supporting those critiques. These applications provide no way for a user to rescind consent, and do not guarantee that all parties have an agreed understanding of the details of the sexual activity, such as specific sex acts. These were both important considerations for our co-designer's envisioned consent technology, which focused on normalizing conversations about boundaries, sexual preference, and consent.

My co-designers specifically did not want the app to provide a way to give and receive through a contract-like system, but instead wanted the technology to assist in conversations that lead up to a sexual encounter. They believed that consent should remain an explicit in-person verbal exchange between all parties. This leads me to conclude that consent technology should not directly mediate consent to sex, but instead should reduce barriers to communicating with others about boundaries, sexual preference, and consent. The following two guidelines provide important considerations for designing such technologies.

5.2.2 Design Guideline 2: Affirmative Consent Technology Must Prioritize User Comfort. Public health organizations and scholars (including those in HCI [126]) have advocated for the adoption of affirmative consent practice due to it's ability to increase sexual agency and decrease ambiguous verbal exchanges, thereby mitigating some forms sexual violence. While my co-designers did not explicitly mention affirmative consent by name, their preferred consent practices aligned very closely with its primary tenants. Notably, the need for: unambiguous verbal consent for specific acts (Enthusiastic, specific, and informed consent), reaffirming consent during a sexual act (reversible

consent), and sensitivity to inadvertently coercing a sexual partner into a sexual act (freely given consent). These findings provide support for adoption of an affirmative consent framework when designing sexual consent technology. As the prevalence of affirmative consent technology increases, it could bring with it a rise in the adoption of affirmative consent practices amongst the user base(s), thereby solving one of the largest barriers to affirmative consent: mass adoption.

Affirmative consent's adoption problem motivates many of the design ideas presented by my co-designers. This can be seen with design ideas that provide conversation topics regarding sex and consent. My co-designers specifically wanted a way to opt-out or skip conversation prompts for any reason, including those about sex and consent. They believed that the user must have the final say in if they are ready to have such conversations and that such a design would increase the comfort of the user. They did not want to repel users who were less accustomed to discussing sex openly with others on the app. For affirmative consent technologies to receive mass adoption, they must cater to users with varying experience with practicing affirmative consent. To do this, I recommend that consent technology be designed to prioritize user comfort and retain user agency for how, when, or if consent is mediated. Retaining user agency will provide the most comfortable experience, which should result in a higher adoption rate of affirmative consent and the technologies which are using it as their framework. Future works should explore how to develop comfort with the adoption of all facets affirmative consent.

5.*2.3* *Design Guideline 3: Affirmative Consent Technology Should Intervene Before Situations Where Sexual Acts May Occur.* My co-designers did not view consent

as a single mutual agreement, but as a process which requires on-going negotiation. This aligns with Beres' theory of on-going consent [15]. Conceptualizing consent as an on-going process provides many opportunities for technological interventions. Our co-designers discussed designs which would intervene during both online interactions and in-person interactions. The online intervention points could work to normalize conversations about boundaries, sexual preference, and consent amongst a userbase. These conversations are crucial for affirmative consent's tenants of fully informed and enthusiastic consent. Co-designers also expressed that such conversations help them to rule out users who have conflicting or problematic views on consent and sex; this could be paramount to preventing sexual violence before it occurs.

While my co-designers' ideas primarily focused on pre-sex intervention points, they also envisioned technology that could be used during sex. Other researchers have also discussed other possible intervention points. Consent exchange in the games *HUGPUNX* and *Hurt Me Plenty* [90], as well as Strengers' TEASE process for sex robot interactions [126] frame post-sex interactions as a possible intervention point for consent technology. In the game *Hurt Me Plenty*, an aftercare phase allows for a players NPC partner in BDSM roleplay to reflect on how well the player abided by the NPCs comfort during the sexual experience. This aligns with the concept of aftercare which has been used by the BDSM as a part of their consent exchange [41,45,134]. Post-sex aftercare could play an important role in the future of sexual encounters and consent by establishing harm-mitigation consent practices. Post-sex intervention points pose a promising candidate for further research into consent technology. I recommend future

research and design of sexual consent technology consider all possible intervention points across online and face-to-face interactions.

5.4 Designing for Consent with At-Risk and Marginalized Communities

According to the Feminist HCI agenda for design, including at-risk and marginalized users in the design of such systems is crucial [12]. These systems must be designed in such a way that reduces harm while maintaining accessibility to as many users as possible. It is likely that if such communities were not involved in the design process that certain aspects that affect them could be missed. Participatory design has potential for involving such communities in the design process. We must involve at-risk and marginalized communities in the design of such systems. Our co-designers advocated that all parties must feel comfortable for the CCP to work correctly. This emphasis on comfort further emphasizes the need for participatory design when implementing these systems. If a single group is not comfortable using such a design, then they will have trouble with or be unable to properly go through the CCP process.

For designs which facilitate a CCP process to work successfully, they must be used by all or most users. Users who are not part of said marginalized communities - such as heterosexual cisgender men – must also be consulted to ensure that the features also provide them with a comfortable experience. As our co-designers discussed, providing a comfortable environment for intimate conversations is the first step to open and honest communication, which is vital for affirmative consent.

6 CONCLUSIONS

This study examines the opportunity for technology to assist in the mediation of consent to sex with the goal of reducing sexual violence through the promotion of positive sexual experiences. There exist technologies today which mediate consent to sex, but this is often an unintentional aspect of design, which has shown to be harmful to the userbase. Other technologies aim to detect sexual violence either during or after-the-fact.

I conducted a participatory design study with 17 US-based women and LGTQIA+ stakeholders due to demographics being disproportionately higher risk of being victims of sexual violence. The goal of the participatory design sessions was to explore possible designs for how dating applications could be used to mediate consent to sex. Their ideas highlight novel intervention points for mobile applications and wearable devices. My co-designers advocated for a consent process which involved multiple steps and conversations about boundaries, sexual preferences, and consent, as opposed to a single verbal exchange. They believed that maximizing users' comfort with having these conversations was paramount to the success of such technology. Their designs have the potential to normalize said conversations, which could in turn provide more people with a process to conceptualize and discuss sexual acts before they occur. This could reduce the prevalence of non-consensual sex due to coercion, miscommunication, or lack of sexual agency. Ideas involving wearable technologies also aim to assist in communicating a partner's discomfort before they have time to verbalize it. This study's findings demonstrate the potential for consent technology to normalize affirmative consent as a practice, providing users with better sexual experiences and battling the historically problematic critique of affirmative consents low adoption rate.

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APPENDIX A

OAKLAND UNIVERSITY

Institutional Review Board

2020-10-14

Protocol #: IRB-FY2021-114

Research Team:
Nicholas Furlo
Douglas Zytko
Jacob Gleason, Alex Meink, Karen Feun

Based on applicable federal regulations, the following study, "Mediating Consent Through Dating Application Design" has been determined to be Exempt, with the following categories Category 3.(i)(B). Research involving benign behavioral interventions in conjunction with the collection of information from an adult subject through verbal or written responses (including data entry) or audiovisual recording if the subject prospectively agrees to the intervention and information collection.
Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation.

Letter and Consent Document:
This letter along with the IRB date stamped consent document can be found in Cayuse in the Submission Details page under Letters and Attachments, respectively.
The IRB date stamped consent document must be downloaded and used in consenting participants.

Modifications:
Any changes to this exempt project must be reviewed by the IRB prior to initiation by submitting a MODIFICATION request. Do not collect data while the changes are being reviewed. Data collected during this time cannot be used in research.

Record Retention:
Exempt projects will be retained by the IRB office for three years after the last action on the project.

You are approved to start the research. Please retain a copy of this notification for your records.

If you have any questions, please contact the IRB office.

Thank you.

The Oakland University IRB