



Domestic violence and information communication technologies

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ABSTRACT

Physical violence against women is pervasive through out the world and domestic violence has been a longstanding issue in feminist activism and research. Yet, these experiences are often not represented in technological research or design. In the move to consider HCI at the margins, in this paper, we ask: how have ICTs affected the experiences of domestic violence survivors? We interviewed female survivors living in a domestic violence shelter about their experiences with technology. Participants reported that they were harassed with mobile phones, experienced additional harassment (but also support) via social networking sites, and tried to resist using their knowledge of security and privacy.

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1. Introduction

Although a definition of the phenomenon varies across cultures, as well as in legal or advocacy contexts, “domestic violence” typically refers to physical, sexual, and psychological abuse directed against domestic partners (Walker, 1999). In addition to non-Western countries, violence is prevalent in the United States as well, where one in four women will experience it in her lifetime (Tjaden and Thoennes, 2000). Factors such as age, education level, poverty, strength of social networks, or a history of family violence can be predictors. However, the single most powerful risk factor for becoming a victim of violence is to be a woman—and the same is true across the globe (Walker, 1999). As such, violence against women and domestic violence has long been examined by feminist activists and theorists. Considering the prevalence of domestic violence along with the many activist projects that acknowledge a connection with ICTs, such as “Take Back the Tech” (Kee, 2005) and Hollaback! (Zraick, 2010), we thought the area was a neglected one and not an unreasonable undertaking.

In addition, the adoption of ICTs such as mobile phones and the Internet, are pervasive in the United States and also much of the world. In the United States, computer ownership rates are high; over two-thirds of US households have Internet connectivity (Horrigan, 2009) and 89% of American adults have a mobile phone (CTIA, 2009). The amount of mobile only households is also increasing and is at 20% of households currently (CTIA, 2009). Text messaging is also on the rise, as Americans receive more text messages than phone calls (Nielsen Company,

2008). Thus, it is likely that domestic violence survivors¹ do have mobile phones and go online.

Stalking and other forms of harassment have long been associated with domestic violence and can be exacerbated by the increasing prevalence of ICTs. Although cyberstalking is more often examined in the context of strangers than current or former intimates, it is generally understood to be any type of harassment by means of technology, and particularly communication technology (Bocij, 2004). Just as traditional stalking has the potential to escalate into violence, so does cyberstalking, making these uses of technology a real danger for domestic violence survivors. However, although increasing amount of attention has been paid to youth and teens’ experiences with cyberbullying and sexting (Lenhart, 2007, 2009), there is a dearth of work that looks at violence and technology amongst adults, such as domestic violence and ICTs.

Furthermore, these same tools that keep people connected may also be used by abusers to maintain control over their victims and make it more difficult to leave a relationship. Although the act of leaving can be an important step in breaking the cycle of violence, there are a great number of valid reasons why this can be difficult, from cultural or financial concerns to complications of children or family to a lack of resources or options to a fear of retaliation (Anderson et al., 2003; Buel, 1999). Moreover, statistics indicate that the most dangerous point in an abusive relationship for a woman is when she tries to extricate herself from it (Kiesel, 2007). The introduction of ICTs that make it easier for an abuser to stay connected may pose not only a greater

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¹ We use the term domestic violence “survivor” instead of “victim” to denote agency of those who experience abuse.

danger, but also provide a deterrent for some women who are considering leaving.

Given the ubiquity of new communication technologies, we explore how domestic violence survivors have been affected in any way with the addition of new ICTs. We conducted in-depth interviews with ten women at a domestic violence shelter to understand how their situations have been affected by ICTs.

2. Related work

The bodies of literature that are useful for contextualizing a study of domestic violence and technology can be categorized into feminist theories of violence, research in cyberviolence, as well as work examining privacy.

2.1. Feminism and violence

Feminist theorists and activists have long examined why the female body is subject to such violence. The female body has been referred to as a site of oppression (Frye, 1983); that is, acts of violence towards women are the result of a male-dominated society or patriarchy. More generally, the manifestation of violence is also referred to as a way that institutions control and discipline the body (Bartky, 1988). Women's bodies have also historically been controlled by limitations to public space (Sewell, 2011), reproductive choices, expression of sexuality, appearance, careers, and leisure activities (Young, 1980). However, much of this earlier work referred to the facts and experiences of violence through the lens of a heterosexual, middle class, Western, white woman. Recent feminist theories and critiques have tried to incorporate other experiences of violence and oppression that intersect with being a "woman" (Sokoloff and Pratt, 2005). For example, violence is often perpetrated against those who do not conform to heterosexual norms or just by being a member of a particular ethnic group, in addition to being a woman.

One feminist theory that can help to conceptualize exactly whose experiences we are speaking for when we examine domestic violence is Feminist Standpoint theory (Harding, 1991; Haraway, 1988). This theory specifically critiques a dominant view of epistemology, and acknowledges that knowledge and experiences are situated. Although the history of standpoint theory was to reflect a "woman's" viewpoint of the world, more recent incarnations of the theory are based on intersectional viewpoints of race, class, gender, sexuality, disability, and culture (Collins, 2000; Harding, 2008). Standpoint theory acknowledges that knowledge production usually comes from dominant groups and advocates using the experiences of traditionally underrepresented groups for a more complete and accurate view of the world. The move to represent marginal groups in HCI, could be, in part, inspired by feminist standpoint theory (Bardzell, 2010).

It is with this theory, that we frame our research in domestic violence and Information Communication Technologies (ICTs). In this paper, we use the term "domestic violence" as a site of analysis as it relates to technology. We acknowledge that using the term "domestic violence" implies heterosexual relationships within the context of the home, and does not consider violence imposed by the state or in public; however, we approached our study as a way to explore violence and ICTs as it exists within the current infrastructure and implementation of domestic violence shelters in the United States, and the lived reality and experiences of those women who reside there. As a result of selecting this site in the southern United States, we describe the experiences of heterosexual, low socioeconomic status, mostly African American women and focus on their experiences with intimate partner violence. We use this approach, more

generally, as a starting point to describe violence within the lives that are considered marginal, how ICTs are intertwined with violence, and also to consider methods for doing such research.

2.2. Cyberviolence

Although there are no empirical studies of domestic violence and technology, there are other areas that are related, such as cyberbullying, cyberharassment, and cyberstalking. Cyberbullying is concerned with the combination of offline and online harassment of youth and teens, but does not typically refer to intimate relationships and is not typically sexual in nature (Li, 2007). Cyberharassment refers to acts such as harassing messages, threats, photo manipulation, posting of personal information, and impersonation that are conducted online and harass an individual or group. Cyberstalking differs from cyberharassment in that (particularly for the purposes of some laws) it includes a credible threat of harm (Smith, 2009); therefore, it is most similar to examining domestic violence since the term often includes both an online and offline component.

Spitzberg and Hoobler conducted three surveys to link psychological measures of obsessive relational intrusion (ORI) and cyber pursuits (Spitzberg and Hoobler, 2002). Similar to traditional stalking, they found a correlation between ORI and cyber pursuits. Adams uses a theoretical position to identify how cyberstalking is problematic in terms of gender power relations and a power-laden gaze (Adam, 2002). Another study surveyed 1051 self-described cyberstalking victims (Sheridan and Grant, 2007) and concluded that cyberstalking does not fundamentally differ from traditional proximal stalking—in other words, the Internet does not necessarily create more stalkers. However, ex-intimates are the most targeted in cyberstalking. Most states do provide for orders of protection in domestic violence situations that include consequences for stalking; however, cyberstalking can sometimes be problematic for survivors since the statutory definition of traditional "stalking" often governs whether a protective order can be issued.

Within the fields of law and computer-mediated communication (CMC), there has also been some work focusing on cyberharassment. Citron examines issues of online harassment within a civil rights framework, using case studies to exemplify the need for cyber civil rights laws (Citron, 2009). Specifically, Citron looks at anonymous mobs that threaten, harass, and try to destroy offline and online lives. Citron relays the story of Kathy Sierra, a software developer and blogger who was forced to shut down her blog and online presence due to online attacks. These attacks included threatening rape, revealing her information, and disseminating modified images of her on a noose. Similarly, feminist bloggers and law students were threatened with rape on the law student social networking site, AutoAdmit (Heller, 2007). Groups of women and religious minorities were also attacked on a website, JuicyCampus, an anonymous bulletin board about college gossip (Citron, 2009). Posters put names of women, phone numbers, and addresses, stating that they were available for sex. In CMC, Dibbell reported on a textually enacted "rape" in a MOO (an early online, text-based social world) where a male character used the affordances within the online environment in order to control two female characters to perform sexually explicit acts (Dibbell, 1996). In response, Spertus has identified different technological and social ways of fighting online harassment (Spertus, 1996).

2.3. Privacy

Another area that is related to domestic violence is privacy. There is a long-standing feminist debate around issues of privacy

in the home (Kelly, 2003; MacKinnon, 1990; Schneider, 1990). That is, because of domestic violence, some argue the home should not be treated as a private sphere where the government cannot intervene. However, for low socio-economic women in the United States, the situation is more complicated since they already have much less privacy from the state than other women (Sokoloff and Pratt, 2005). Because of the relationship between domestic violence and welfare (abusers may control resources and prevent survivors from obtaining a job) (Tolman and Raphael, 2000), women who experience domestic violence may have decreased privacy from the state (Gilman, 2009). For example, in order to receive welfare benefits, low socio-economic women must be subjected to drug tests, unannounced home inspections, fingerprinting, and restrictions on reproductive choices. Gilman identifies different types of privacy that the state encroaches upon: informational, physical, and decisional privacy. By physical privacy we mean the ability to keep one's bodily integrity and home free from the intrusions of others (Gilman, 2009). For the purposes of domestic violence, we would like to extend this concept from the state to other individuals, such as ex-intimates. Thus, we are concerned with privacy in confluence with other individuals rather than the state.

Privacy is complex and does not have a universal definition. Palen and Dourish surmise that privacy is a dynamic, dialectical process that is diverse in everyday settings (Palen and Dourish, 2003). Privacy is negotiated in response to circumstances, rather than an enforcement of rules. To that extent, Dourish et al. examine how people manage privacy in everyday situations and found that people in their study relied on others and organizations to manage their privacy (Dourish et al., 2004). With respect to location information and technology, privacy is a vital issue (Snekkenes, 2001). Location information is often paired with identity, that is, another attribute of information such as a name and social security number, albeit dynamic (Barkhuus and Dey, 2003). Thus, physical privacy and the potential for harm is not considered together with location information. Barkhuus and Dey identify that situations that require location-based privacy are understudied, and should be examined in the context of implemented technologies and situated contexts (Barkhuus and Dey, 2003). One example that provides an empirical study of such technologies is Shklovski et al.; they examine how location becomes a commodity in the context of sexual offenders who are tracked with GPS by their parole officers (Shklovski et al., 2009). However, this study examines privacy in the context of the power of the state exerting control over individuals.

The issue of privacy on social networking sites has recently been taken up as a prominent topic within western media. Specifically, journalists have investigated Facebook's attitudes towards privacy, finding that Mark Zuckerberg, Facebook's founder, stated that people's attitudes toward privacy are changing, shifting to open disclosure of formally private information (Boyd, 2008). However, Boyd and Hargittai have illustrated that young adults are indeed concerned with privacy and actively manage their privacy settings on Facebook (Boyd and Hargittai, 2010). Other work points to how gendered differences in privacy attitudes may be due to safety concerns (Lewis et al., 2008). We build on this work, and provide a case where location information and physical privacy from other individuals is necessary, and that an open policy towards privacy does not apply to everyone.

3. Method

We interviewed 10 women who were residents at a domestic violence shelter in the southern United States. We used both qual-

itative methods to gather our information and to analyze our data. Because there are no empirical studies of domestic violence and technology, a qualitative approach is more appropriate at this stage as we wish to determine what phenomena are occurring and what questions are worth asking moving forward. We will describe how we gained access to our participants, their demographics, and how we analyzed the interview data.

3.1. Access and participants

We began with a pilot interview study of undergraduate students about online harassment, which led to our study of women in shelters. Unrelated to the present study, the first author had been volunteering at a domestic violence shelter for over three months and got to know the residents and the staff through this work. In comparison to the experiences of the college students, the residents at the shelter seemed to have unique and severe problems. We decided to interview women at the shelter, and the shelter director granted us permission. An employee who was the first author's mentor during volunteering spread word that we were conducting research interviews concerning domestic violence and technology. Spending three months volunteering was crucial in order to gain the trust of the staff and the residents.

Prior to the interview, participants were given a consent form to sign and were told of the risks of participating in the study. Further, the first author emphasized the anonymity of these interviews, that we would never use their real names, and that the recordings would be destroyed after one month. They received a ten-dollar gift card to a department store for participation. Of the fifteen women at the shelter, ten opted to participate—six were African American, two were white, one was Caribbean, and one was from Sub-Saharan Africa (see Table 1). All were of low socio-economic status. The time the women had been in the shelter at the start of the interviews ranged from two weeks to four months; however, we did not ask this question directly, as it is a sensitive topic. The first author had interacted with most of them previously during volunteering unrelated to the study.

3.2. Data collection and analysis

Our approach to conducting the interviews reflects methods used in feminist participatory action research (Gatenby and Humphries, 2000). Specifically, in our actions to make sure the women at the shelter could and wanted to participate, an emphasis on social change, and researcher reflexivity, or a reflection on how the researcher as an instrument has an impact on how participant's knowledges are represented. As HCI research moves to the margins, feminist action research can help with minimizing harm and intrusiveness.

First, in three of the interviews, the women had infants and toddlers, and could not simply "step away" for an hour. In this case, the interviewer helped watch the children while conducting the

Table 1
Participant demographics.

Name (changed)	Age	Race/ethnicity	Children
Ami	54	African	4
Ayana	20s	African American	1
Gina	22	Caribbean	0
Heather	33	White	3
Jana	22	African American	1
Janelle	34	White	4
Shaniqua	23	African American	1
Sheena	26	African American	4
Tia	23	African American	0
Wanda	50s	African American	2

interview. On two of these occasions, the researcher actually held one of the children while conducting the interview (this level of trust with the researcher was gained through a sustained amount of interaction previous to the interview.) Second, in order to accommodate the women, the interviews were, at times, very unstructured. Although the goal was to understand how technology had complicated their experience, the session often also became a way to vent about their court date, other women in the shelter, or how impossible it was to find a job without a car. The interviewer did not try to steer them away from talking about any unrelated subject. In order to understand how technology was related to their experiences, we did ask questions such as, “What do you do on the computer?” and “Tell me how you use your cell phone?” The interviews lasted from twenty to sixty minutes. Third, after the interviews, the first author continued volunteering and conducted two safe technology workshops, discussing ways to practice safe technology use with residents.

Interviews were analyzed using thematic analysis (Aronson, 1994). First, we transcribed the interviews from audio. Then, we identified general patterns of experience that the interviews followed; this included the personal domestic violence story and how technology was intertwined with the experience. The second pattern included tactics that participants used to resist contact with their abuser. We then identified the subthemes in the patterns. Because the first researcher is a white middle class woman, she also used the workshops as a way to present themes she learned from the interviews and get feedback on the validity of those themes.

4. Results

First, we will describe the story of one of our participants that will capture some of the nuances that characterize many of the issues that other participants faced. We will then delve into the broader themes we identified from the interviews.

4.1. Janelle's story²

We begin the interview by asking Janelle to tell us about herself. She looks exhausted and is trying to hold her 2-year-old son while he squirms around, holding a small truck. We are sitting in the “cozy room,” a room in the domestic violence shelter used for therapy. Janelle states that she is in her thirties, a mother of four, and from another state—she fled to this women's domestic violence shelter from her husband, her abuser.

There are three computers in the house that are almost always occupied by women in the house. But we had never seen Janelle on a computer. Certainly she is busy with her four kids among other things, but we had previously seen other women with the same number or more kids transfixed to the computer. We ask her if she ever goes on the computer. Janelle says she used to have a Facebook and MySpace, but now she says, “*My life on the Internet is over.*” Janelle tells me that she used to go on Facebook every day and was very active in posting updates and communicating with her friends and family, but is no longer active on the site due to harassment and threats from her husband and his family. Janelle tells us that they left comments on her wall saying that she “*stole the kids*” and they called her names. Further, her husband sent her death threats via email and text message. Because her son is toddling about the room now, she whispers the particularly gruesome details.

“The previous phone I had, I got crazy text messages from him like, I’m gonna gut you.”

Janelle's sister, who is also on Facebook, received threats on Facebook as well, and through email from Janelle's husband, asking her to tell him where Janelle was.

“He puts messages on her Facebook wall and emails her, asking where I am.”

Although she does not put any information on Facebook, Janelle tells us that she still visits her sister's page, to see what she is doing and to feel more in touch. Janelle feels that her sister updates her page more frequently for Janelle's benefit. She states it is a risk she is willing to take to look at her sister's Facebook page, to feel more connected with her family since she has had to sever all of her ties. But she is hesitant to put any information on the Internet and this can be problematic, especially when trying to look for permanent housing, search for jobs, or submit job applications that typically require a social security number (SSN). Janelle says she is particularly afraid to enter her SSN, as she believes her husband may find that she is in a different state. When Janelle arrived at the shelter, she also got a new prepaid cell phone, but registered it under an alias, rather than using her real name. Again, she did not want her husband to be able to obtain her cell phone number or to find out where she is.

For the ten women we interviewed, Janelle's story is not unique, but highlights the broader technologies, situations, and resistance that other women also experienced. All but one woman had technology interwoven into her domestic violence situation. Ami, who never experienced any technology issues with her abuser, is from Sub-Saharan Africa and has never owned a mobile phone but has just started to use the Internet to search for jobs. The following table illustrates the different technologies women described in relation to their abusers. Social networking sites were not as prevalent as mobile phone harassment or use—all but one woman had a cell phone. Yet, three of the women we talked to said that they had either just signed up on Facebook, or were planning to join soon. This may be due to the availability of the computers in the shelter and influence from other women at the shelter who were already using Facebook (see Table 2).

4.2. Leaving and technology

Research into domestic violence marks “leaving” as an important act to break out of the web of domestic violence (Johnson and Ferraro, 2000). However, with the ubiquity of mobile phones, and the prevalence of social networking sites, it is not clear that physically leaving severs ties or abuse. In this section, we describe how mobile phones and social networking sites affected the experiences of domestic violence survivors after leaving their abusers. We also discuss how blocking on mobile phones is problematic, and other issues that result from social networking sites.

4.2.1. Mobile phones

Even though Ayana has left her husband after physical and emotional abuse, she is still available for him to contact through her mobile phone.

Table 2
Number of participants who experienced or perceived harassment via specific technologies.

Technology	# of participants (out of 10)
Text messages	7
Mobile phone calls	5
Social networking sites	3
Email	3
GPS	2

² All names have been changed to protect participants.

"He calls me at three in the morning, leaving messages on my phone, I wish I could just let you hear them on my phone. He would leave messages like, 'I know you with somebody,' stuff like that, [and messages like] 'I'm here.' But that don't matter because we are done and over with but still the messages and texts, 'I know you with another dude, and it's cool you have my daughter around different dudes.'"

Mobile phones are physically present with a person at most times, in contrast to a landline, traditional mail, physical encounters, or even a computer. Communication is more accessible, even though our participants left their abuser. Further, since our participants had moved, sometimes multiple times, they no longer had a permanent address, landline, or desktop computer from which to communicate. In particular, they did not have access to sites such as Facebook or check email until they arrived at the shelter.

Communication was not limited to phone calls, as text messaging was also one of the prominent ways in which abusers would communicate with the people we interviewed (seven of the women had issues with their abusers sending text messages). As Heather put it,

"At first we started textmessaging because we couldn't talk on the phone without screaming at each other and me hanging up. It became a way that he could say terrible things to me."

Text messages are hard to block and this process varies according to carrier; sometimes blocking services are not available at all. Heather's husband texted her that he had sent out an "Amber Alert,"³ threatened to kill her, told her he knew where she was, but also how much he missed her. Tia received texts from her abusive ex-boyfriend asking her to send him naked pictures or asking if she had a camera phone, as well as sexually explicit messages. Some women chose to get another phone, and did so frequently in order to avoid contact. But often, their abusers obtained their new numbers from family. As a result, some women decided to withhold contact from their family members completely or tried to ignore the text messages.

In contrast, in the shelter, communication via the landline is controlled in order to prevent abusers from trying to contact residents. For the landline, the residents must give all names and numbers of people they want to be able to contact them; this list is next to the phone in the shelter's office and is only answered by staff. If someone calls and they are not on the list from a specific number, the staff is instructed to end the conversation. Yet, this same type of filtering is not readily available on mobile phones.

4.2.2. Social networking sites

Sites such as Facebook were also used as an extension of abuse after leaving for three of the women. As we learned from Janelle in the opening story, her abuser used Facebook to harass, threaten, and to try to get information. Not only did Janelle's husband post messages on her wall, but on the wall of her sister's page. When we asked if she or her sister did anything in reaction, she said that because they feared him, Janelle and her sister were afraid to do anything in retaliation and just tried to appease or ignore him without revealing any information. Meanwhile, Janelle stopped participating on Facebook. Her abuser's family also used Facebook to accuse her of stealing the kids and shamed her in front of her own family and friends.

Gina felt harassed by her husband's lover through Facebook. Gina said the woman changed her Facebook profile picture to a picture of Gina's husband, and sent her messages through Facebook, calling her names. Gina was heavily active on social networking

sites including MySpace, hi5, and more recently Facebook; she had a computer when she was at home. Gina's abuser, her husband who is currently in jail, did not use MySpace or Facebook, and she was not worried about him contacting her through those sites. However, she said she had a different stalker on MySpace. A man on MySpace messaged Gina, and because she thought he was attractive, she responded. They started messaging and she soon realized she did not want to communicate with him.

"He was cute, so I accepted him and he started getting real personal. He took my pics off my page, and I blocked him and he kept on getting new profiles and try to add me and stuff, so I just deleted my whole page."

Gina told us that he put her pictures on his profile and associated nasty names with her. Even though she blocked him, he was persistent and created new profiles and he even started calling her—she had her phone number on MySpace but took it down after he started harassing her. Although this experience is not domestic violence, it is telling of some dangers of participating on social networking sites when too much information is revealed.

4.3. ICTs for support

Even though ICTs can be problematic, they can also be used for support. Janelle stopped communicating and posting with her friends and her sister on Facebook. Yet, she still looked at her page in order to feel close to them and to learn what was going on their lives. Although she did stop posting to Facebook, she resisted completely shutting them out of her life.

Ayana talks to her mother-in-law for support, but she has had to develop a work-around mechanism in order to do so. Ayana's husband sometimes calls from his mother's home phone, so Ayana is never sure who exactly is trying to call. To remedy this, Ayana recorded a voicemail stating that she does not answer calls, but will respond to voicemail. Her mother-in-law leaves a message, telling her that it is okay to call, and then Ayana calls her back.

Thus, technologies can be helpful, but sites such as Facebook do not easily provide the kind of privacy that domestic violence survivors require. Additionally, residents in the shelter were already on social networking sites, or were just signing up.

4.4. Management of privacy

Perceptions of privacy can be seen in the ways that the women tried to "deal" with their abusers and the technologies they used to harass. These ways of dealing included registering phones under aliases, limiting content on the Internet, and withholding contact from family. Participants took many precautions because they did not know how much abusers could know about their location and other personal information. For example, Heather's abuser sent her a text stating that he knew where she was because her phone has GPS on it. Heather was terrified because he had previously threatened her with a gun if she left. She was driving en route with her children to another state to escape her husband and stay with family. Learning that her husband may be able to trace her through her phone, Heather immediately threw the phone out the window. Tia told me that her ex-boyfriend had been stalking her and she did not know how he found out where she was, but attributed his computer skills to his ability to stalk her.

"I mean he is very computer savvy. He knows how to make a computer. Literally like from scratch."

Whether or not the phones had GPS or the abusers were able to track them, participants were not willing to risk their safety by keeping their phones. Due to the fear of being tracked and issues

³ Amber Alert is a US child abduction alert bulletin.

with blocking, all but two women had purchased a new mobile phone to try to cut off communication with their abuser or stalker.

4.4.1. Using aliases

Participants took extra precautions to make sure they could not be tracked. Two of the women used aliases to register a new phone. Both Janelle and Gina got prepaid phones, but registered under aliases in order to protect themselves from their abusers. As Gina told us,

“Yeah so one day I just went and got a new metro and so it is so easy to get a metro, you don’t even have to an ID and stuff. . .you can go in and say you are Miss Beyonce Knowles and they don’t care.”

For Gina and Janelle, it was not worth the risk to use their real names again, as they feared that their information could show up on other phones or on the Internet. However, sometimes it is not possible to get a new phone. Wanda has a government issued cell phone and is given sixty-eight minutes a month. She tries to use it only for responding to job ads, but her abuser keeps calling and leaving voicemail. He sometimes uses different numbers, so she is never sure when she should check her voicemail or not. She wishes she could change her phone number, but she cannot because the government phones require a home address, and only one phone per address. Because the shelter has a P.O. Box, she cannot use it for an address. The support staff at the shelter recommended that she go to the police to stop the calls, but Wanda is hesitant because she doesn’t think it will help and may only cause more trouble.

4.4.2. Limiting access on the internet

Janelle, Shaniqua, Tia, Heather, and Gina started to limit their information and participation online. Janelle and Shaniqua were afraid to put any information online, which was hard when applying for jobs online. Janelle was particularly concerned about putting her Social Security Number on job applications online, as she was afraid her abuser might be able to find out that she is in a different state. Instead, Janelle and Shaniqua said they opted to call potential employers rather than use the Internet.

Because Tia perceived her ex to have much more technical prowess than her, she said she does not really go online anymore. She also said she is afraid to use credit cards or anything that might track her.

“Interviewer: so you feel like he is more technically savvy than you?”

“Tia: Yeah, I mean I watched him take money out of his mom’s bank account. And I was like how the heck did you hack in there? So yeah.”

Sheena, Wanda, and Ayana told us that they did not need to worry about their participation online because their abusers did not use computers. Instead, they were excited to learn computer skills and to join the world of social networking using the computers that were available to them at the shelter.

4.4.3. Limiting contact with family

Limiting contact with family was another tactic that the women would use in order to protect themselves. Shaniqua told me she had made the mistake of giving her number to her sisters before; her abuser threatened them, and he was able to get her number from them. Now Shaniqua only talks to a friend from the shelter on the phone and does not have any contact with her sisters.

Tia made a similar statement:

“Interviewer: so have you have you stopped giving your sister your phone number?”

Tia: Yeah. Oh yeah. She is always giving out my phone number.”

Tia could no longer talk to her sister because she gives out her information. Because of this, the relationship between Tia and her sister has dissolved.

5. Discussion

For our participants, ICTs are inextricably intertwined with their domestic violence experiences, even after achieving safety in a shelter. In addition to the barriers that women must face to escape their abusers, ICTs are yet another factor to consider. In this discussion, we will explore issues that resulted from our data, namely, issues regarding location-based technologies, the design of technology oriented towards the family, implications for social media, and how these issues connect to broader discussions in social computing and privacy.

5.1. Issues with location-based technologies and aggregation

Our participants feared that their abusers could track them through GPS or other technologies on their phones or on the Internet. In some cases, abusers tried to exert their power over the participants through technological knowledge. For example, Tia felt her abuser could track her because she perceived he was much more technically savvy than her. After Heather’s abuser threatened that he could track her with her phone, she decided to throw her phone out the window. Although it may not have been possible for some abusers to track them, participants did not feel they had enough knowledge to be able to confidently know that they were not being tracked.

With the introduction of location-based technologies such as FourSquare and Google Latitude, this is not necessarily an irrational fear. Sites such as PleaseRobMe.com illustrate potential problems of sharing too much information online (Fletcher, 2010). The site uses feeds from FourSquare, a social location-based game, where people “check-in” or announce to other sites like Twitter and Facebook when they are not home. The site’s message is that because you are announcing location information online, robbers could potentially keep tabs on when you are not home. For domestic violence survivors, the problem becomes much more severe—location data that is released online could potentially lead to physical harm. Additionally, as more social services such as Facebook take up location data, survivors must contend with shifting privacy policies and settings that may put them at risk.

There is also a danger of aggregating different data online that includes location data. One example is Google Buzz, a service that aggregates many online identities, such as Google chat, Twitter, Flickr, Blogger, Google Reader, and even physical location services such as Google Latitude. When Buzz launched, it disclosed all the names of Gmail contacts publically. For one blogger, this was extremely problematic because the service automatically shared her comments on Google Reader with her abusive ex-husband, which resulted in disclosure of the locations of her home and work (Fugitivus, 2010). Thus, there are design implications for using location data integrated with personal data—this type of service might be the very last thing that some people need or want in terms of their physical safety. Further, the aggregation of data may release physical locations that people think are safely siloed.

The domestic violence shelter has policies and processes in place to protect the safety of the residents, specifically concerning the physical location of the shelter, but this does not extend to mobile phones and computers. All women who are admitted to the

shelter sign a confidentiality agreement stating that they will not disclose the shelter's location under any circumstances—this means to family, friends, employers, etc. Further, there are several security cameras that are monitored by staff 24 h a day around various entrances to the building. In order to enter the premises, residents and personnel must state their names through an intercom. Staff then confirms their name and the identity of the person through a security camera. There is additional confirmation at the entrance to the door, where the staff again confirms through video that the same person at the gate is entering through the door. Because privacy spans a spectrum of both social and technological (Dourish, 1993), social processes also need to be developed to protect residents, in similar ways that the location is protected in the shelter. In the shelter, staff should disseminate information about the dangers of different technologies such as giving out mobile phone numbers and limiting information put on social networking sites. Staff and advocates for domestic violence survivors must also contend with survivors' perceptions of technical expertise—that they may view their abusers as more technically savvy than themselves and that this is another realm in which abusers exert their control.

5.2. Designing for the family

In the HCI community, there has been recent research around different family configurations and disruptions, such as death and divorce, and how this affects the design of technology (Dimond et al., 2010; Massimi and Baecker, 2010; Rode, 2010; Yarosh et al., 2009). We add to this work to illustrate how specific designs, such as mobile phones and privacy controls, embed designers' notions of a family without considering conflict and privacy issues.

Our participants received death threats, harassment, requests for sexual pictures and acts, and other unwanted messages through text messaging and mobile phone calls. They were unable to use blocking mechanisms and had to resort to other tactics. Blocking unwanted calls and text messages is hard, costs money, depends on the carrier and phone, and is sometimes impossible. In many cases, it was just easier for the residents to get a new phone and use an alias. Additionally, some carriers require users to block phone numbers on a website, and not all the women had access to a computer when they needed to block someone. In some cases as well, blocking was impossible due to government issued phones.

In a post in the *New York Times*, David Pogue blogged on how to block “spam” messages from cell phones (Pogue, 2008)—and the method is different for each carrier and does not give information for pre paid or pay-as-you-go phones. But these methods only allow blocking from messages sent from email addresses. We went to popular phone companies' web support and forums to find out how to block actual incoming calls or text messages from other wireless subscribers. The findings are in the table below. AT&T provides a service to their family subscriber plans to allow control over children and teen's phones. But, this model breaks when thinking about harassment and abuse, since survivors will not have a child's phone. Further, the prepaid phones do not offer any blocking service (see Table 3).

Table 3
How to block numbers according to carrier.

Carrier	Method
AT&T	SmartLimits family program, \$5.00/month
Verizon wireless	Block up to 20 numbers online for an extra \$4.99/month
Prepaid	No way to block
Sprint	Parental Controls with family plan
T-mobile	Block up to 10 numbers online for an extra \$5.00/month

Considering the difficulty that participants had blocking text messages and calls, an immediate implication of this study is that there is a need for the same safety controls on mobile phones for adults that are already available for children, recognizing that adults also have physical safety concerns. According to the blocking programs available, designs of privacy controls are mostly based on normative visions of “family” security—that is, for adults to protect their children.

Designers cannot assume that the family is one coherent unit and a stable construct—each member may have different practices and different needs. The composition of the family is much more diverse than a mother and father who live together with their children and who want to communicate with each other. For example, our participants did not want communication with the father of their children, and had to use many tactics in order to avoid that imposed communication.

Designers also need to consider how such blocking mechanisms should convey what will appear to the person who is being blocked. In the case of domestic violence survivors, there is a risk of an escalation of violence if survivors attempt to leave (Buel, 1999). Therefore, if there is any indication to the abuser that they are being blocked, this could be another signal that they are trying to leave or escape. Certainly there is a need to protect children from cyberbullying and harassment, but adults may also need this protection.

5.3. Dynamic relationships and social networking

Leaving is already difficult for domestic violence survivors, and social networking sites seem to have complicated this issue—they are used for support but also as an additional web of entanglement. Even with privacy issues on social networking sites (Boyd, 2010), domestic violence survivors are not willing to stop using these sites. For example, although Janelle did not post any content to Facebook because her abuser was harassing her, she used it in order to look at her sister's profile to feel connected. In a time of isolation and separation from their social network, sites such as Facebook provide survivors with much needed connection to family and friends.

Yet, there are serious implications if they stay. From Facebook's hard to use privacy settings and general attitude towards making personal information public (Akkad and McNish, 2010), domestic violence survivors illustrate what some of the consequences are of these decisions. Abusers not only can harass survivors while they are separated, but also can try to turn their family, friends, and other connections against them. For example, Gina also experienced harassment from her abuser's lover on Facebook and Janelle was harassed by the family of her abuser.

These interactions illustrate the complex nature of relationships, and that the binary “friend” or “not friend” model on Facebook is inadequate. Relationships are dynamic: they may sour, end, rekindle, and may cause other relationships to become strained or strengthened. Although friend lists on Facebook may help users group friends and associate different privacy levels, it is an ad hoc approach that may be hard to apply to existing networks. Social networking sites may also cause these personal interactions to persist (Donath, 2004). People at risk for intimate partner violence now have to contend with traceable interactions with other partners and friends, such as Facebook's friendship pages (a way to easily view all past interactions with a single person). They may also have to contend with a history of abuse, as recorded on their Facebook wall and inbox, and may have to do additional work in order to remove these unwanted interactions, such as deleting death threats and other abuse.

6. Future work

Our study considers partner violence in the context of low socio-economic heterosexual relationships. However, partner violence occurs across all socio-economic groups and racial groups (although partner violence has a higher correlation with low socio-economic class (Cunradi et al., 2002)) and within same-sex relationships as well (Tjaden and Thoennes, 2000). In the case of gay and lesbian intimate partner violence survivors, there is a threat of their abuser “outing” them to their family and community, which can be extremely detrimental in terms of losing support and resources. Information on citizenship can also be problematic for immigrant women facing domestic violence, as they fear deportation, which prevents them from seeking public services (Sokoloff and Pratt, 2005). As more people enter the realm of social networking, further research needs to be conducted on how the information released by people within a social network affects the privacy of the individual.

7. Conclusion

In our study of domestic violence survivors, ICTs have changed the way abusers impact survivors long after the act of leaving. In addition to financial concerns, children, and other factors that prevent survivors from leaving their abuser, they must also now contend with ICTs, such as mobile phones and social networking sites, as an additional factor to escape this web of entanglement.

We have shown the difficulty that survivors of domestic violence must face with the addition of ICTs—specifically, they must contend with a tradeoff of benefits vs. harm. For example, through mobile phones and social networking sites, abuse continues. However, these technologies have also offered some glimpses of support, such as feeling connected with family through social networking sites, especially when they have had to cut ties in order to move on. Domestic violence survivors need technology in order to find jobs, feel connected to family and friends, and find resources to support themselves and their children. Thus, the use of technology becomes a dangerous tradeoff that survivors must confront daily.

Participants also had to manage their privacy on their own; this was problematic and often resulted in chilling effects or the purchase of new technologies—neither of which is a sustainable practice. There is a need to develop best practices around safe technology use and for the dissemination of this information to domestic violence advocates, staff, and survivors. There is also a need to contend with how some survivors view their technical abilities compared to their abusers, and how this may complicate education and dissemination of technology use information.

We have also shown how the experiences of domestic violence survivors illustrate that technological design often embed and reflect a harmonious family view. For example, we have shown how current blocking mechanisms on mobile phones are inadequate for survivors, and reflect a harmonious family view in their design. Similarly, social networking sites do not account for the dynamism of relationships, and assume that a “friend” on these sites, stays that way. These interactions illustrate the fluid nature of relationships and how this fact should also be reflected in the design of social networks.

Feminist Standpoint theory can help researchers in HCI to understand that there is a plurality of experiences (Bardzell, 2010), and that technological design often assumes a “Universal” design that does not reflect the experiences of all. Specifically, different configurations of gender, race, class, culture etc., affect technology use and thus design. The theory can also help researchers understand how the unit of analysis, such as domestic violence,

impacts who is being studied. Further, in order to research understudied populations, feminist action research lends methods in order to minimize harm to those populations.

Although the experiences of domestic violence survivors seem like a marginal case, it is a reality for many. The move from “typical users” to the consideration of more marginal populations in HCI, such as domestic violence survivors and the homeless, reflects a shift similar from the second wave to the third wave feminist movement. Feminist theories can help HCI researchers think about which users are not being represented, and how their experiences gives us greater insight into technology design for all.

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