
Designing Technology to Support Safety for Transgender Women & Non-Binary People of Color

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Abstract

This work provides a preliminary understanding of how transgender women and non-binary people of color experience violence and manage safety, and what opportunities exist for HCI to support the safety needs of this community. We conducted nine interviews to understand how participants practice safety and what role technology played, if any, in these experiences. Interviewees expressed physical and psychological safety concerns, and managed safety by informing friends of their location using digital technologies, making compromises, and avoiding law enforcement. We designed U-Signal, a wearable technology and accompanying smartphone application prototype to increase physical safety and decrease safety concerns, reduce violence, and help build community.

Author Keywords

Transgender; non-binary; people of color; safety; community; transphobia; violence; trans people of color (TPOC); wearables; location-based applications.

CSS Concepts

• Human-centered computing~Human computer interaction (HCI)

The current state of violence for TPOC

The TPOC community is facing an epidemic of violence. LGBTQ+ people of color are twice as likely than white LGBTQ+ to experience physically violent anti-LGBTQ+ harassment [15]. Additionally, 61% of LGBTQ+ hate-related homicide victims were TPOC [15]. Many Black and Latinx trans women face extreme poverty and homelessness due to employment discrimination and lack of traditional work opportunities [6]. At some point in their lives, some of these women will work in the sex trade, because it has fewer barriers than traditional workplaces. This increases their vulnerability to harm and violence. The majority of the violence these women face goes unreported because of their past traumatic experiences with the police and justice system [6].

Introduction

Violence disproportionately affects transgender women and non-binary people of color (TPOC), and the intersection of racism, sexism, homophobia, and transphobia makes them particularly vulnerable. As researchers and designers, our goal was to learn from and give voice to TPOC by providing a technological platform that could help to reduce violence faced by this vulnerable population. Using a human-centered design (HCD) approach with our target population, we designed a prototype, U-Signal: a wearable technology for TPOC in the form of a watch that sends out an SOS emergency message to the user's pre-designated emergency contacts, including a recording and their GPS location. We then evaluated this prototype by conducting nine interviews to determine how well the system met the populations' needs.

Background and Related Work

To create technological solutions to help improve safety for TPOC, we build on prior research that addresses how communities facing violence have used social technologies to communicate and secure safety, and prior research about trans people's technology use.

How communities facing violence use social technology

Our design draws from several studies that address how communities facing violence use social technologies to mitigate violence. This includes Hollaback!, a web and mobile application and a global, people-powered movement aiming to end harassment and educate about its harmfulness, and create communities of resistance to harassment [4,16]; the investigation of Twitter to share tips about violent local cartel activity [22]; and the use of co-design methods to develop technology to address violence against LGBT

people in Brazil [16]. Other HCI studies have addressed crowdsourced location-based solutions to street harassment faced by women [2], and how digital technologies both enable intimate partner violence [7,8] and can help protect survivors from abusers [18].

Transgender people's technology use

There is limited research on how transgender and non-binary people use technology to aid in their safety, and even fewer systems designed specifically for this population [23]. Scheuerman et al. documented trans people's experiences of safety and harm as mediated by technology, touching on how some participants used technology to mitigate safety threats in the physical world [24] – a theme our work builds on. Beirl et al. developed an app to help increase trans people's safety in using public restrooms [3]. Other HCI work has examined trans people's use of social media sites [12,13] and crowdfunding platforms [11], and reactions to automatic gender recognition systems [14,20]. While some studies have examined how TPOC use social media for activism and advocacy [5,17,27] and others have examined the feasibility of GPS use for measuring trans women's mobility [10], our work is the first to our knowledge to address technology design in service of TPOC's safety against violence. Technology is usually not designed considering trans users [1], which can lead to design decisions that disproportionately harm them [1,14,20]; thus, we take the opposite approach, and design specifically *for* trans users.

Methods

The first author recruited participants via social media and snowball sampling, conducted nine semi-structured interviews with trans and non-binary people, and followed an HCD approach [26] to design our initial

Research Questions

Our research questions directly address the pervasive violence and safety threats faced by TPOC:

1. How can technology support TPOC in practicing safety and feeling safe?
2. How can technology enable TPOC to report data related to violent incidents and hold attackers accountable?

Researcher Positionality Statement

The authors acknowledge that because they are not trans women of color, their relative privilege within society provides them with certain advantages that participants in this study and users of this technology do not hold. Thus, the first author took great care in interviews by using a Reflective Design Approach [25], pausing to reflect on these important questions during the research and design process:

1. Will this benefit me or my users?
2. Is this a savior's complex? Or am I truly supporting and serving this community?
3. What biases am I bringing to this work?

prototype. Interviews lasted 20-40 minutes and occurred through Facebook messaging and FaceTime. The first author first conducted two interviews, one expert and one non-expert, which informed the initial design. They later conducted seven interviews to gain more insight, refine the initial prototype, and involve more community members. We asked about interviewees' experiences with transphobia and trans violence, ways they believed the community could be supported, and (for the second interview group) feedback on the initial interactive digital prototype. Interviewees described their genders as follows: 3 trans women, 4 non-binary, and 2 femme. Interviews were audio recorded and transcribed. We used affinity diagramming [19], an inductive approach, to analyze our data [18]. We found that there were no safety applications designed for the unique needs of TPOC after conducting a comparative analysis of five current products [21].

Results*Current digital prototype functionalities*

Through our initial interviews, we learned that TPOC would value a wearable technology that enabled them to easily notify trusted contacts if they found themselves in a dangerous situation. The prototype includes two main components: a smartwatch application and a smartphone application (Figure 1). The main functionality of the smartwatch app is to provide support to the users' safety, by sending a message to a trusted friend containing a custom text, voice recording, and their GPS coordinates. The safety feature on the smartwatch is activated by tapping the screen three times. Once activated, the app will continuously send the user's GPS coordinates as they

change. When no longer needed, the user again taps the screen three times to deactivate the safety feature.

Interview results: How interviewees practice safety

We summarize three ways interviewees described managing personal safety: communicating with friends using digital technologies, making compromises, and avoiding law enforcement.

Interviewees described several current strategies for navigating safety in the physical world using digital technologies like text messaging, cell phones, and social media. P3 stated, "*I text friends I was hanging out with when I get to my next destination.*" If they are going to meet someone for the first time alone, participants sometimes text a friend the person's address and photo of the place. Some of the interviewees used social media to warn others of dangerous areas or speak out against their abusers. U-Signal incorporates several of these strategies into one inconspicuous wearable application to increase speed and ease of use, which will potentially increase safety.

Some situations required interviewees to make compromises in which they lost access to resources or to their ability to present their gender in the way they choose. P5 stated, "*Not only am I constantly misgendered at work, I was also recently kicked out of my neighborhood grocery store by a cisgender woman. I now have to avoid that store and go out of my way just to shop for food.*" P3 described trade-offs between safety and self-presentation: "*trying to avoid dangerous situations...means sometimes letting people's incorrect perceptions of my gender pass without correction.*" While an app cannot solve these problems, working to increase safety for TPOC and

Application Features

The smartphone application component provides three main functions: check in, follow friends, build community, and self-tracking. The check in function allows users to check in with friends to inform them that they made it to their next location safely (Figure 2). The user's location is displayed on a map, with options to say they are okay or need help. The app also includes a profile feature that gives the choice to follow other people, to help users build a community with each other. Another critically important feature of the app is the user being able to track their own movements. One of the initial two interviewees described the desire for an interactive map to track her movements if they needed to be retraced, or to document incidents.



Figure 1.



Figure 2.

decrease cultural, systemic transphobia can make impact in this direction.

All interviewees stated that they did not trust nor have a good relationship with law enforcement and felt targeted by police. They wanted no involvement with police, and in managing safety avoided them as much as possible (similar to LGBT youths' ambivalence toward hate crime reporting [9]). If they were arrested, police continuously misgendered them using their sex assigned at birth, rather than their current name and gender. Due to the TPOC community's precarious relationship with law enforcement, it was important in U-Signal's design that users' emergency contacts were trusted friends, not police.

User Feedback on Prototype

Participants told us that the prototype was needed in the community and that it could be supportive in efforts to practice safety. P7 stated, "I think this app would be wonderful for the community. It's too long that we had access to this much technology without something like this." Similarly, P6 said, "definitely think the community needs this. I think with all the watch users that addition is definitely necessary." Everyone's favorite was the ability to create their own emergency contact list. As P9 put it, "I like the fact that the emergency contacts aren't conventional police or 911. With the reality of police violence and high medical costs, creating your own contacts is a more realistic option for many people in the community." Participants did mention the design could be more accessible, such as by adding a voice command, or adding multiple languages because not everyone in the community is fluent in English.

Conclusion and Future Directions

We have presented results highlighting how TPOC currently practice safety in physical spaces, and designed U-Signal, a new prototype app and smartwatch technology that supports TPOC's safety and can provide data to improve the epidemic of violence they face. We found that TPOC currently manage safety by using digital technologies to notify friends about their location, making compromises, and avoiding law enforcement, themes that we incorporated into technology design. U-Signal brings attention to the critical issues of violence against trans people, but also supports users in building safety and community with each other.

Future work could examine the complex interplays between different types of violence (e.g., physical, psychological, structural) and perceived and actualized states of safety felt and experienced by TPOC in different contexts. Methods such as in-depth interviews and participatory design would enable a deeper understanding of what it means to design for this community's safety. Future technological opportunities include providing a tracking and reporting feature for this community to identify and visualize places with high amounts of transphobia. U-Signal data could be used with other platforms, such as the Anti-Violence Project, to quantify the crisis of violence TPOC face, and further education efforts. Previous HCI research [4,22] has shown that reporting violent incidents can improve conditions for marginalized populations. This future work will provide more opportunities within HCI to support the safety needs of this community.

References

- [1] Alex A. Ahmed. 2018. Trans Competent Interaction Design: A Qualitative Study on Voice, Identity, and Technology. *Interacting with Computers* 30, 1: 53–71.
- [2] Mohammed Eunos Ali, Shabnam Basera Rishta, Lazima Ansari, Tanzima Hashem, and Ahamad Imtiaz Khan. 2015. SafeStreet: Empowering Women Against Street Harassment Using a Privacy-aware Location Based Application. *Proceedings of the Seventh International Conference on Information and Communication Technologies and Development*, ACM, 24:1–24:4.
- [3] Diana Beirl, Anya Zeitlin, Jerald Chan, Kai Ip Alvin Loh, and Xiaodi Zhong. 2017. GotYourBack: An Internet of Toilets for the Trans* Community. *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, ACM Press, 39–45.
- [4] Jill P. Dimond, Michaelanne Dye, Daphne Larose, and Amy S. Bruckman. 2013. Hollaback!: The Role of Storytelling Online in a Social Movement Organization. *Proceedings of the 2013 Conference on Computer Supported Cooperative Work*, ACM, 477–490.
- [5] Mia Fischer. 2016. #Free_CeCe: the material convergence of social media activism. *Feminist Media Studies* 16, 5: 755–771.
- [6] Erin Fitzgerald, Sarah Elspeth, M Ed, Darby Hickey, and Harper Jean Tobin. 2015. *Meaningful Work: Transgender Experiences in the Sex Trade*. .
- [7] Diana Freed, Jackeline Palmer, Diana Elizabeth Minchala, Karen Levy, Thomas Ristenpart, and Nicola Dell. 2017. Digital Technologies and Intimate Partner Violence: A Qualitative Analysis with Multiple Stakeholders. *Proc. ACM Hum.-Comput. Interact.* 1, CSCW: 46:1–46:22.
- [8] Diana Freed, Jackeline Palmer, Diana Minchala, Karen Levy, Thomas Ristenpart, and Nicola Dell. 2018. “A Stalker’s Paradise”: How Intimate Partner Abusers Exploit Technology. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, ACM, 667:1–667:13.
- [9] Cally Gatehouse, Matthew Wood, Jo Briggs, James Pickles, and Shaun Lawson. 2018. Troubling Vulnerability: Designing with LGBT Young People’s Ambivalence Towards Hate Crime Reporting. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, ACM, 109:1–109:13.
- [10] William C. Goedel, Sari L. Reisner, Aron C. Janssen, et al. 2017. Acceptability and Feasibility of Using a Novel Geospatial Method to Measure Neighborhood Contexts and Mobility Among Transgender Women in New York City. *Transgender Health* 2, 1: 96–106.
- [11] Amy Gonzales and Nicole Fritz. 2017. Prioritizing Flexibility and Intangibles: Medical Crowdfunding for Stigmatized Individuals. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, ACM Press, 2371–2375.
- [12] Oliver L. Haimson. 2018. Social Media As Social Transition Machinery. *Proc. ACM Hum.-Comput. Interact.* 2, CSCW: 63:1–63:21.
- [13] Oliver L. Haimson, Jed R. Brubaker, Lynn Dombrowski, and Gillian R. Hayes. 2015. Disclosure, Stress, and Support During Gender Transition on Facebook. *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing*, ACM, 1176–1190.
- [14] Foad Hamidi, Morgan Klaus Scheuerman, and Stacy M. Branham. 2018. Gender Recognition or Gender Reductionism?: The Social Implications of Embedded Gender Recognition Systems.

Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems, ACM, 8:1–8:13.

- [15] Hollaback! LGBTQ+ Harassment: Survivor and Bystander Guide. *Hollaback! Together We Have the Power to End Harassment*. Retrieved January 6, 2019 from <https://www.ihollaback.org/lgbtq-street-harassment-a-guide-for-survivors-and-bystanders/>.
- [16] Hollaback! About | Hollaback! We Have the Power to End Harassment. *Hollaback! Together We Have the Power to End Harassment*. Retrieved January 6, 2019 from <https://www.ihollaback.org/about/>.
- [17] Sarah J Jackson, Moya Bailey, and Brooke Foucault Welles. 2018. #GirlsLikeUs: Trans advocacy and community building online. *New Media & Society* 20, 5: 1868–1888.
- [18] Zayira Jordán Conde, William Eric Marsh, Andrew W. Luse, and Li-Shan Eva Tao. 2008. GuardDV: A Proximity Detection Device for Homeless Survivors of Domestic Violence. *CHI '08 Extended Abstracts on Human Factors in Computing Systems*, ACM, 3855–3860.
- [19] Karen Holtzblatt, Jessamyn Burns Wendell, and Shelley Wood. 2005. *Rapid Contextual Design: A How-to Guide to Key Techniques for User-Centered Design (Interactive Technologies)*. Morgan Kaufmann Publishers, San Francisco, CA.
- [20] Os Keyes. 2018. The Misgendering Machines: Trans/HCI Implications of Automatic Gender Recognition. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW: 88.
- [21] Mobile App Daily. 2019. 12 Best Women Safety Apps For Women In 2019 {Android & iOS}. *MobileAppDaily*. Retrieved April 16, 2019 from <https://www.mobileappdaily.com/2018/03/15/best-women-safety-apps>.
- [22] Andrés Monroy-Hernández, danah boyd, Emre Kiciman, Munmun De Choudhury, and Scott Counts. 2013. The New War Correspondents: The Rise of Civic Media Curation in Urban Warfare. *Proceedings of the 2013 Conference on Computer Supported Cooperative Work*, ACM, 1443–1452.
- [23] Guilherme C Pereira and M Cecilia C Baranauskas. 2018. Codesigning emancipatory systems: a study on mobile applications and lesbian, gay, bisexual, and transgender (LGBT) issues. *SBC Journal on Interactive Systems* 9, 3: 13.
- [24] Morgan Klaus Scheuerman, Stacy M. Branham, and Foad Hamidi. 2018. Safe Spaces and Safe Places: Unpacking Technology-Mediated Experiences of Safety and Harm with Transgender People. *Proc. ACM Hum.-Comput. Interact.* 2, CSCW: 155:1–155:27.
- [25] Phoebe Sengers, Kirsten Boehner, Shay David, and Joseph “Jofish” Kaye. 2005. Reflective Design. *Proceedings of the 4th Decennial Conference on Critical Computing: Between Sense and Sensibility*, ACM, 49–58.
- [26] Clay Spinuzzi. 2003. *Tracing Genres through Organizations*. MIT Press.
- [27] Sherri Williams. 2016. #SayHerName: using digital activism to document violence against black women. *Feminist Media Studies* 16, 5: 922–925.