Reducing Uncertainty and Offering Comfort: Designing Technology for Coping with Interpersonal Racism

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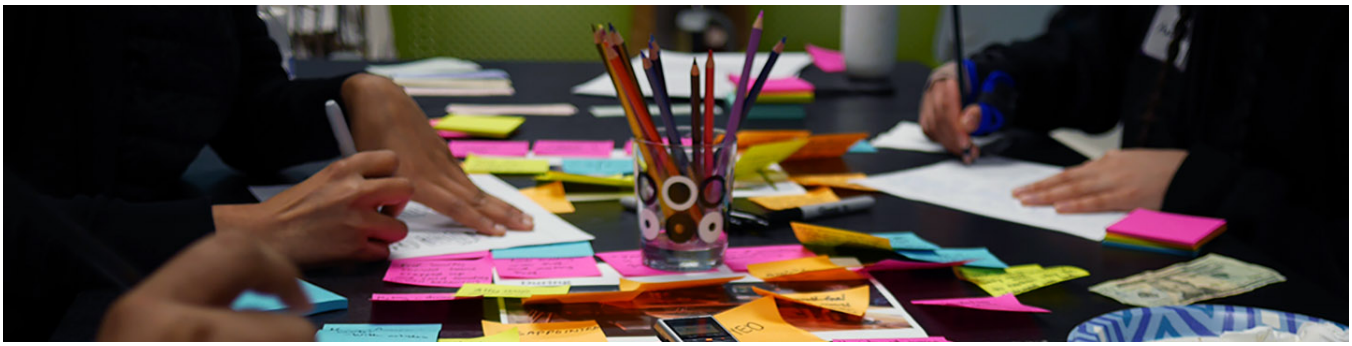

Figure 1: Workshop participants brainstorming together by layering post-its on paper prompts and drawing storyboards.

ABSTRACT

Ranging from subtle to overt, unintentional to systemic, navigating racism is additional everyday work for many people. Yet the needs of people who experience racism have been overlooked as a fertile ground for better technology. Through a series of workshops we call Foundational Fiction, we engaged BIPOC (Black, Indigenous, People of Color) in participatory design to identify qualities of technology that can support people coping before, during, and after a racist interaction. Participants developed storyboards for digital tools that offer advice, predict consequences, identify racist remarks and intervene, educate both targets and perpetrators about interpersonal and systemic racism, and more. In the paper we present our workshop method utilizing interactive fiction, participants' design concepts, prevalent themes (reducing uncertainty and offering comfort), and we provide critical analysis of the complexity of technology in these contexts. This work identifies specific opportunities for exploring anti-racist social tools.

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CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**; *Empirical studies in collaborative and social computing*; • **Social and professional topics** → *Race and ethnicity*.

KEYWORDS

racism, microaggressions, participatory design, interactive fiction, uncertainty, design workshops

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1 INTRODUCTION

Experiences of interpersonal racism are still a regular occurrence for BIPOC[1] (Black, Indigenous, People of Color) in the United States and seeking social support for those experiences remains challenging. It is neither safe nor comfortable for BIPOC to use mainstream social and communication technology to post about or discuss vulnerable or sensitive topics [98]. Potential support-seekers must contend with legitimate risks of backlash for even speaking publicly about racism, including harassment and hate speech, invalidation

[1] In keeping with current norms in racial justice work, we use the term "BIPOC" in order to center Black and Brown peoples, who tend to face the most extreme, ubiquitious, and violent forms of racism in the U.S.

of lived experiences, and added emotional and cognitive burden of teaching otherwise well-meaning supporters about the nature of their experiences [98]. At a much broader level, online social technology itself predominantly embeds, enables, and enacts interpersonal and systemic racism [10, 30, 83].

The Coping After Racist Experiences (CARE) project[2] examines how we might design technology for coping with interpersonal racism [25, 98]. This paper reports on a study that explores qualities of design innovations for sociotechnical tools to support social coping processes following experiences of interpersonal racism for BIPOC. We invited participants to imagine speculative technology that could disrupt or offer support around racist interactions, to find patterns in the qualities of the technology they are seeking. We conducted six participatory design workshops with 26 adults who have been targeted by interpersonal racism (Figure 1). We sought to foster a brief collaboration in which people who experience racism can design a future where their social support needs are prioritized in the creation of social technologies. Specifically, we engaged two research questions: RQ1) *What are the qualities of technology that support people when coping with interpersonal racism?* and RQ2) *How do we imagine social technology that prioritizes racism as a space for intervention?*

For these workshops, we developed a Foundational Fiction method, which uses an interactive fictional narrative to engage participants with the topic of interpersonal racism followed by collaborative design, discussion, role-playing, and storyboarding activities to explore ways that imaginary technology could assist those experiencing racist interactions, first described in [25]. Participatory methods and Design Fiction are ideal for bringing members of affected communities into the design process (e.g., [6, 43, 48, 54, 62, 65, 72, 74, 102, 104]), while minimizing risks of amplifying stigmatization that come with a focus on vulnerable communities [15, 23, 60, 71, 90, 103] and centering end-user voices [80]. However many PD approaches are limited in their ability to facilitate generative conversation around sensitive subjects such as racism, particularly with groups of strangers. Our approach leverages the psychologically protective benefits of fiction (e.g., [15, 55, 61]) as well as a social justice and critical race lens to build on the generative and human-centered aspects of participatory design.

We present a range of designs from the workshops for both near and distant-future technologies that might support the coping processes. From these workshops we gained insight on the needs targets of racism have for coping with interpersonal racism, including the importance of addressing and reducing uncertainty as well as supporting forms of technology-mediated emotional comfort and support. Through these workshops, participants imagined ways that futuristic technology could offer intelligent support to reduce the uncertainty they feel as targets of racism. They built on existing communication methods to better express and explain themselves and they brought joy and humor into ideas for intervention, advice, distraction, and personalized comfort. With this work we hope to contribute generative ideation and design methods for vulnerable and sensitive situations as well as findings that explore how the design of communication tools can center the needs of people in marginalized contexts.

This work continues the efforts of design justice practitioners and scholars, highlights the ways that BIPOC have been historically excluded from the design and implementation of everyday social technologies, and underscores the value of including different perspectives in the design of technology. The growing Design Justice movement recognizes that shaping technology without asking critical questions about justice and inclusion too often results in upholding a marginalizing and oppressive status quo [3, 6, 19, 30, 38, 42, 65, 74, 77]. On the role of technologies, Strohmayer has asserted, "*Technologies are not Solutions... building on the importance of adequately contextualizing technologies, and advocating for the use of multiple formats of service delivery, we now also want to address HCI's tendency to assume that technologies are able to solve complex issues*" [94]. Racism is one such complex issue that technology cannot solve. In our work, we use technology as a provocation and facilitator for conversations about racism. Through this process we can learn more about what people want and don't want in their technology. This work responds to Ruha Benjamin's call to action that, "*ultimately we must demand that tech designers and decision-makers become accountable stewards of technology, able to advance social welfare*," [10]. Here we demonstrate the fruitfulness of centering BIPOC experiences to understand how technology shapes, and is shaped by, social needs.

2 BACKGROUND

The present work on the CARE project centers Critical Race Theory principles in HCI research. This work focuses specifically on designing technology for coping with everyday experiences of interpersonal racism, a space that has been largely unexplored. In order to provide appropriate context, we briefly review literature unpacking everyday racism and how that relates to personal technology usage as well as participatory design approaches that could appropriately be used in this context.

An understanding of the ordinariness of racism, particularly as it manifests in the United States, is necessary context for this work. Racism is an everyday occurrence for BIPOC in the U.S. [34, 95]. One way of understanding racism is through the "Four I's of Oppression": institutional, interpersonal, internal, and ideological [32]. The present work focuses on interpersonal racism– conscious and unconscious oppression that occurs between individuals and groups of individuals– but with an understanding that very often these different levels of oppression interact and inform one another. Experiencing interpersonal racism on a regular basis contributes to substantial mental, emotional, physical, and practical harm in the short and long term.

Interpersonal racism occurs across a range of severities and forms - from subtle acts such as slights and exclusions to more overt forms such as hate speech and violence. Race scholars have said that in modern society, racism has not gone away, but rather has morphed [39, 81]. As described in our previous work on the CARE project [98], we use Derald Wing Sue's definition of modern racism as being: 1) "highly disguised, invisible, and subtle forms that lie outside the level of conscious awareness", 2) "hiding in the invisible assumptions and beliefs of individuals," and 3) "embedded in the

[2]This work was led by a Asian-American, mixed-race woman and a white woman, supported by two white faculty.

policies and structures of our institutions" [95]. Microaggressions, subtle, sometimes unconscious statements or acts of prejudice, are one of the more common forms of modern, everyday racism [95]. A common form of microaggression is an unintended insult in regards to race (though there are also microaggressions for other forms of identity, such as gender and sexuality) [76]. For example, complimenting an Asian American person by saying "your English is so good" instead relays an expectation of poor command of the language, and in the process, negates the target's U.S. heritage and reinforces their status as a perpetual foreigner [96]. For people who experience racism, these seemingly small, ambiguously negative experiences actually tend to linger longer and weigh heavier in the mind [44]. In fact, cardiovascular response is notably elevated in response to ambiguously racist events compared to overtly racist ones and this subtle racism can erode heart health over time through psychological stress [75]. People tend to downplay and underestimate how microaggressions will impact their lives, and thus may be less likely to seek support to counteract those effects. Though, of course, each incident is unpleasant in its own right, it is through accumulation of these slights, insults, and exclusions that this form of interpersonal racism can create long-term and lasting harm. Previous work identifies that ambiguity and uncertainty as being at the core of the emotional experience of racism [98]. For example, social validation of a racist experience is crucial to the coping process as it can help mitigate feelings of being overly sensitive, can help targets make meaning of an experience, and can help immunize them against future experiences by helping connect to a larger group experience [95, 96].

However, BIPOC today struggle to seek social support and share experiences of interpersonal racism online through mainstream technologies for social connection (e.g., Twitter, Facebook, Instagram) due to legitimate fears ranging from invalidation and questioning from friends to career backlash and racist harassment [98]. Because racism is ordinary in our society, it is also ordinary in our technology [10, 83]. Technology tends to embed, enable, and amplify the racist bias and oppression present in our society and enact it both implicitly and explicitly. At present, the anonymity and structure of social media technologies gives way to expression of hateful and harassing racial attitudes [46, 92]. Social and personal computing technology is relatedly an overlooked space for innovation when it comes to coping with racism. Online spaces are already providing unique access to spaces for communities of color to connect around identity and culture (e.g., [2, 33]). Social technology for uncertainty management as a form of coping with racism may therefore be a fruitful starting place for design work.

There has been a recent surge of research focusing explicitly on race and racism in human-computer interaction, following a long historic deficit [83]. Previous work on race at CHI has looked at how technology use and design is situated within racialized contexts in the U.S. (e.g., challenges in developing digital literacy for returning citizens [84], online conversations around social disorder in gentrifying neighborhoods [41], etc.). There is an additional growing body of HCI work centered on complex notions of identity including feminism [6] and intersectionality [87], marginalization [40], justice and equity [38, 42, 94], community-based practice [3], and emancipatory approaches to HCI [69] that either focus on or incorporate racial and ethnic identity. Though many of these works deal with issues relevant to race, their existence calls for more explicit study on race and technology. Critical Race Theory (CRT) contributes a vocabulary and understanding of race that enables that explicit conversation, and in fact to bring that theory to HCI the first author wrote and published "Critical Race Theory for HCI" which has since been embraced by the HCI community [83]. Thus far CRT has been used as a means for unpacking race and racism in technology (e.g., understanding racialized notions of algorithmic fairness [53], exploring how algorithms interpret and construct identity [88], etc.). The present work incorporates learnings from those early works in understanding technology use in racialized contexts, and applies learnings from intersectionality and CRT that the authors learned, not only in academic, but in social justice settings (e.g., community organizing meetings, protests, activist trainings, etc.), to exploring unidentified priorities for coping with racism that become salient when BIPOC needs are centered in technology design.

3 METHODS

We created a participatory design workshop method that we call *Foundational Fiction* in order to address the specific challenge of bringing in groups of strangers to discuss and design for the sensitive topic of racism. We chose Participatory Design because of its usefulness in empowering people who are underrepresented in design spaces [7, 54, 55, 97]. However, Galleguillos et al. write, "the literature lacks a unified source that guides PD researchers and practitioners in devising and implementing projects with groups facing more barriers to participation" [62]. We have found a growing number of papers that call for greater reflection on power and privilege in PD work [6, 38, 52, 62, 65, 72, 74, 87, 105] as well as more descriptions of projects that work with historically disenfranchised participants [12, 29, 60, 63, 99, 107], which we incorporate in the design of our workshop. Yet few descriptions of how PD methods are adapted to consider or accommodate marginalized experiences, with the notable exception of Harrington et al. [54, 55], Blake et al. [15] and Buck-Coleman and Biddle [23]. We hope this paper can contribute to discussion and reflection on specific approaches that engage issues of race and racism.

The practical goal of this research was to generate new ideas about supportive technology, from the perspective of those who have experienced racism. An additional goal was to care for the well-being of our participants. In this section we describe our means for fostering a supportive, respectful environment, the method and relevant background, and details of our implementation of the workshops over six sessions.

3.1 Creating a Supportive Environment

The sensitive nature of the topic of interpersonal racism and our task to ask strangers to discuss it in groups required us to build in several tools for creating a just and transparent space. We used techniques learned from social justice practices (experiences through on the ground activist efforts and learned from social justice design work [47, 50, 66, 91]) to set a tone of trust. We began with introductions of all of the researchers in the room and took time for the two main researchers (first and second author) to explain our positionality when it comes to race and racism. For the second author, the main

facilitator, she shared "*I am a PhD student in Design and I am going to facilitate today. My work focuses on understanding how design can address racism more directly, and how white people can understand racism more.*" For the first author, lead researcher but not facilitating, it was "*I am a PhD student in human-computer interaction and I study Critical Race Theory and how people use technology to cope with racist experiences. On a personal note, this work is important to me because outside of the university I am also a racial justice activist. I have my own experiences with racism, as do friends, family members, and colleagues, but there are many experiences that you may have had that I haven't and vise versa. In this workshop, my goal is to leverage this position at a major university to develop tools for empowering people in dealing with both extreme forms of racism but also the everyday racism that many of us have to deal with.*" Our aim was to make it clear to the participants that we sought their consultation as experts in their experiences. We used this framing as a touch-point throughout the workshop to decrease any power distance between researchers and participants (e.g., when a participant might ask a question about whether or not their are "right" we reflected back their expert role).

We sought to be clear and transparent about the purpose of this research project, sharing "*Our goal for this workshop is to learn from you, and many other people, what is needed for technology to offer support after racist interactions. We recognize that for many people, racism is an everyday occurrence. We are conducting a series of these workshops. The learnings from them will add to the literature in HCI and Design, to bring more awareness of race and its implications to consideration when creating technology.*"

Although it took approximately ten to fifteen minutes in the beginning of each workshop to set an inclusive space, we felt it was an important and valuable use of time. We created a statement about discomfort to read aloud as well. "*Another thing to mention before we really begin is that racism is a difficult topic, sometimes painful, sometimes sensitive. So we thank you all very much for agreeing to share your thoughts today. If at any point you don't want to answer a question or share a thought, you are always free to decline that. If you need to get up and walk away, you are free to do that as well. Please feel welcome to take care of yourself however you need to, during this 2-hour workshop. We will have a short break after the first hour, too, so that's a moment to pause and check in with yourself and see how you're feeling.*"

We included a guideline for engagement that we pulled directly from Light & Luckin's handbook, "*During all design processes, differences of opinion and disagreements between different members of the team are likely to arise. This may be inevitable, and can even be a positive part of the process, as different perspectives can lead to more productive and creative conversations*" [66].

After the purpose was clarified, we asked participants to introduce themselves, but left it up to them as to whether they would talk about their racial identity. Most chose not to. Instead we asked them about their favorite, "social tool." Leaving it up to them to interpret that however they liked, (e.g. technology, social media, other ways of connecting with friends or family). Lastly, we took photos of only their hands during the sessions, no faces, so they would not be identifiable as participating in the workshop.

As part of facilitating these sensitive conversations, the facilitators avoided denying or rejecting participants' interpretations, but were careful to pause and reflect at various points in the conversation (e.g., when things became emotionally intense, when participants posed questions to the researchers about whether or not their interpretations were "correct") and re-centering the group on being generative together.

3.2 Study Procedure

To bring people who experience racism - people of color - into the design of social technologies process, we conducted six workshops from December 2019 to February 2020. Participants were recruited through posters and through online social media posts on various platforms for residents of Pittsburgh, PA - a mid-sized midwestern U.S. city. Relevant to this topic of this research, as of a 2019 report on race and gender equity, Pittsburgh was found to be the worst city in America for Black people and specifically Black women across a wide range of metrics (e.g., infant mortality, mother mortality, police referrals for children, occupational segregation, etc.) [58]. Recruitment materials asked whether someone had "thoughts to share about racist interactions?" and invited them to sign up for our two and a half hour workshops. Recruitment materials specified that eligible participants must be 18 years or older and capable of completing all study measures in English. Participants were compensated $40 USD for taking part in the study.

We report on demographic data from our participants that is likely to have impacted the experiences they shared and designs they brainstormed [89]. In recruitment we did not explicitly include or exclude people from specific racial or ethnic backgrounds, and instead require that participants have "experienced racism or racial aggression." Our sample included 26 adults (21 women, 5 men), aged 18 to 56 years (avg. 25 years) from a wide variety of racial-ethnic backgrounds who primarily reside in Pittsburgh, PA (Table 1). In recruitment we explicitly attempted to reach beyond our university and succeeded in including 11 of 26 participants not affiliated with our university.

Participants who were accepted to the workshop were sent the consent form which linked to the interactive narrative vignette materials up to a week in advance of the workshop and asked to complete all of this as "pre-work" before attending our in-person sessions. Participants then attended our participatory design workshops in groups of 3-6. We open the workshop by giving an overview of the day's activities, our research goals, and by introducing each of the facilitators including self-disclosure about our relationship to interpersonal racism and research about racism (more detail in 3.1). Each workshop was run following the same schedule (Table 2). The first workshop, unfortunately, ran long due to discussions, so we only made it through brainstorming – participants in that session did not have time to create storyboards.

3.3 Foundational Fiction Workshops

Our aim was to provide common ground that is familiar enough for participants to relate to so that they might engage in productive idea generation, but preserve agency in self-disclosure to facilitate ideas [25]. We began this research by combining Participatory Design techniques with aspects of Design Fictions to discuss and engage with the sensitive topic of racism - more on this below. To

P ID	Age	Gender	Racial Background
W1P1	27	Female	African American and White
W1P2	32	Male	Indian
W1P3	19	Female	Asian
W1P4	19	Female	Middle Eastern
W1P5	18	Female	Mixed
W1P6	19	Female	Black
W2P1	18	Female	Asian
W2P2	18	Female	Black
W2P3	19	Female	Asian
W2P4	19	Female	Filipino
W3P1	19	Female	Asian (Korean)
W3P2	18	Female	Chinese
W3P3	30	Female	Asian American
W3P4	19	Female	Haitian American
W4P1	30	Female	Indian
W4P2	26	Male	Black
W4P3	18	Male	Asian Indian
W4P4	21	Female	Mixed Race (Black, White, Indian, Hispanic/Indigenous)
W5P1	18	Female	Taiwanese American
W5P1	19	Female	Black
W5P3	31	Female	Caucasian/Jewish
W5P4	26	Female	Prefer Not to Disclose
W5P5	20	Female	African American
W6P1	56	Male	Black
W6P2	23	Male	Hispanic/Latino
W6P3	37	Female	Italian/Irish

Table 1: Participant Demographic Data across six workshops including age, self-described gender and self-described racial/ethnic identity.

create a shared experience of racism that was not dependent on self-disclosure from our participants, we created an interactive narrative fiction describing a racist microaggession. This fiction created a discursive space as a place for our participants to design within (i.e., a story world for a productive, protected design conversation [67]).

While PD has been exploring the use of Design Fiction in collaborative work (e.g., [16, 24, 27, 56, 93]), our use of fiction is not for speculation or to present a new concept. Our fiction offers one shared, relatable story to connect to diverse participants, which is closer to Dindler & Iverson's use of Fictional Inquiry [37]. Our purpose for the narrative is to protect participants from being required to reveal their own painful experiences, providing them with agency in the process of self-disclosure. Typically, Design Fiction is used to represent a world that is unusual or far in the future (e.g., [28, 68]). However, for our objectives the fiction offered privacy and protection from vulnerable disclosures in a design workshop setting, in the way that Harrington et al. discuss in their reflection on community-based design workshops [54] and as Blake et al. leverage fictional personas in PD sessions to "allow participants to talk about and give their opinion about sensitive issues like mental health, without disclosing their personal experiences" [15]. Blake et al. ask participants to build out fictional lives for the given personas, while in our work, we provided a fictional story for participants to analyze, discuss, and brainstorm around.

On a small scale, the analysis of the fiction allowed our participants to define the problem space themselves. They identified the pain points from their own perspectives and chose which to focus on for their speculative interventions during the brainstorming and storyboarding phases. It is recommended in social justice work that the people most affected should have the opportunity to define the problem. Dombrowski et al describe this as a strategy of recognition: "recognition also encourages us to create open, transparent, and inclusive decision-making processes about which issues are deemed important when understanding a problem" [38]. Our participants defined the elements of the racist interaction that they would put at the center of their ideation.

Before attending the workshop, on their own, participants played through the interactive narrative as pre-work (3.3.1) and then attend a group, co-located design workshop (3.3.2). Because this fictional story of a racist microaggression was used as the foundation for the participatory design activities in the workshop, we call this approach *Foundational Fiction.*

3.3.1 Racial Microaggression Interactive Narrative. Drawing from psychological research on narrative fiction and game design techniques, we designed an interactive vignette as a foundation for discussing racism in our participatory design workshops. The interactive narrative served as a realistic but fictional account to represent personal experiences. We centered the narrative around a racial microaggression because they are incredibly common forms of modern interpersonal racism - it is likely that all BIPOC have experienced and would recognize some form of racial microaggression [95]. Microaggressions are also often ambiguous - the uncertainty they cause in the target makes them particularly difficult when it comes to validation, often driving a need for active social-support seeking. [98]. Our intent was to provide a real-time experience with a realistic, recognizable form of racism so that participants could discuss without being required to self-disclose a personal experience and without our causing unnecessary harm that either a narrative about a more extreme form of racism or a deceptive laboratory encounter might cause. Participants play through the fictional story as a college student, Sam, who experiences a racial microaggression from a visiting professor at a team meeting (a version may be found here: https://www.alexandrato.com/projects/care-vignette). By providing a shared experience for participants to discuss the challenges of coping with interpersonal racism we provide privacy and agency for participants in disclosing their thoughts, opinions, and personal experiences.

Before the workshop, participants were provided a link and asked to complete the task of reading through the story. Each player-participant walks through a typical day in Sam's shoes, walking around campus, speaking with their roommate in their dorm, and receiving an invitation for a coffee meeting and networking event with their supervising professor, lab mates, and a visiting professor. Sam attends the meeting at the cafe. As they are introducing each other and discussing career aspirations and opportunities, the visitor, Dr. Avery, says three microaggressions to your character: "*1) Your English is so advanced. 2) You're so articulate. 3) Where are you from? Well, where are your parents from?*" Although each of these three microaggressions target different racial minority groups, they

Time	Activity	Description
30 min	Pre-Work	*Read and sign informed consent and complete the interactive fiction at home.*
15 min	Introduction	*Introductions, review research goals, researcher-self disclosure.*
30 min	Identify Key Moments	*Collaborative reconstruction of the racial microaggression fictional narrative.*
10 min	Identify Emotions	*Identify key emotions throughout the narrative.*
5 min	*BREAK*	
10 min	Role-Play Activity	*Role play support-seeking and support-giving using various social technologies.*
10 min	Identify Needs	*Identify needs present in the narrative.*
10 min	Ideation	*Generate ideas for social technologies either for the narrative or their own lives.*
10 min	Storyboarding	*Select a favorite idea and extend it and put it in context through a storyboard.*

Table 2: Foundational Fiction Breakdown: Participants are asked to spend no more than 30 minutes on the pre-work including informed consent. The in-person workshop activities take no more than 2 hours.

all convey the prejudiced assumption that the target does not belong (e.g., through implied foreignness, unexpected intelligence, etc. [95]). Sam is visibly uncomfortable, but neither Sam nor anyone else at the table directly addresses the racism or inappropriateness of the comments.

3.3.2 Participatory Design Workshop. Following the interactive narrative, participants are invited to a collaborative, participatory design workshop. We agree with and aspire to the methodological approaches for a new PD proposed by Bødker & Kyng, but realize that we cannot deliver on them all because this was an exploratory project, not a long-term engagement [18]. We aspire to the "*commitments necessary to developing a social justice oriented design practice – a commitment to conflict, a commitment to reflexivity, and a commitment to personal ethics and politics*" put forth by Dombrowski and colleagues [38]. Our aim was to foster a supportive, respectful environment - more detail on how we did this is below in 3.1.3.

In each of our workshops, participants came together in groups of three to six to discuss the fictional narrative as an example of the present state of the challenge to be addressed. We open with an extended introduction of the researchers, project, and its goals - more on this in 3.1.3. The workshop then has six main activities (Table 2), and throughout the workshop, participants could refer to moments in the fictional story for ideation or share their personal experiences if they wished.

First, following the approach of the Future Workshop [85, 100] and the Landscape Game [21] participants would collectively reconstruct the narrative and the racist incident. They recreate the key moments from the fiction together, writing their points onto sticky notes and placing them on a shared board that depicted three images from the fictional narrative. This helped to create a shared understanding of the foundational story. They continued by identifying key emotions felt during those moments and added those as another layer of differently colored sticky notes (as seen in Figure 1).

Following a short break, participants engage in a role-playing activity which served to help participants think about different ways to offer social support, beyond what was described in the fictional narrative. Two participants are asked to role-play an interaction between two people using prompts from a deck of scenarios pulling from examples in our previous research [98]. The deck of cards include: 1) specified support-seeker and support-giver relationships (e.g. family, coworker, best friend), 2) examples of interpersonal racism that happened to the support-seeker (e.g. followed around a store, describe using a racial stereotype), and 3) a specific social technology that the two communicate through (e.g. Twitter, text message, virtual reality). The recipient of the racist event would begin the scene. Together they would act out how they might reach out for social support and how they might interact together. Then, as a group, we would discuss: *How did that feel for the actors? What did you notice as the audience? What else could give support to Actor A? Did that technology work well? How could it be better?* We would run the activity twice through, to explore different situations and technology.

Next, participants return to the narrative and continue to build up layers. We ask them to identify the main character's needs at each stage, on a third set of different colored sticky note. Together they talk through and write down ideas about what Sam's emotional and informational needs might be as the story evolved. On a fourth and final set of differently colored sticky notes, participants move from needs identification to concept brainstorming (as seen in Figure 1). They are encouraged to use the previous three layers of events, emotions, and needs to come up with ideas that might help make the situation better or easier. They are also encouraged to incorporate understandings from the role play, their own lives, or anything else they may have discussed in the workshop space.

As the final stage of the workshop, participants are asked to choose one of the concepts generated and develop it further into a storyboard in order to show the concept in use (e.g., Figure 2). They may storyboard their own idea or an idea shared by another participant. At the end of the workshop participants share their storyboards with one another and the researchers conduct a short debrief to describe what the next steps of the research project are.

4 RESULTS

In deploying the Foundational Fiction workshop method, we observed that participants engaged with and related to the narrative, became comfortable disclosing their vulnerable personal experiences with each other and the research team, and were able to produce many varied ideas for future technologies.

The volume and diversity of design proposals along with typically unsolicited personal disclosure is evidence that the Foundational Fiction method successfully facilitated co-design around

Category	Need	Description
Individual	Distraction and Joy	*I need to feel better, I need my lived experiences to not only center on oppression*
	Empowerment and Belonging	*I need to feel comfortable in the larger context of this incident, either to speak up, take action, or just to feel that I have a place here*
	Information and Context	*I need to understand what just happened, why it happened, and how it impacts me and the world around me*
	Direct Confrontation	*I need the perpetrator to know that they did something wrong*
Social	Empathetic Conversation	*I need to talk to someone who understands me and who will not judge me*
	Validation and Acknowledgement	*I need it to be recognized by others that something racist happened*
	Community	*I need to feel like I have a group of people who will support me*
	Advice	*I need to know what to do next*
Systemic	Reduction in Racism	*I need this to stop happening, I need the world to be anti-racist, I know this cannot happen through individual change*
	Safety	*I need to be assured that further harm won't come to me (physically, mentally, or emotionally) or I need to be able to quickly and safely exit the situation or space*

Table 3: 10 high-level needs for coping with interpersonal racism, ranging across individual, social, to systemic needs.

vulnerable and marginalizing experiences of racism towards justice-oriented outcomes. Here we present findings regarding: 1) the needs participants identified and expressed in the narrative, 2) their design concepts and storyboards, and 3) an analysis of the design themes expressed through the concepts and storyboards. We developed the design themes through a mixed inductive and deductive approach (e.g., [73]). The deductive approach focused on uncertainty reduction, informed by findings from our prior work [98]. The ideas proposed by participants represented a range of ideas for technology that focus on healing the pain of daily racism.

4.1 Needs for Coping with Racism

Through the activity to identify needs of the main character, participants expressed a number of strategies to prepare for, manage, or recover after experiences of racism. In the collaborative discussion participants would, at times, refer to their own needs and experiences during past interactions. These needs are universal and not attached to the constraints of either social-support or technology. After coding and grouping we uncovered 10 high-level needs for coping with racism along a range from: individual (i.e., internal needs including distraction and joy, empowerment and belonging, information and context, and direct confrontation), social (i.e., interpersonal needs including empathetic conversation, acknowledgement, community, and advice), and systemic (i.e., institutional needs including reduction in racism and safety) (Table 3). These needs align with and validate findings from previous interviews with individuals about social coping with everyday racism [98].

4.2 Design Generation

4.2.1 Design Concepts. Participants imagined multiple technologies that might address their, or the character Sam's, needs when it comes to dealing with interpersonal racism. Some designs might be realistic and feasible with today's technology, others were futuristic and magical. Across the six workshops, more than 100 ideas were generated on individual sticky notes.

The participants developed solutions with a variety of qualities, for example: from realistic to fantastical (e.g. "*survey students anonymously talk about professor*" and "*annotations over Sam's field of view showing what people around him think of racism*"), from individual to social (e.g. "*AI that knows exactly what to say to comfort you depending on personality*" and "*virtual reality with your friend/ supportive person you want to reach out to*"), from focused on the perpetrator to supporting the recipient (e.g. "*a chip that sets implanted in everyone's head that notifies them if they make someone feel bad*" and "*emotional tags for messages so people understand your emotions*"), from interpersonal to structural (e.g. "*a button on Facebook that announces 'I just had a racist experience' and friends who care can call you*" and "*move textbook company outside of Texas -> reform education*"), and from gaining comfort from AI to facilitating human interactions for advice (e.g. "*online chatbot that allows people to vent and respond with positive affirmations*" to "*an advisor or online advisor who could advise you on how to navigate the situation*"). Additional examples can be found in Tables 4 and 5.

4.2.2 Storyboards. Twenty participants generated individual storyboards that represent an idea that was particularly interesting or meaningful to each (Figure 2). Here we describe a few storyboards to demonstrate the output. We list all of the storyboards in Tables 4 and 5 that connects them to the Design Themes drawn from all 100 design ideas generated in the brainstorms.

The most common idea that was represented in the twenty storyboards was that of monitoring racist behaviors. This took many forms– whether it was a public announcement of inappropriate comments or an individual notification to the perpetrator. These storyboard concepts relied on some form of listening to conversations to detect the racist behavior. For example, a storyboard from workshop 2 describes a robot that attends school or workplace meetings and interrupts if a racist situation happens. Another storyboard, from workshop 4, proposes a watch that listens and detects racist comments and informs the wearer that they have said something racist, which is targeted toward people who want to learn to improve their own behavior. Taking a different approach to offering support, one storyboards imagines a version of a smart speaker that is designed to provide comfort. The images show someone coming home after an upsetting event and a device in the room

diffuses scented oil and asks how it can help, ending by telling the main character a story from a happier time.

4.3 Design Themes

The themes we establish here represent what the participants imagined in the storyboarding and ideation phases. In order to properly honor our participants' stories, desires, and ideas, we present them with little comment on validity, efficacy, or value here and instead seek to share how participants think and feel about designing for their futures [86]. We want to reiterate that *these themes are not design recommendations* meant to be implemented without further investigation, as many of them run as much risk of amplifying oppression as mitigating it. In the discussion (5.3) we more thoroughly engage critically with these themes.

For the purposes of answering our research questions, we discuss themes that directly relate to the question of coping with interpersonal racism. Themes that address systemic and internalized racism or veer away from social means of coping are left to future work. These themes are presented in two sub-categories: 1) Reducing Uncertainty and 2) Comfort, Support, and Communication.

4.3.1 Reducing Uncertainty. Ambiguity is central to the negative and lingering effects of interpersonal racism [98]. The first set of four themes address how tools might help participants in reducing their uncertainty related to experiences of interpersonal racism (Table 4).

Validate Lived Experiences through Smart Data. Participants believed that technologists could easily design ways to make use of their audio, location, email transcript, sentiment analysis, and biometric data such as heart rate in the design of existing technology. Participants expressed beliefs that their personal data is constantly being collected and used, regardless of their discomfort or consent. In designing for support against racism, they expressed that such data analysis would be considered trustworthy and authoritative to others, and that it could be used to track racism that occurs. Because a frequent part of experiencing racism is both internal and external uncertainty and invalidation [98], turning to a source that they see as neutral or authoritative is helpful. To these participants, a better technological future was one where they were empowered with ubiquitous data to reflect back their own lived experiences in order to validate when their experiences have indeed been shaped by racism.

Prepare Me for Future Racism with Predictive Models. Participants desired to either feel mentally and emotionally warned about situation where there will be a person who has done racist things in the past. The other value of "data" then becomes the ability to prepare BIPOC in advance of potential racism. They imagined that it may be better to know when racism is likely, in order to not be surprised and taken off guard– or to avoid the situation entirely. In these situations they could have phrases at the ready to fend off microaggressions and redirect racist sentiments and actions. Participants described entire databases of a person's past racist comments and indiscretions, augmented reality vision that had pop-ups of each person's level of racism, and ways for them to manually enter information about people they encounter to help prepare others. Such files might also help them to validate their own experience through the evidence of others and, in extreme cases, to build an argument for legal or HR purposes when a single person's experience is not seen as valid. They again positioned data as a source of empowerment through knowledge and preparation.

AI for Advice: Advise Me About the Consequences and Stakes. In nearly every workshop, participants discussed a need to better understand the consequences of taking action. In experiences of interpersonal racism, the personal experiences that stick out the most are the ones that are most novel or have the highest uncertainty [98]. Part of what is stressful and overwhelming during a racist interaction is the uncertainty about both the short and long-term consequences. Priorities include physical safety, mental and emotional well-being, cognitive burden, and future opportunities. Even if they could resolve that initial uncertainty about the intention behind what happened, they have many concerns about what to do next.

Multiple calculations occur in the moment of interaction and many participants use the language of Machine Learning or Artificial Intelligence to describe this. They ask of the technology: *Have other people experienced something like this? What did they do in response? What is likely to happen if I confront this person? How have they responded to confrontation in the past?* For example, the participants in Workshop 4 were particularly interested in the ways that targets of racism could be presented with, or learn ahead of time, recommendations for how best to respond in a particular situation. Informed by the context, the people involved, and the possible repercussions, an AI could offer advice. These ideas included: a website to read about the complexity of racism and a corresponding app that advises on the best action to take during an incident; Siri has a feature that listens for racist incidents, offers options to respond, and then collects feedback on how well it worked; an AI app that monitors and analyzes racial incidents, then prints out information for the transgressor and prepares Sam with details about the possible consequences (Table 4).

Here we can see how increasingly public discourse about the power of ML/AI has influenced participants. They know that their data and the data of perpetrators of interpersonal racism might be used to elicit patterns and they desire to learn from those patterns to take action. What can I do and say next that will result in the largest benefit and least harm to me?

Technology that Intervenes. The most immediate thing people want is for a racist interaction to stop and they envision technology that can be an ally. Interpersonal racism more often happens in ongoing social situations (e.g., during a conversation with a supervisor vs. a stranger passing on the street). The thing everyone wants to say, but cannot (for reasons detailed in the other design themes) is, "*Stop. Just stop. Please stop talking now.*" The overarching theme here is that it's risky for targets of racism to speak out, but technology, which is simultaneously seen as a third-party authority and a neutral device, is free from the social and practical ramifications of calling someone out. Interventions take a large range of forms. In some situations, the desire may just be to stop or distract and change the topic. In other situations, participants proposed publicly calling out the perpetrator ranging from inferences (e.g., Siri on their smartphones speaking up and saying, "*Hey actually did you know that she's been asked where she's really from 500 times in her life?*") to actual labeling (e.g., a button I could press under my seat

Figure 2: Four storyboards show a range of ideas developed by participants

and an alarm goes off that says, "*That was racist!*"). Implicit in technology calling someone out is validation. In order for the tech to call someone out automatically, it must already have identified that something racist is happening. In situations where the participant triggers the technology, they still know that the tech is there to support them and will not deny their experiences.

4.3.2 Comfort, Support, and Communication. The second set of three themes addresses how technology could relieve the burden of repeatedly explaining an experience to others, digitally express and receive more rich emotions, and how technology might embody a shift away from prioritizing productivity to emotional and mental care and well-being. (Table 5).

Relieve the Emotional Burden of Sharing. It is incredibly burdensome to explain the nuances and emotions of racist experiences through current technologies. Participants described feeling exhausted and drained following such uncomfortable interactions and being especially vulnerable to invalidation. Tracking down a safe space or a supportive person takes work. Once they have connected, they often are asked to describe repeatedly and re-describe the context of the experience, rehash and reconstruct what happened, who was involved, what led up to it, etc. Participants said that this can be too high a burden so that it becomes not worth it even to seek support. They imagined smart technology that could replace the unpredictability of a friend or family member - "*someone who gets me.*" They proposed robots that would get to know their needs, distract them when they wanted, and be better listeners than humans at times. Additionally, when targets of racism speak up for themselves or try to stop a situation, they are often tasked with explaining how and why it is offensive to the perpetrator. BIPOC described this extra communication as an emotional burden and work that they would prefer not to take on. Several of the concepts dealt with this issue. For example, one racism alarm printed out an explanation of the history and context of the detected microaggression.

Augment Emotional Expression. Those who have been harmed do not always have the words to share how they are feeling. Ideally, I can just be with someone who understands; an in-person supporter can look at me and read my body language to see my hurt and exhaustion, anxiety, fear, anger, or other emotions. But for many different reasons, targets have to communicate their needs over distance through technology. Our participants brainstormed ways to make that outreach more evocative and clear, from both sides. They want to share and receive rich emotional support through different channels. With their current options, there have often been missed opportunities, "*I can text them what happened, but they can't see just how upset I am.*" They want to feel a genuine connection - the kind they might normally get through eye contact, body language, and touch. The ideas developed in this area proposed more expressive ways to communicate, such as animations in text and more comfortable video sharing. But also ways to receive back love and empathy.

Comfort and Protection. Because phones are more ever-present than many people in their lives, participants described wanting my

Reducing Uncertainty			
Theme	**Storyboard Examples**	**Design Concept Examples**	**Related Needs**
Validate Lived Experiences through Smart Data	- Siri listens for a racist comment and then speaks up for you, telling the perpetrator not to be racist	- Student forum for talking about racist interaction. - Annotations over Sam's field of view showing what people around him think of racism. - A way to tell if people have ill intent behind their word	*I need to know if that was intentionally racist. I need someone to acknowledge impropriety. I need a reality check.*
Prepare Me for Future Racism with Predictive Models	- A website that tracks whether professors are racist, so you can be prepared. - A Wikipedia-type site that collects incidents of racism, scientific research on them, and advice on how to respond - people research ahead to be prepared. - A review site like Yelp to help people share experiences with racism.	- Website that tracks the amount of racist things someone says.	*I need to know what to say.* *I need to know if this person has said something racist before to anyone else.* *I need context about my status in this space.*
AI for Advice: Advise Me About the Consequences and Stakes	- Siri listens for racism, offers options to respond, then collects feedback on how well it worked. - An AI app that monitors and analyzes racial incidents, then prints out information for the transgressor and preps details about possible consequences. - A website to read about the complexity of racism and a corresponding app that advises on the best action to take during an incident. - A non-commercial racism search engine – information about situations, history, and ways to deal with it.	- Online forum that allows people to search different perspectives navigating issues. - Online advisor who could advise you on how to navigate the situation.	*I need to discuss my options for reporting.* *I need to vent and hear other opinions. I need routes for career help.* *I need to know if I will face retaliation.*
Technology That Intervenes	- A robot that attends meetings and interrupts if a racist situation happens. - A watch that listens for racist behavior and tells the wearer that they have been racist. - A feature on phones that detects racist comments and then locks until the perpetrator reads info about it. - Wristbands that monitors conversations at work for racism, people are punished or rewarded accordingly.	- Siri speaks up for you. - Buzzer in the room like a smoke detector that buzzes when it hears racist comments. - Chip that gets implanted in everyone's head that notifies them if they make someone feel bad. - Hidden "Alert" button in the moment to let a Prof. or someone subtly know you're uncomfortable.	*I need confidence to stand up for myself.* *I need to educate people in a way that doesn't alienate them.* *I need an ally to call out the situation.* *I need to not be singled out.* *I need to not be vulnerable to retaliation.*

Table 4: Connecting the "Reducing Uncertainty" design themes to storyboard concepts created by participants. Storyboards are also related to earlier, more simple design concept pitches from participants and represent multiple needs for coping with interpersonal racism.

technology to have a more attentive relationship with them. Several ideas built on participants' close attachment to their smartphones and other forms of ubiquitous computing - taking advantage of the daily information these devices are likely to be collecting. *What if my devices notice when something is wrong with me and try to make me feel better? Please get to know me and show me that you care when something has gone wrong. If my heart beats faster, ask me if I am ok. If someone is yelling at me, offer to intervene.* In this theme area, concepts used personal data collected, not for commercialization, but support and care.

5 DISCUSSION

This study generated one hundred ideas about how technology could be supportive, in both speculative and near-term ways, by centering racialized experiences and facilitating conversations about interpersonal racism and social methods of coping. In this section we share reflections on using fiction in our design methods to center BIPOC voices, designing future supportive technologies for comfort, advice, and intervention, and what it might take to implement and evaluate our participants' design proposals in-context. Incorporating tactics from critical, speculative design and design justice, we discuss the implications of these themes both for designing social

Comfort, Support, and Communication			
Theme	**Storyboard Example**	**Design Concept Example**	**Related Need**
Relieve the Emotional Burden of Sharing	- An app for people to learn about implicit bias by listening for statements and then sharing the history behind it.	- Device that can help you perfectly construct arguments over why the statements were wrong for persuasion. - Website where people can add what they consider racist and why	*I need a supportive friend.* *I need to talk about what happened.* *I need allyship from someone who saw what happened.* *I need a safe space to process.* *I need others to understand impact vs. intent.* *I need others to see personal and historical context.*
Augment Emotional Expression	- An app where you can rant your emotions and then it gets deleted immediately.	- Fitbit bracelet exposing your feelings. - Emotion tags for messages (e.g., speech bubble with the word "happy" attached). - VR with your friend or supportive person you want to reach out to. - Button on Facebook that announces "I just had a racist experience" so friends who care can call.	*I need it reaffirmed that I belong.* *I need someone to check-in with me.* *I need empathy and support.* *I need to vent to someone who gets it.*
Comfort and Protection	- A smart home speaker that asks how you are and offers comfort: listening, stories, scents. - AI that knows how to comfort you personally. - A superhero video game: you create racist villains and then defeat them.	- Earpiece that blocks out certain phrases. - AI that knows exactly what to say to comfort you depending on personality. - Something that could recreate the feeling of a hug (because sometimes that's all you need). - Online chatbot that allows people to vent and respond with positive affirmations.	*I need to feel better.* *I need physical, mental, and emotional safety and comfort.* *I need empathy and understanding of my lived experiences.* *I need the ability or help in opting out of a space.*

Table 5: Connecting the "Comfort, Support, and Communication" design themes to storyboard concepts created by participants. Storyboards are also related to earlier, more simple design concept pitches from participants and represent multiple needs for coping with interpersonal racism.

technologies to support coping with racism and in understanding the alignment of participants' stated desires and their unintended and unforeseen consequences.

5.1 Centering BIPOC in Conceptualizing Tech

Using the Foundational Fiction workshop method, we successfully facilitated productive, generative conversations with groups of strangers around social technologies to provide support following experiences of interpersonal racism. In addition to generating one hundred ideas for new technologies, participants had open, vulnerable conversations about their experiences and shared over one hundred personal stories and experiences throughout the six workshops [25]. As we asserted at the beginning of this paper, experiences with racism are ordinary, and race can comprise a central, critical aspect of a person's identity and lived experience. This work demonstrates how fruitful it can be to use a Critical Race Theory-informed approach to center BIPOC voices and experiences, specifically around race, in technology design processes.

Our initial research questions involved understanding what qualities of technology could support people in coping with interpersonal racism. As has become common in participatory design research, the workshops brought to the forefront unexpected insights that are indirect but essential to our research questions– particularly around our participants' perceptions of racism and social technology, as well as the ways that interpersonal racism exists within a much larger network of systemic and ideological racism [1, 17]. Though we had anticipated hesitancy, participants very quickly built rapport and were eager to have new conversations. Many remarked, "*I haven't talked about race like this before*," and asked for other places on campus where they could continue the conversation. In line with other perspectives on prototyping, we can see how the products of the Foundational Fiction method go beyond the artifacts produced by participants, but also manifests as the understanding, communication, and relationships formed through the research process [101]. For example, approximately half of our participants were either unfamiliar with the term "microaggression" or unfamiliar with the specific mechanics of microaggressions that make them harmful (e.g., that they can be unintended, that they have a cumulative impact, etc.). Through discussions, the participants often became more confident in their understanding that microaggressions can be harmful. In three of the workshops, the first author intervened in the conversation when a participant was particularly reluctant to assign blame to the perpetrator in a personal experience of a microaggression. She would tell participants that they did not have to make excuses for the people who had said or done harmful things to them within this workshop space. As Harrington writes, the workshop space itself presents an opportunity to create individual change as well as community ownership over

design [55]. More broadly, this workshop method facilitated conversations around designing for more empowered, justice-oriented futures.

Within the "four levels of oppression" framework (ideological, institutional, interpersonal, and internalized) [32], our research has focused on "interpersonal" racism - racism that happens in interactions between individuals and/or groups of individuals. Throughout the workshop, our participants brought internalized racism (i.e., beliefs about the inferiority or superiority of certain racial groups) and institutional racism (i.e., policies, procedures, structures) into the conversation and into their design solutions. Those ideas reveal a nuanced and complex conceptualization of racism, expressed through desires for a less racist world, to encounter less racist people, to have better education for what racism looks like and how to safely react to it, and to have a caring, non-extractive, non-oppressive relationship with technology. These aspects of coping with racism are inextricably linked and so despite our fictional narrative's focus on the interpersonal, participants were able to extrapolate and identify moments of systemic oppression in the story. This also reifies our approach to this research, which is to underscore that racism is not "curable" or "solvable." It would be unethical and impractical to frame this work as one that might "solve" racism. Our work encourages us to imagine and design social technology that better supports the targets of interpersonal racism in their coping process.

The Foundational Fiction brings people who experience a wide range of types and intensities of racism on a everyday frequency into the co-design of anti-racist technology. However, as is the nature of a participatory design workshop, this method encourages a focus on ideas that the general group finds agreeable, rather than focusing on individual preference. Although we received a wide range of design proposals, we observe in the conversations in the workshop how participants might be influenced by ideas that others respond to the most favorably.

The work does not end here. There are many avenues for future research in exploring how technology can better support identifying, coping with, and dismantling systemic, ideological, and internalized racism. In addition, we hope future work can examine other racialized experiences that look beyond trauma. Just as racism is an ordinary occurrence that is deserving of space in technology design, so too are experiences with race that involve resistance, joy, and strength.

5.2 Designing for Coping with Racism

5.2.1 Designing to Comfort. In the themes surrounding "Comfort, Support, and Communication" we can observe a desire for technology to alleviate the mental and emotional burden of communicating with others about racism. Many of the themes from participant ideas related to relieving the cognitive and emotional burdens that come with experiencing interpersonal racism. Prior research has shown how humor has been used both as a coping mechanism [98] as well as a facilitator for sussing out racial attitudes in conversation about racism (e.g., [8]). In some situations, there is a desire for technology to augment those conversations - to reduce the barriers of conveying not only the pragmatics of the experience but to convey the fraught emotions behind it. In other proposals, participants expressed a desire for technology to be an ally or even a co-conspirator in coping with racism. These ranged from Siri, Apple's intelligent assistant becoming vocally anti-racist, to conceptions of smart homes that detect your mood, converse about and validate experiences of racism, and provide comfort through words, as well as ambient changes to the environment such as changes to lighting and scent.

Participants perceive technology again to be ubiquitous and integrated parts of their lives that prioritizes their productivity and encourages them to help themselves through behavior change (e.g., fitness tracking, screen time monitors, etc.). Instead, participants wish to have a degree of emotional closeness to their tech. There is already a plethora of work in technology that prioritizes connection (e.g., wearable technology supporting social live-action roleplay through encouraging vulnerability [31]) , empathy (e.g., expressive biosignals encouraging empathy and closeness with stigmatized group members [70]), and comfort (e.g., designing chatbots that use active listening skills [106]). Our findings reinforce the need for technologies such as these and for structures and venues to bring them into the broader public's awareness (e.g. through public scholarship and media engagement [45]). However, the broad brush of "empathy" can be deceivingly fraught. As Bennett & Rosner remind us, empathy has always nominally been at the center of "human-centered design" processes, but many empathy-building practices further distance those in marginalized contexts, such as people with disabilities [11]. Prioritizing emotional comfort in design of anti-racist technology similarly requires guidance by BIPOC who have lived experiences with racism.

5.2.2 Designing to Advise. Participants proposed a future where technology helps them anticipate the nature of their interactions (e.g., *not only that I have a meeting in 15 minutes with my boss, but that it's likely to be microaggressive and upsetting to me*) as well as anticipate the consequences of their coping mechanisms (e.g., *if I file a report, will it help someone who comes after me not have to deal with racism, or will I just get fired and it will get buried?*). In the themes on "AI for Advice: Advise Me About the Consequences and Stakes" and "Prepare Me for Future Racism with Predictive Models" we can see how uncertainty creates cyclical relationships with experiences of racism. Past and future experiences are linked. Interpersonal racism creates embodied experiences of unease including anxiety about both past experiences and anticipation for what those past experiences might imply for future experiences.

Participants know that technology is already anticipating their future through automated reminders for commuter routes to work, predictive text in their email and document writing, and eerie set of promoted ads based on their recent conversations and interests. As we will discuss further in 5.3, there are numerous ethical quandaries with applying predictive models to socially complex issues such as racism. Technology that can characterize and predict harassing and adversarial users is already in the making and tends to be marketed towards enabling stronger moderation practice (e.g., [59]). However, in many instances, the wide net of such algorithms backfire and target people of color (e.g., Facebook's former hate speech policies which stifled conversations about race from Black users). Whether addressed through these particular technologies or not, the core

problem remains overwhelming uncertainty in the face of what can be an extremely serious set of circumstances - *what should I do and how likely is it to help me in the long run?*

5.2.3 Designing to Validate. In the theme "Use Data to Validate My Experiences" we observe that participants experience data as an authoritative entity. They express an understanding that their "data" are being collected at all times, without their consent or knowledge - it is just the way of the world (though we recognize this is not necessarily the case and is a belief situated in our participants' U.S.-centric context). In their design proposals, they suggested using location data, audio recording of conversations with others, speech transcription of those conversations, sentiment analysis, facial recognition, calendar events to track where you are and who you are with, emails with racial bias detection, and more - not as tools that might exist, but that tools that exist now that can be used to support the targets of racism. Rather than fighting what participants expressed to be a problematic but inevitable present, they envision a future where that data is used for them rather than against them.

There are opportunities here for social technologies to be educational. Though the effects of harassment are documented and quite serious, elusive and shifting definitions of harassment make platform governance challenging [13, 14]. Social media sites such as Facebook and Twitter allow users to report harmful content, but typically use labels such as "Abusive or Harmful" with sub-labels such as "directing hate against a protected category." These labels implicitly make value statements about what is worth or not worth consideration as harmful on these platforms. Social technologies could educate targets and perpetrators about the spectrum of racism and other forms of prejudice - such as in cases when the harm is real but unintended.

A desire for increased capability for data-based validation lives in friction with understanding that data discrimination and the amplification of bias and harm against women and BIPOC has been pervasive in online technologies [10, 82]. In future work our responsibility lies in making assumptions more visible, to play out the whole system that this would put into motion, assess the ethics and pragmatics, costs and benefits, of fulfilling this desire, and then check, is this still a good fulfillment of need?

5.3 Considerations for Putting Ideas in Context

Participants' designs cannot be implemented without further investigation and deeper understanding of their contextual use. By designing and utilizing the Fictional Foundation participatory design method, we have embodied an anti-solutionist attitude in our work (e.g., [17, 25, 69, 94]). Participants' proposed designs ranged from the extremely practical to the magical and fictional. In other words, the designs proposed by participants have, as intended, revealed our assumptions, highlighted underlying existing dynamics in the space of interpersonal racism and social coping, and made room for "naive, fragile fictions" [17] - giving way to new understandings about the present and future roles of technology in both facilitating and resisting racism. As such, our approach here embodies Blythe's call to "*resist the urge to present slick solutions or criticisms, and instead acknowledge the complexity of the problems we seek to address and the fragility of our own ideas and approaches*" [17]. Here we discuss one theme in depth as an exemplar for more critically evaluating the design proposals, while using them to gain a deeper understanding of the participants and their needs.

Within the theme "Prepare Me for Future Racism with Predictive Models" many participants expressed a desire to know the potentiality of a racist event. They desired to know who in their social sphere would be likely to say something racist, when and how they might say it, and with access to what they've said to others. They proposed this might happen through email text analysis, calendar event notification, search through a database on people, or through augmented reality pop-ups in real-time.

Participants' desire for knowledge in advance is coming from a very real place. When you experience racism you are taken by surprise, which when combined with uncertainty can make those experiences devastating in a long-lasting way [98]. *If only I knew, I would have been ready for it.* It is important to recognize that while each person is an expert in their own experiences of racism, not everyone has developed skills in how to go about fixing it. As Muller & Druin describe, "*articulating, clarifying, and informing the needs of themselves as individuals, and of the people they are connected to or responsible for*" [79] may foster reflexive insights for those in a participatory design conversation.

In practice these design solutions not only have a number of ethical quandaries such as privacy, data storage and access, evaluation of racism, etc., but are actually much more likely to cause harm to the intended beneficiary. For example, existing algorithms to detect hate speech and harassment are more likely to target those they purport to protect [49]. Assuming a perfect detection technology, such as the ones our participants propose, we also know that anticipation of a racist event, rather than adequately preparing a target, is likely to cause increased anxiety, paranoia, and stress. Anticipating a scenario where racism might occur contributes to confirmation bias around interpreting perceived slights and microaggressions (e.g., as in the case with stereotype threat [78]). Instead, psychological literature would lead us towards designs that, rather than anticipating specific events of racism, educate potential targets about the nature of microaggressions - how to identify them, what they mean and why they are upsetting, and then how to respond and cope.

Ongoing public conversations around ethical AI make clear the problems with implementing designs under this theme without first conducting further research into their extended effect - particularly because race is such a complex structural phenomenon [53]. We suspect that this is the case with everything proposed in these early, generative workshops. Therefore future work would interrogate themes revealed by the Foundational Fiction workshop (e.g., through iterative design processes, multidisciplinary investigation, participatory co-design, etc.), rather than treating them as recommendations.

5.4 Limitations

This sample and data have a few limitations. Our participant sample by design included people who are comfortable sharing their opinions about racism with a group of strangers. Although our workshop's structure may have facilitated these conversations, all participants responded to our initial advertisement, which poses

the question, "*Do you have something to say about racist interactions?*" We expect that even for our participants who were the least experienced, there is a baseline level of comfort around these topics. Potentially related, there were many more women in the study than men and no participants who identified as genderqueer or non-binary. While meta-analyses tend to indicate that men and women do not experience emotion differently, there is considerable evidence that there are gender differences in the expression of emotion– which may be attributed to social roles [57]. While race and racism tend to impact women and men differently (e.g., misogynoir [4, 5]), there was no evidence of variation in our results by gender. We expect that the desires may differ for people targeted by racism who are less comfortable or familiar with thinking about these issues in depth.

This work also operates from a U.S.-specific context of race and racism. Even within that specific lens, it is difficult and not well-advised to write about the experiences of BIPOC as a monolith. As evidenced in the writing of the racial microaggression in the interactive narrative, people from different racial minority backgrounds experience interpersonal racism along very different axes. This work does not intend to collapse those experiences, but instead to explore what kinds of designs might empower as many people as possible in coping with interpersonal racism.

Finally, because the narrative focuses on racial microaggressions instead of more overt forms of racism, there is a risk that this work might produce designs and design insights that are only applicable to more subtle forms of discrimination. However, in the conversations, we saw evidence that participants built on that experience to discuss a wide range of experiences with racism, including overt forms such as hate speech and violence and institutional and internalized forms of racism.

6 CONCLUSION AND FUTURE WORK

This work focused on a painful experience of race, but experiences of race are not always painful. Race is an important part of the lives people live and in fact contributes heavily to the development of online culture [22], but it's not proportionately represented in HCI research [83]. Similar oversights and exclusions in mainstream practices have been pointed out in the past. Genevieve Bell challenged us to engage with the role of religion in people's lives in 2006 [9]; from our own team, Jessica Hammer revisited this perspective again in 2020 showing us that the hegemonic Christian invisibly dominates the design of our technology: the flow of days, weeks, and years. She outlines several ways that a Jewish ethnoreligious experience could shape new, more personal and fitting technologies [51]. As Ruha Benjamin describes, too often HCI takes on the majority, dominant perspective without acknowledging or questioning it [10]. When we allow our discomfort to prevent us from engaging with different aspects of lived experience, we miss out on many opportunities to make technology that connects to the way people live.

In this paper we share how rich and productive it was to center a design process on racialized experiences. We explored how new ideas about how technology can offer social and emotional support, both practical and speculative, when we engage people in the topic of racism. We built on participatory design techniques to imagine futures where social technologies prioritize some of their most pressing and ignored needs. From this work, we uncovered a broad set of desires for how technology might empower individuals in dealing with racism. Findings can inform new ways to generate designs for social coping with experiences of interpersonal discrimination. We learned that participants had much to offer on the role of technology to validate their experiences. Because racial interactions are often contested, regardless of their own certainty, participants imagined ways that technology could act as an objective third-party entity. Ideation resulted in many interventions that could powerfully provide evidence and assurance that racism was happening, not only to targets but also to perpetrators and bystanders. In other words, for many participants, the authority that "data" and "technology" hold in the public mind could powerfully bolster their voice and put a stronger spotlight on inappropriate and racist behavior. Participants also desired comfort and support from smart devices that diffuse scented oil and retrieve happy memories to ways that Siri can speak up for you, so you don't have to. Many ideas harnessed data tracking to create allies through personal devices.

Our methods and findings may be of use to researchers who work with sensitive issues and/or vulnerable populations (e.g., [26, 35]), but should also have relevance to those in the HCI community with a vested interest in inclusive design. We see our paper as contributing to two efforts within HCI: 1) adapting methods to center the needs of marginalized people (e.g., [55, 97]) and 2) exploring how communication tools are used by those who are not represented in the mainstream development process as a means for demonstrating how fruitful it can be to learn about and design for communication needs from other standpoints (e.g., [36, 64]).

With a deeper understanding of the risks and stakes associated with designing technology for coping with racism as well as an understanding of what people who are most directly impacted by this technology might be, our future work now can involve putting those designs back into the context of today's world and evaluating how they might impact social coping with racism. Opportunities for exploration include: *What happens when you validate a racist experience publicly, in-the-moment? What does it feel like to be comforted by technology? How is uncertainty impacted by these technologies, and does increased certainty lead to better emotional experiences? How well could these concepts translate to other aspects of identity?* We seek to explore some of these questions in our future work by designing and evaluating design provotypes (i.e., provocative prototypes [20]) that bring these ideas closer to reality.

Through this work of exploring possibilities for anti-racist social tools, we have identified multiple ways for HCI to engage with urgent contemporary issues and open new paths for contribution. We have outlined a few opportunities here, but there is much more to explore because this is an essential part of people's lives and has been understudied by HCI. If we are not actively addressing identity-relevant experiences such as race, religion, ability, and gender, in our work, we are likely to recreate and uphold systemic oppression.

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