Designing For Microaggressions

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Microaggressions are subtle, everyday comments or actions that communicate discrimination towards historically marginalized groups. While these can be small experiences, they can cause measurable harm. Researchers have investigated how to reduce the negative experiences that result. But there have only been limited investigations into how to support those efforts with technology. To address this, we conduct a series of fifteen participatory design workshops aimed at designing to reduce the occurrence of and negative impacts from microaggressions. The workshops included 47 participants drawn from communities frequently targeted by microaggressions, with groups formed around gender, race/ethnicity, and disability & accessibility. Our study findings identified four primary themes in designing effective interventions for microaggressions: proactive measures, reward and accountability frameworks, community support mechanisms, and long-term educational resources. Through axial coding, we observed that different groups respond uniquely to these intervention approaches, with distinct preferences for timing, intervention style, and accountability. We identify challenges participants face when intervening around microaggressions and suggest directions for future solutions.

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

Additional Key Words and Phrases: Microaggressions, participatory design

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1 Introduction

Microaggressions are subtle comments or actions, either intentional or unintentional, that communicate discrimination towards stigmatized or marginalized groups [96]. These experiences can range from being patronized for completing mundane tasks [56] to being stereotyped as criminals [99]. Researchers have conducted empirical studies of the experience of microaggressions for many marginalized groups — including people of color [67], people with disabilities [56, 76], people who are LGBTQ+ [91], women [20, 51], and religious minorities [70] — finding they can create mental or even serious physical health issues [46, 71, 100].

In response, scholars and practitioners have developed a range of interventions aimed at reducing the occurrence and harmful effects of microaggressions [2, 82, 96, 100], through training programs [100], disarming microaggressions [98], and "micro-interventions" [97], among other

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strategies. These interventions can be targeted at perpetrators, but also at allies and well-intentioned bystanders [89]. Many technology researchers have sought to intervene on other aspects of systemic racism [22, 102–104], for example, designing tools to offer support around racist interactions [22] and to support social coping processes following experiences of interpersonal racism [102]. However, despite the pervasiveness and harm of microaggressions, the field of interactive computing has yet to specifically address microaggressions.

To explore how interactive technologies might help reduce the prevalence and impact of microaggressions, we conducted a series of 15 one-hour online participatory design workshops with 47 participants. Participants were drawn from three groups frequently targeted by microaggressions: i) people of color, which included Black, Indigenous, and Latino participants, ii) a gender group, which included cisgender women, transgender women, and nonbinary participants, and iii) people with disabilities, which included people who reported having long-term health conditions or disability, including reduced mobility, vision and hearing impairment, and so on. Through the design activities, we aimed to identify both the potential for and pitfalls of designs for microaggressions, answering three research questions:

RQ1: How do stakeholders perceive the risks and benefits of designing around microaggressions?
RQ2: What approaches are stakeholders most interested in to cope with microaggressions?
RQ3: What differences in priorities and concerns about the designs emerge across different groups?

Participants shared insights on practical intervention designs and assessed the feasibility, risks, and benefits of various approaches to managing microaggressions across both online and offline contexts. Through qualitative analysis of these workshops, including thematic analysis and axial coding, we identified productive directions for designing around microaggressions. Stakeholders proposed four categories of potential strategies for current or near-future technologies: *proactive interventions*, with real-time feedback to prompt immediate self-awareness; *reward and accountability* systems that encourage positive behavior change for individuals; *community support* mechanisms providing safe, supportive spaces for victims and allies to address microaggressions collectively; and long-term *educational tools* aimed at fostering empathy and gradual societal change. These themes emphasize a blend of real-time responses and sustainable education, aligning short-term behavioral adjustments with the goal of long-term inclusivity.

We also observed distinctive preferences across gender, race/ethnicity, and disability groups in addressing microaggressions. Gender groups generally preferred restorative justice approaches, such as reminders reminders to self-correct and promote empathy, believing that low-stakes interventions could foster positive behavioral changes without punitive consequences. In contrast, the race/ethnicity groups advocated for stronger accountability, emphasizing the importance of structured consequences like sensitivity training or lockouts for repeated offenses, especially in public or professional settings. Meanwhile, participants in the disability groups highlighted community-centered approaches, including collective actions like community service, aiming to foster a supportive environment for offenders to understand the broader social impact of their behaviors. These preferences reflect each group's unique perspectives on balancing direct intervention with opportunities for restorative growth and suggest the need for multifaceted approaches in the design of microaggression interventions, sensitive to the needs, experiences, and histories of different groups.

2 Related Work

Microaggressions are "*brief, everyday exchanges that send denigrating messages to certain individuals because of their group membership*" [96]. The concept was first introduced by Chester M. Pierce in 1970 to describe the insults and dismissals that he regularly witnessed non-black Americans inflicting on African Americans [100]. Unlike more overt forms of racism, perpetrators of microaggressions are often unaware of the impacts of their speech and actions [100], making interventions with bystanders and even perpetrators more feasible.

2.1 Differences in Forms and Experiences of Microaggressions

The form that microaggressions take can vary significantly based on the identity of the target. This is because microaggressions generally internalize some form of stereotype about the identity group. So, while those with disabilities might be patronized for completing mundane tasks (being stereotyped as childlike or incapable), someone who is Black might be followed around a store (being stereotyped as a criminal or threat). Similarly, people might be targeted by microaggressions rooted in different stereotypes of the same identity. As the theory of microaggressions developed, researchers created a taxonomy of racial microaggressions that target people of color [96]. While early research on microaggressions focused on the experiences of Black Americans, the forms of microaggressions that target many other groups have now been studied, including LGBTQ individuals, those living in poverty, and people with disabilities [20, 56, 74]. Similar to other harms, microaggressions can be exacerbated for those with intersectional identities; studies have revealed that individuals who have multiple marginalized identities, such as bisexual men of color, report higher frequencies of microaggressions than their counterparts [7].

We discuss common microaggressions targeting three specific groups — based around gender, race/ethnicity, and disability status — in the Methods section, as part of our selection of participant groups. While those are three of the most common targets, microaggressions exist for many marginalized groups [56]. Class-based microaggressions can take the form of judging someone's intelligence or worth based on their socioeconomic status, reinforcing stereotypes that poverty is due to personal failure rather than systemic inequality [20]. Religious microaggressions often manifest as assumptions, exclusionary comments, or pressure to conform to dominant religious norms [66, 68]. For example, Muslim individuals frequently experience suspicion-based microaggressions, such as being subjected to extra airport security screenings or being asked if they support extremist groups, reinforcing harmful stereotypes about their faith [66]. The cumulative effects of these microaggressions—across different identities—highlight the need for an intersectional approach to addressing and mitigating their harm.

2.2 Effects of Microaggressions

Microaggressions have significant psychological and emotional consequences, contributing to stress, anxiety, and diminished self-esteem [72, 100]. Repeated exposure can spur constant vigilance, which in turn, can lead to emotional exhaustion [92]. Those who frequently encounter microaggressions report higher levels of depressive symptoms and lower psychological well-being [77]. Moreover, because microaggressions are often dismissed as minor or unintentional, victims may struggle to validate their experiences, leading to internalized distress and self-doubt [67].

Beyond psychological harm, microaggressions negatively impact social and professional outcomes, reinforcing systemic inequalities in workplaces and educational settings. In professional environments, microaggressions can undermine confidence, contribute to imposter syndrome, and create hostile or exclusionary work cultures that limit career advancement for marginalized individuals [28]. Research shows that students who experience racial and ethnic microaggressions in

academic settings are more likely to feel disengaged, perform worse academically, and report lower levels of institutional belonging [95, 97]. This aligns with stereotype threat theory, which suggests that awareness of negative stereotypes can impair performance and reinforce disparities [94].

Finally, microaggressions also erode trust and social cohesion, affecting interpersonal relationships and community dynamics. When individuals experience microaggressions, they may become less likely to engage in cross-cultural interactions, fearing further invalidation or bias [93]. This can lead to social withdrawal and decreased participation in workplace or academic communities [69]. Microaggressions also contribute to a climate of exclusion, reinforcing societal power imbalances and maintaining systemic discrimination [41]. These wide-ranging effects for individuals and society highlight the need for a variety of intervention strategies, which we discuss next.

2.3 Interventions for Microaggressions

Interventions to address microaggressions span individual, institutional, and community approaches; each is designed to mitigate harm, promote accountability, and/or foster inclusive environments. For perpetrators, interventions focus on raising awareness and encouraging self-reflection, as many individuals unintentionally commit microaggressions due to implicit biases. Research suggests that perspective-taking exercises, implicit bias training, and microaggression education programs can help individuals recognize and reduce biased behaviors [35, 97]. Real-time prompts for self-reflection—such as reminders to reconsider word choices or tools that highlight potentially harmful phrases—can nudge individuals toward more inclusive communication [87]. For victims, interventions prioritize validation, coping strategies, and empowerment. Research suggests that affirmation-based interventions, such as support groups, journaling, and professional counseling, help individuals process and counteract the emotional toll of microaggressions [72].

Community-driven approaches emphasize bystander interventions and peer accountability to address microaggressions in social settings. Bystander intervention programs train individuals to recognize, respond to, and disrupt microaggressions effectively, providing scripted strategies for calling out harm in constructive ways [72]. Restorative justice approaches encourage open dialogue, listening to impacted individuals, and taking corrective actions [111]. Community support platforms, such as peer-led forums or moderated discussion spaces, can provide a safe environment for individuals to share experiences, seek validation, and develop collective strategies for handling microaggressions [12].

At the institutional level, interventions focus on policy enforcement, structural inclusivity, and leadership accountability. Strategies include anonymous reporting systems, sensitivity training, and policies to hold individuals accountable and prevent microaggressions from becoming normalized [28]. Research highlights the importance of diversity and inclusion initiatives, which encourage long-term cultural shifts by embedding anti-bias principles into hiring, mentorship, and workplace evaluations [69]. Institutions can also integrate microaggression education into curricula and employee training, ensuring that awareness and prevention become ongoing efforts rather than one-time off interventions [94].

2.3.1 Technology-based Interventions. Recently, researchers have begun exploring technological approaches and interventions. For example, AI-driven moderation tools have been explored for identifying microaggressions in online communities, offering automated feedback or flagging problematic interactions before they escalate [12]. Similarly, anonymous reporting apps provide a way for individuals to document incidents without fear of retaliation, allowing for data-driven insights into workplace and social environments [87]. Other innovations include interactive learning modules, gamified training programs, and real-time language processing tools, which offer adaptive feedback to help users recognize and avoid microaggressions [41]. While these tools have the

potential to enhance accountability, scholars have expressed concerns of reinforcing biases or over-policing speech in ways that may be counterproductive [35].

3 Prompt Designs

Existing research has explored various strategies and technologies for addressing microaggressions; however, concerns still remain, including around missing context, over-policing, privacy risks, and so on. To explore effective interventions for addressing microaggressions, we conducted a design workshop that engaged participants in brainstorming potential solutions. Design workshops offer a collaborative space where individuals can share their experiences, express their concerns, and co-create tools and strategies that reflect their needs. To guide these discussions, we introduced prompt designs as provocations to stimulate reflection and dialogue.

We provided the prompt designs in two phases: an initial criticism phase and a second generation phase. Presenting these prompt designs aimed to deepen our understanding of the context and challenges in addressing microaggressions. The prompt designs we created are similar to *sacrificial concepts*, meaning playful ideas that are created to "*feel out the boundaries of a problem*" and "*by no means intend to be correct*" [21, 63, 103]. The storyboards that accompany each idea are also similar to presenting *provotypes*, which aim to elaborate contradictions that call for further exploration [14]. Thus in presenting these prompts to users, we were not studying a proof of concept or evaluating the usability of the idea. Instead, our goal in showing these prompt ideas is to expose participants to different ideas and articulate matters of concern, to help with the later brainstorming stages [101].

3.1 Design Dimensions

As the research team curated prompt ideas, we specified five design dimensions (Table 1) to guide brainstorming, ensuring that the design prompts inspired diverse stakeholders, encompassed a wide range of strategies, and encouraged participants to think creatively. The five final prompt designs that emerged from this process are shown in Figure 1.

	Stakeholders	Scope	Stages	Space	Visibility
Daily Report	perpetrators	individual	after	offline	private
Pocket Card	bystanders	individual	during	offline	private
maCAPTCHA	perpetrators	individual	during	online	private
Booth	victims	individual	after	offline	private
Plant Mural	bystanders	community	before	both	public

Table 1. Five design prompts, along with values for each design dimension

Stakeholders: victims, by-standers and prepetrators. Major stakeholder groups that are involved in microaggression scenarios include victims, perpetrators, and bystanders [49, 96, 97]. Each of these groups has different needs, and we create prompt designs targeted for each. (1) *Victims:* The experience of a microaggression can often feel isolating, painful, and threatening [96], so the *Booth* prompt design (Figure 1c) aims to provide comfort to a victim. (2) *Perpetrators:* Although interventions aimed at perpetrators can create discomfort, most are meant to be educational, rather than punitive [97]. Two of our designs primarily target perpetrators: the *Daily Report* to reflect on their intentions and experiences (Figure 1a) and the *maCAPTCHA* or Micro Aggressions CAPTCHA to increase empathy (Figure 1d). (3) *Bystanders:* A number of researchers have emphasized the importance of receiving external reinforcement or support from bystanders [15, 49, 80, 89]. Drawing on prior work that developed a set of "pocket cards" to encourage bystanders to take action [89], we developed a digital *Pocket Card* (Figure 1b), while the *Plant Mural* aims to raise awareness of microaggressions in a broader community (Figure 1e).

Stages: before, during, and after a microaggression. Interventions before microaggression can potentially equip people with knowledge and resources to raise their awareness, help to identify

microaggressions, and avoid producing them. This principle is reflected in the *Plant Mural*. Just-in-time feedback has been shown to be effective for interventions in other contexts (e.g., changing diet and physical activity) [85], so two designs explore this approach: the *Pocket Card* provides immediate notification for bystanders to take actions and *maCAPTCHA* appears when perpetrators attempt to send hurtful messages. Alternatively, delayed feedback can help individuals reflect on their experiences and apply their knowledge [6]. Correspondingly, the *Daily Report* summarizes perpetrators' behaviors at the end of the day, while the *Booth* allows victims to reflect and process their experiences over longer periods.

Scope: community and individual interventions. Most of the prompt designs are intended as individual or even personalized interventions, including the *Daily Report*, *Pocket Card*, *Booth*, and *maCAPTCHA*. But community level interventions might create a sense of awareness, accountability and motivation, so the *Plant Mural* aims to mirror any microaggressions in the online community back to the offline community at large.

Space: online versus offline practices. Microaggressions can occur in both online and offline environments. In physical settings, these instances might manifest through verbal comments, body language, or exclusionary behaviors. Similarly, online spaces—including social media platforms, forums, or professional networks—can also host microaggressions, conveyed through language, tone, or lack of representation. Design prompts for offline situations included the *Daily Report*, *Pocket Card*, and *Booth*, while the *maCAPTCHA* and *Plant Mural* prompts focused on online microaggressions.

Visibility: private versus public. In private settings—such as one-on-one conversations or small, familiar gatherings—microaggressions may go unnoticed by others, allowing for subtler forms of bias to persist unchecked. Individuals on the receiving end may feel less supported or less able to challenge the behavior without witnesses, which we aim to explore with the *Daily Report* and *Pocket Card*. However, public microaggressions can perpetuate harmful stereotypes on a larger scale, influencing the attitudes of bystanders and reinforcing biases in the broader community. Both the *Booth* and *Plant Mural* design prompts can allow for discussions in public spaces.

3.2 Design Procedure

To produce design prompts, three researchers in the team conducted an iterative design process. All were women, two identified their ethnicity as Asian. Over the course of 10 weeks, one author generated several ideas each week, drawing from the research literature, social media posts, and educational materials. Once initial ideas were generated, the author produced visual representations, such as storyboards or sketches, capturing a single scene for each concept. All three researchers met weekly to discuss design concepts and iterated on the design concepts. Sixteen initial design ideas were generated; across the context of education and training, community-level design in public places, ubiquitous sensing, building campaigns, among others. The research team reviewed and discussed each. In addition to the five design dimensions described above, criteria for evaluating designs also included: representing a range of ideas from realistic to futuristic designs and differing from existing systems (such as educational programs). The research team focused on the breadth of the ideas and did not prioritize technical and financial feasibility. Instead, the team decided to explore "out of the box" concepts with different levels of risks to investigate participants' concerns and preferences. The research team selected five of the 16 ideas to move forward.

In the next phase, two researchers solicited feedback from a broader research group, consulting with six additional researchers. Five researchers were women or non-binary people and three were from underrepresented race/ethnicities. The research team presented the design concepts to

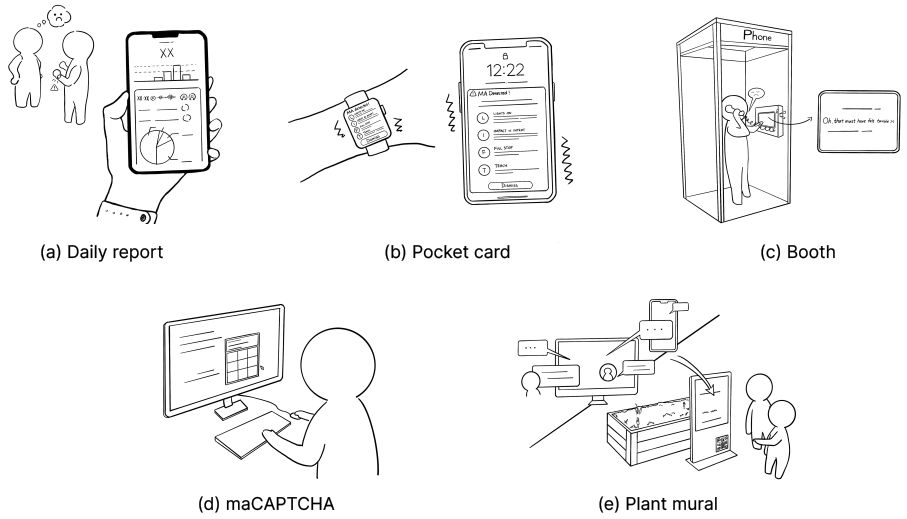

Fig. 1. Five prompt designs around microaggressions

the group to gather any concerns and used the collected feedback to update the design concepts, described in their final versions below.

3.3 Five Prompt Designs

3.3.1 Daily Report. Not everyone who produces microaggressions means to hurt the people around them. The *Daily Report* app seeks to help a perpetrator to produce fewer microaggressions. The tool uses ubiquitous sensing technology to track the user's daily verbal interactions, recording microaggressions and potential targets. On the report, users can see the number of microaggressions they produced that day and the changes in the frequency over longer periods. The quantitative data gives users a clear overview of their behavior and any changes. The goal is to make people aware of how subtle and unintentional microaggressions can be, and therefore reflect on and improve their own behaviors.

3.3.2 maCAPTCHA. The microaggression CAPTCHA (*maCAPTCHA*) aims at protecting marginalized groups from harm resulting from online microaggressions, while improving perpetrators knowledge of microaggressions, particularly intersectional ones. When a user posts content containing a potential microaggression, a maCAPTCHA will appear, displaying multiple square boxes, each representing an identity. Users will need to select all the identities that could potentially be harmed, prompting users to learn about discrimination and reflect on their actions.

3.3.3 Booth. Targets often experience great anxiety and disappointment, when they do not know how to respond to microaggressions [97], making validating their experiences an essential practice [99]. The *Booth* draws on the idea of a public phone booth, allowing victims to share their microaggression experiences anonymously. After a user shares an experience, the screen will show comforting responses, aiming to offer an emotional outlet, provide more support and care for targets, and call public attention to microaggressions.

3.3.4 Pocket Card. When intervening in a microaggression, people from the dominant identity group can be considered more persuasive and unbiased [1]. However, bystanders often lack the knowledge of when and how to respond to microaggressions. The *Pocket Card* is a real-time notification system for bystanders with a guide to suggested interventions. The system tracks and analyzes the conversations around the user. When a microaggression occurs, a notification will appear on users' smartwatches or phones. On the pop-up are suggestions of different levels of intervention users can choose to take — drawing on an existing bystander training tutorial [5] — ranging from informing a microaggression has occurred to persuading the people to reframe their words and avoid harm. Users can also dismiss the guide, as the wisest choice may be not to intervene.

3.3.5 Plant Mural. The final design is a *Plant Mural* installation within a neighborhood. The physical space is paired with an online space, and watering system of the garden is controlled by local, online microaggression data. The goal is to educate the public about the influence of microaggressions on the community around them. If the frequency of online microaggressions is high or increasing, the garden's sprinkler system will shut down, causing the plants to wither. A digital billboard alongside will display information about microaggressions and the local data. This design aims to strengthen the awareness that what people say in the digital world causes effects in the physical world.

4 Methods

The participatory design or co-design approach is widely used in HCI research [8, 58, 64, 65, 105, 106]. Participatory design is the process of involving groups of stakeholders in system development to better support diverse stakeholders' values and goals as well as avoid unwanted effects of technology [8, 36, 64]. Over time, the approach has expanded to emphasize democratic, inclusive, and justice-oriented design, particularly for marginalized communities [38, 44]. We conducted 15 participatory design workshops with 47 participants, drawn from communities frequently targeted by microaggressions. Workshops were conducted between May and June 2023. Each workshop lasted approximately 60 minutes and was conducted online via Zoom. The protocol was approved by our institutional review board.

4.1 Participatory Design Workshop

Existing research has used participatory design methods to understand issues related to interpersonal racism and and has highlighted considerations around equitable participatory design engagements [47, 102]. Our study used the participatory design workshop method and focused on microaggressions in three groups that are frequently targeted by microaggressions: gender groups, race/ethnicity groups, and disability groups. This group design facilitated intersectional discussions, providing unique insights into the challenges and impacts of microaggressions for individuals with multiple marginalized identities [66]. For example, people in the gender groups can also be minorities in the race/ethnicity attribute or have disabilities. Prior research has shown that individuals with multiple marginalized identities may experience microaggressions that are absent from studies focusing on singular identities [66]. Hence, we hope the current design can provide insights into the challenges faced with intersectional identities.

4.2 Communities Frequently Targeted By Microaggressions

We recruited participants from communities previously targeted by microaggressions. We focus on three attributes: race/ethnicity (recruiting African American/Black, Hispanic/Latino, and Native American/American Indian participants), gender (recruiting cisgender women, transgender women,

and nonbinary participants[1]), and disability/accessibility communities. Prior work has shown these groups are frequent targets of microaggressions [74, 100].

Race/ethnicity-based microaggresions Racial and ethnic microaggressions reflect how systemic biases and racial stereotypes influence everyday interactions [100]. These microaggressions can take various forms, including assumptions of inferiority, assumptions of criminality, and the dismissal of racial experiences and systemic discrimination [100]. One common form of racial microaggressions is microinsults, which subtly demean an individual's intelligence, competence, or belonging [72, 100]. For instance, Black professionals may hear "*You're so articulate*" implying that eloquence is unexpected for their racial group. Asian Americans frequently face the foreigner stereotype, with questions like "*Where are you really from?*" suggesting they are perpetual outsiders [72, 77]. Similarly, Latinx and Asian individuals are often assumed to lack cultural belonging, reinforcing racialized ideas of national identity [77]. Racial microaggressions also include microinvalidations, which dismiss or minimize racial experiences. Individuals of color may be told that "*Racism isn't a problem anymore*", which erases the reality of systemic discrimination [97]. Additionally, racial microaggressions sometimes invalidate cultural expressions and lived experiences. For example, comments that imply intelligence and professionalism are unexpected for certain racial groups reinforce underlying biases [97]. One study found that race-based microaggressions were more harmful than other insults because they served as a reminder of individuals' overall subjugation, persecution, and status in society [107].

Gender-based microaggresions Gender-based microaggressions reflect sexist attitudes and gender stereotypes, subtly reinforcing power imbalances in workplaces, schools, and social settings [20, 78]. Women and gender minorities often experience undermining comments, objectification, and exclusion from leadership roles due to implicit gender biases [28]. Research has documented how women are frequently interrupted or spoken over in meetings, reflecting the broader societal tendency to devalue their voices in professional settings [35]. In addition to workplace biases, gender-based microaggressions can also reinforce traditional expectations of femininity and masculinity. For example, women may be dismissed as "*too emotional*" or "*too soft*", reinforcing the stereotype that they are less capable of leadership [94]. Conversely, men who display emotions or deviate from traditional masculinity may be ridiculed as "*weak*" or "*not manly enough*". These microaggressions not only shape social interactions but also affect economic and professional opportunities, as gendered expectations contribute to pay gaps, hiring biases, and workplace discrimination [69].

Transgender individuals can also face gender-based microaggressions, ranging from intrusive questions and comments that seek to reinforce gender binaries to the invalidation of gender identity and misgendering [42, 73]. Transgender men and transgender women both experience microaggressions; however, the specific forms and contexts of these microaggressions can differ due to societal perceptions and gender norms [24]. For instance, transgender men may encounter microaggressions related to assumptions about their physical capabilities or leadership abilities, reflecting societal biases that associate masculinity with strength and authority. In contrast, transgender women might face microaggressions that involve hypersexualization or assumptions of incompetence, stemming from stereotypes that devalue femininity. Social media platforms have been recognized as both enabling and challenging for transgender individuals: while they provide opportunities for social transition and self-expression, they also expose users to persistent microaggressions that undermine their identities [42]. Findings suggest that transgender-specific social media platforms offer unique benefits, including enhanced safety and reduced privacy concerns [43, 48].

Disability-based microaggressions People with disabilities often encounter microaggressions that perpetuate stereotypes and reinforce social exclusion. Ableist microaggressions—ranging from

[1]While transgender men were also included in our recruitment, none chose to participate.

patronizing comments to assumptions of incompetence—are pervasive in both physical and digital spaces [9, 50, 76, 84]. Prior research has found that social media amplifies these experiences, where subtle yet harmful language can easily be disguised within common interactions. Such interactions can stigmatize disabled users, framing them as dependent or in need of pity, which creates a barrier to authentic self-representation [50]. Similarly, in studies with people with disabilities, participants reported being treated as children, patronized, and desexualized by others [56, 76].

4.3 Recruitment

Participants were recruited through the Prolific panel service. Recruitment materials explicitly stated that workshops would focus on microaggressions. While this increased the risk of selection bias, this ensured that participants were prepared for the potentially sensitive nature of the discussions. Inclusion criteria included that participants must be 18 years or older and capable of completing the study in English. Participants were compensated $15.50 per hour for participating in the study. Table 2 provides participants' demographic information within each group. Participants had previously responded to questions about their identities when enrolling on Prolific. On Prolific, we used the screening criteria they provided about sex identities. Unfortunately, Prolific does not store detailed individual data on gender identity. We applied two independent screening criteria. For three of the gender groups, participants had to identify as transgender based on the pre-screening

Group	P (#)	Age		Gender(%)			Race (%[a])				
		M	Range	F	M	N	A[b]	B	H	N	W
Race & ethnicity											
G1	2	30	28–31	50	50	–	–	100	0	–	–
G3	3	31	26–51	67	33	–	–	33	67	–	–
G5	4	52	22–54	75	25	–	–	50	50	–	–
G7	3	43	36–45	100	0	–	–	67	33	–	–
G9	4	44	26–55	50	50	–	–	75	25	–	–
Gender & sexuality											
G2	3	55	20 – 58	67	–	33	–	0	–	–	100
G4	3	49	28 – 50	33	–	67	–	33	–	–	67
G6	2	27	26 – 28	100	–	0	–	0	–	–	100
G8	2	33	28 – 35	50	–	50	–	0	–	–	100
G10	2	34	19 – 48	100	–	0	–	50	–	–	50
Disability & accessibility											
G11	4	50	22 – 69	75	25	–	–	0	–	–	100
G12	3	49	26 – 53	100	–	–	–	33	–	–	67
G13	4	56	38 – 58	75	25	–	–	–	50	–	50
G14	4	34	30 – 48	25	75	–	–	25	–	–	75
G15	3	39	22 – 63	67	33	–	–	33	–	–	67
Overall	*3.1*	*41.5*	*19–69*	*67*	*24*	*9*	–	*33*	*17*	–	*50*

[a]Percentage of respondents who reported that race or ethnicity; values may add up to more than 100%
[b]A - Asian, B - Black or African American, H - Hispanic, Latino or Spanish, N - American Indian or Alaska Native, W - White.

Table 2. Workshop Participant Demographics

questions. Although our recruitment targeted transgender participants, only trans women signed up for the design workshops.

To recruit participants for the race/ethnicity group, we included African American/Black, Hispanic/Latino, and Native American/American Indian participants. Recruitment did not include Asian American participants, as within the context of designing technology to mitigate microaggressions, Asian Americans might be perceived as a "model minority," potentially influencing the discussions [62], and are highly represented in the tech industry. To ensure diverse representation, we prioritized engagement with other marginalized racial and ethnic communities.

For accessibility groups, we used the Prolific pre-screening feature to include participants who have "*long-term health condition or disability (vision impairment, hearing impairment, physical disability/reduced mobility)*". Eighteen participants were recruited, who reported: physical disability/reduced mobility (72.2%), psychological disorder/mental health condition (55.6%), neurological disability (33.3%), vision impairment (22.2%), autism spectrum disorder (22.2%), hearing impairment (16.7%), and intellectual or learning disability (11.1%). While we did not specifically aim to include participants with mental health conditions, nor did we exclude them.

4.4 Workshop Procedure

The workshop featured three phases, progressively building participants' comfort and confidence in a final generative design task, as shown in Figure 2. Workshop activities were developed with three goals [83]: (1) building a supportive environment and rapport within the group to share thoughts, (2) enhancing participants' ability to analyze potential benefits and risks [10], and (3) strengthening participants' ability to generate design ideas. To test out the activities and the slides we prepared, we conducted pilot studies with four different groups to test the procedure and estimate the workshop duration. To improve the accessibility of the workshops and to "*help [participants] start to realize their own routines, habits and feeling around a topic, which seems not so rich in information initially*" [83], participants with disabilities were given access to sensitizing materials 24 hours prior to the workshop. Experiences in our pilot studies emphasized importance of a supportive environment for participants receive support from others after disclosing their experiences of microaggressions. However, for the accessibility group, the improved access outweighed this concern. Any extra time spent reviewing materials was also compensated at $15.50 per hour.

4.4.1 Phase I: Introduction. In each workshop, participants came together on a Zoom call in groups of two to four. The workshops were led by the first author and facilitated by two co-authors. To maintain anonymity, participants were assigned participant IDs. The research team shared a private online slide deck that each participant could work on as a personal workspace through the participatory design workshop. The workshop began with an introduction to the researchers, project, and goals, followed by a shared definition of microaggressions adapted from prior work [100]:

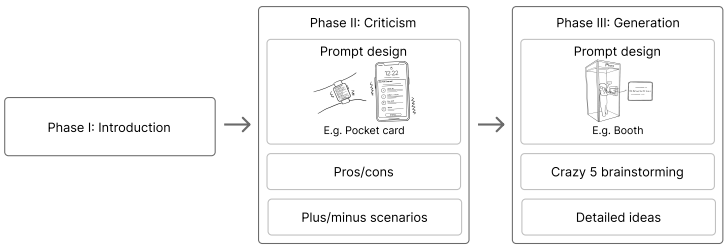

Fig. 2. Workshop procedure

> *Microaggressions are the everyday slights, insults, putdowns, invalidations, and offensive behaviors that people experience in daily interactions with generally well-intentioned individuals who may be unaware that they have engaged in demeaning ways*

The organizer then read three examples of microaggressions from the perspectives of a perpetrator, victim, and bystander.

Participants were then invited to introduce themselves, with the option to share their pronouns and professional background if they wished. To warm up for the brainstorming session, participants were shown a slide listing 25 locations (e.g., workplaces, public restrooms) and asked to mark places where they had encountered microaggressions. To prevent re-traumatization, participants were encouraged to choose whether they wanted to share their personal experiences either in their notes or when sharing any reflections with the group [25].

4.4.2 Phase II: Criticism. After the introductions, participants were asked to critique on one of the five prompt designs (discussed in Section 3). This was designed to increase participants' familiarity with and confidence in the idea of designing around microaggressions. This phase included two activities: brainstorming the pros and cons of a prompt design and developing a plus or minus scenario. The prompt designs work as a starting point to help participants better understand the uncertainty of design concepts and build empathy with different stakeholders.

Pros/Cons. First, participants brainstormed the pros and cons of one of the five prompt designs. This activity encouraged them to expand their thinking beyond existing ideas or approaches [105]. The organizer described the prompt design, displayed a sketch, and gave participants five minutes to list as many pros and cons as possible on their own slides. To minimize confirmation bias, participants worked independently, while a facilitator copied responses onto a shared worksheet. After five minutes, participants discussed the most significant pros and cons. Each participant then placed an emoji on what they considered the most important pro and the most severe con. This exercise helped participants envision both the best-case and worst-case scenarios of the design.

Plus + Minus Scenarios. User scenarios are a key tool in user-centered design for evaluating prototypes, generating ideas, and facilitating communication among participants, designers, and stakeholders [13]. In design workshops, scenarios help situate thinking around possible solutions by framing both typical and critical situations. Plus and minus scenarios further encourage reflection and idea generation by amplifying both positive and negative aspects of a concept [13]. A plus scenario amplifies benefits to prompt consideration of feasibility and limitations, while a minus scenario highlights risks and unintended consequences. These techniques enable designers to anticipate challenges, refine solutions, and facilitate communication among diverse stakeholders. For example, the "Black Mirror Writers Room" invited students to speculate on the potential harms of emerging technologies [57]. To help participants identify potential risks and benefits, this activity asked them to create either a plus scenario (describing a positive experience with the app) or a minus scenario (illustrating a worst-case experience). Participants then shared their scenarios.

4.4.3 Phase III: Generation. The third phase of the workshop asked participants to generate their own designs. This final activity ensured that participants had explored a range of ideas and felt confident in proposing—and evaluating—their own solutions. This phase featured two activities: rapid brainstorming and detailed discussion of one selected idea.

Crazy 5 Brainstorming. Participants spent the remaining 30 minutes brainstorming their own ideas. The organizer briefly described four example ideas that were not discussed in Phase I. Each participant then had five minutes to generate as many ideas as possible, writing a few words as notes. Participants discussed the ideas as a group.

Detailed Ideas. After brainstorming, participants shared and refined their ideas collectively. They could build on others' ideas or provide feedback. The facilitator encouraged critical discussion by prompting participants to consider pros and cons and anticipate worst-case scenarios. For example, the organizer asked "*Great! So when you were designing that, who were you trying to help? What you were trying to help them with?*" or "*Can anyone think of potential concerns or risks of this approach? Is there any way things could go wrong or make microaggressions worse?*". After discussing their own ideas, each participant was encouraged to give feedback on others'. As the brainstorming progressed, the organizer asked questions like "*Are there any ideas that stand out to you as most important?*" to elicit overall values and priorities. At the end, participants discussed the solutions they had developed together and collectively selected the most promising idea as the "MVP" (most valuable player, or in this case, prototype).

4.5 Ethical Considerations

This study obtained IRB approval and all study materials went through the IRB review. Participants were sent the consent form before the study. Given the sensitive nature of the topics, care was taken throughout the design to support participants and ensure their well-being.

Managing Participant Risks and Safety. Sharing experiences of microaggressions can be re-traumatizing [10, 25]. To minimize potential harm, we carefully assessed and identified risks before selecting the lowest-risk approach for the study. For example, participants were given private slides accessible only to the research team and themselves, allowing them to document their experiences and ideas privately, without needing to explain, disclose or share with other participants. When sharing examples of microaggressions during the introduction phase, Participants had full control over their level of disclosure. Participants could share an example of a microaggression they had experienced, but participants who were not comfortable sharing personal experiences could select a random scenario from a set of provided examples or opt to skip the activity. To ensure their comfort and safety, we explicitly informed participants at the start of each session that they had the right to decline questions or leave the workshop at any time.We further allowed participants to partake in the session with their cameras off to protect their identities [29].

A key strategy for safer at-risk research is recognizing that participants self-manage risk [10]. Researchers should offer information and decision-making authority, allowing participants to engage with safety measures in ways that best support their well-being. To support this, our IRB-approved consent form included mental health resources and helpline information. At the end of the study, we conducted a debriefing session to reinforce confidentiality and direct participants to available support resources.

Accounting for accessibility in design workshops. To improve accessibility for participants with disabilities, we enabled captions by default during the workshop. Participants were not required to type or write on slides; instead, they could participate verbally, allowing greater inclusion for those with vision impairments [4]. The recruitment email included a warning about potential toxic content and study-related risks. Sensitizing materials were provided at least 24 hours in advance, with additional compensation for the time spent reviewing them. These materials are included in the supplementary materials. For this group, we prioritized sufficient time and accessibility accommodations for workshop materials. However, reviewing materials independently may present challenges for some participants. Of the 18 participants in these groups, eight read through the sensitizing materials in advance, and no one opted to withdraw from the study.

4.6 Analysis

All fifteen workshops were recorded and transcribed. Data analysis included workshop transcripts, written pros and cons, and generated ideas. Results were analyzed using qualitative coding. To address RQ1, we analyzed the pros and cons raised by participants using a labeling, ordering, and clustering approach [83]. Each pro and con, whether written on slides or discussed in groups, served as a unit of analysis. The research team labeled and clustered all pros and cons into themes based on value and concern (e.g., 'raise awareness' or 'risk of backfire'). During the process, the research team first sampled 80 pros and cons (10%) across all workshops and independently conducted open coding to generate initial labels. Second, three researchers discussed and refined the codes before independently labeling the remaining data. Last, they independently performed the clustering and iterated on the groupings until they reached an agreement. While the workshops generated hundreds of possible risks and benefits in response to the prompt designs, results are reported as counts of participants to avoid biasing results towards particularly vocal participants.

To address RQ2, similarly, we conducted a thematic analysis of ideas proposed during the idea generation phase [18]. Two researchers analyzed and coded each idea description proposed in the discussion along with the ideas written in the slides. Themes identified in the ideas were organized according to the timing, intentions, and target of the interventions (perpetrator, victim, or bystander). First, two researchers conducted iterative open-coding to capture the main proposal of each idea (e.g., online support groups) After discussion, a large initial set of codes was generated. Then, the first author grouped ideas into themes and periodically discussed them with another researcher. A total of 151 ideas were categorized into four themes, with representative examples detailed in the following section.

To gain deeper insights into group-specific perspectives, we conducted axial coding [27]. This analysis compared viewpoints across gender, race/ethnicity, and disability groups, enabling the identification of key themes specific to each. Following Strauss and Corbin's approach [27], we connected initial open codes into broader themes by examining patterns in participants' experiences. The analysis revealed two major themes, each reflecting how microaggressions manifest across identities, in terms of the perception of the role of education and punishment.

4.7 Positionality

Our research team has diverse backgrounds and life experiences in terms of gender, race/ethnicity and disability status. None of us share all the intersecting identities of our participants, but we have overlapped with some aspects of their identities and experiences, which on the one hand, help us build empathy, but on the other hand, has likely influenced our analysis. According to previous research, we recognize that our individual experiences, identities, and positionalities can shape our research process and outcomes [90]. We also acknowledge our privilege and power as researchers working with marginalized communities—including people with disabilities, gender minorities, and racial/ethnic minorities—even as some team members hold one or more of these identities.

5 Findings

5.1 RQ1: Benefits and Risks of Prompt Designs

Participants raised a total of 124 possible benefits and 204 possible risks of the prompt designs. The main themes are presented according to who the benefit or risk is focused on: perpetrators, victims, or bystanders.

Perpetrators: Participants highlighted that perpetrator-focused interventions, such as the Daily Report, primarily serve to raise awareness and make the invisible visible (N=29). For example, that interventions could "*point out exactly what they're doing that's harmful to other people*" [G7P3]

and "*make you aware of microaggressions you would never think of*" [G2P1]. Some thought this increased awareness might lead perpetrators to reflect on their actions and beliefs (N=9), as with one participant who thought interventions might lead perpetrators to "*think about it in ways that they didn't think about it before*" [G9P3] or even, in the best case, to improve their behavior (N=21), either by "*let[ting] people fix their actions*" [G8P1] or even "*apologiz[ing] to the victim, if you feel bad*" [G1P2].

However, many participants raised concerns about interventions backfiring (N=19), as with one participant who worried that "*where some people would change their behaviors, some people would completely go the opposite way*" [G7P3]. Some participants suggested that backfiring would simply "*make people more dug in*" [G10P1], but others suggested that perpetrators might escalate, "*wanting to even go farther*" [G9P3], as described by one participant who shared that, "*my friend [is] the kind of person that if she got positive feedback from it she would do 50 other shitty things*" [G2P3]. In a similar vein, several participants noted a risk that interventions could trigger negative emotions in perpetrators (N=10), even if they do not make situations worse. For example, participants noted concerns that interventions might "*make some people feel attacked*" [G8P2], particularly if they did not agree with the automated label, "*it would turn into anger, and they might lash out like 'Oh, well, you're just being too judgmental, or you're not understanding me'*" [G15P4]. Finally some participants noted a risk of the interventions is that many perpetrators lack motivation to change (N=14), "*the people who most need it would probably not be interested*" [G4P2], and that as a result, it might lead to very superficial engagement from perpetrators, where "*if you modify your behavior but you don't really believe that what you're doing is wrong*" then any changes perpetrators make "*might be a performative gesture [...] it might not actually produce any long term effect*" [G1P2]. So while participants saw some potential for interventions, they were tempered by concerns about perpetrators' willingness to change and potential escalation of harms that could result.

Victims: A key benefit for victims is comfort and support (N=12). Participants noted the opportunity for this to happen both directly though interventions like the Booth, providing "*a little bit of comfort*" [G11P4] or "*helping navigate complex emotions*" [G6P1], but also envisioned opportunities for interventions to help develop greater community-based support, "*it would be nice to have kind of a set response to say to those things...I don't always know like the exact right thing to say*" [G6P1]. Similarly, participants saw potential for interventions to help victims express themselves (N=8), for example, by providing "*more tools to kind of have in their inventory with things to say and how to call out someone respectfully without escalating the situation*" [G6P2]. Again, however, participants noted potential risks. Many participants worried about the accuracy of such systems (N=17). Some worried about perpetrators in terms of "*false positives*" [G2P1] and "*misunderstandings*" [G13P3]. But many were concerned about the accuracy from the perspective of victims, noting "*language is tricky, you know*" [G13P1] and that conversations taken "*out of context*" could reduce the autonomy of conversations between people "*who are friends, or they're part of a community*" [G4P2]. Another participant noted that people experience comments very differently, "*what bothers y'all may not phase me. And something that makes me cry [...] may not bother you all at all*" [G2P3], so external adjudication of what qualifies could be invalidating. Finally some warned that inaccuracy could be harmful to participants' self identity and how their communities are represented to the world, "*intersectional identities really are critical for these kind of things to not tokenize, to not base it off of stereotypes*" [G10P2]. Because microaggressions so often rely on existing stereotypes, any automated interventions risk reinforcing those same stereotypes. The other common concern that participants mentioned was around the accessibility of any interventions (N=12). This included physical accessibility and convenience but also things like how many groups are included or how many languages are available, as one participant suggested "*the question is who is it designed for? Is it gonna have multiple languages? [... If not,] it's going to be a restriction for some people*" [G7P1].

Bystanders and the general public: Discussions of the potential for raising awareness (N=29) often mentioned perpetrators, but also recognized the key role allies and well-intentioned bystanders play in addressing microaggressions. This included mentions of the opportunity to make information "*there for everyone see to see*" [G13P3], so "*the community and people can [...] learn about it*" [G14P4] and changing norms and expectations can benefit from having a "*group mentality thing involved*" [G15P3]. However, many participants expressed concerns about the privacy risks (N=21) involved in the prompt designs, particularly for bystanders. The idea of "*some technology that's always listening to us*" [G15P2] was uncomfortable for many participants, with some posing questions like, "*where's this information going to at the end of the day?*" [G1P3] and others emphatically stating that "*I would not trust the machine*" [G5P3] and "*I don't want any app recording every single thing I say*" [G2P2]. A less common but important risk mentioned by participants was the potential for a chilling effect on speech (N=6). For example one participant argued that if these interventions existed, people are "*not gonna be themselves*" [G7P3] while another asked, "*isn't this going to shut down open and honest communication between strangers?*" [G2P3]. Others offered even stronger criticisms, for example, asking "*why do we have to do this?*" [G9P3] with some going as far as to describe the prompt designs as "*dystopian*" [G3P1]. Thus, while participants saw potential benefits from many of the designs, particularly around encouraging reflection by perpetrators, increasing awareness among bystanders, and providing support for victims, these were tempered by concerns around inaccuracy, privacy threats, and even significant potential for interventions to backfire, among other risks.

5.2 RQ2: Themes of Ideas around Microaggressions

Participants generated 151 ideas for addressing microaggressions, which we categorized into four themes. Proactive interventions address microaggressions early, while rewards or punishments try to encourage reflection. Community support aids immediate recovery and public awareness and education drive long-term societal change. A sample of ideas for each theme is provided in Table 3.

5.2.1 Proactive Intervention. Many participants suggested providing feedback to stop perpetrators in the moment (N=29). One approach involved holding perpetrators accountable through visible and immediate alerts to stop microaggressions in real time, particularly during conversations or meetings. For example, one participant proposed an alert where "*it takes a minute or two to go back to normal, so people can have a moment to discuss or think over it*" [G15P4]. Others proposed sending private notifications with resources or guidance to perpetrators or bystanders to prevent escalation.

Participants viewed this approach as a way to stop microaggressions in real-time while fostering reflection. However, concerns arose about the risk that interventions could inadvertently expose or isolate the person targeted, particularly for marginalized individuals. One participant worried that a nonbinary person in the room might feel *"singled out"* [G15P3] if the intervention clearly signaled that a microaggression had occurred, implying who it was directed toward. Similarly, another participant warned that alerts lacking nuance or context could *"put victims at risk"* [G4P2], either by drawing unwanted attention or escalating the situation. These concerns highlight the need for designs that intervene without making targets feel publicly identified or vulnerable. Some other reflective interventions included phone wallpapers or support animals signaling microaggressions. Proactive feedback could also precede conversations, such as a "*think before you joke*" prompt or a tool suggesting wording edits before posting. If ignored, an alarm could sound on the user's computer, reinforcing the message. These interventions aimed to nudge perpetrators before or during microaggressions, balancing accountability with minimal harm.

Proactive intervention seeks to immediately disarm microaggressions and make behaviors visible, aligning with micro intervention strategies [97]. In line with findings from from learning

Proactive Intervention	
Instantaneous	Alarm on the personal computer making a loud noise when posting microaggressions. Smart speakers recognize microaggressions and light up in response. Shoes with a mic and flashlight vibrate when microaggressions are detected. The wallpaper of the phone reacts to detected microaggressions.
Reflective	"Think before you joke" prompt appears at the start of a conversation. AI spell check tool that evaluates each word for microaggressions while editing. An apology prompt triggered when someone engages in a microaggression. Support animal reacts after conversation with many microaggressions
Reward and Punishment	
Tangible	Extra vacation time for workers who combat microaggressions. Snap challenges to encourage microaggression intervention. Partnering with food pantries to reward anti-microaggression behavior. Cryptocurrency swear jar: pay when microaggressions are made, earn it back.
Intangible	Virtual pets live/die based on user behavior. Friends notified daily about unaddressed or committed microaggressions. App posts publicly when a microaggression occurs. Wearing a T-shirt with a slogan as a form of public accountability.
Community Support	
General	Anonymous forums for sharing experiences and seeking feedback. Community meetings when thresholds of microaggressions are reached. Pairing experienced and new communities to facilitate learning. Elected mediators address reports of microaggressions.
Specialized	Marginalized identity groups provide safe spaces for discussion. Support groups for communities such as people of color. Subreddits/sub-communities for specific groups (e.g., people with visual impairments). Chat that connects a victim to another person in their community in real time.
Long-term Education	
Youth-focused	Parents, teachers, and counselors educate kids early about microaggressions. Log and report children's microaggressive behaviors for early intervention. Verbal education from teachers in real time. Immediate feedback paired with parental intervention.
Life-long	Workplace workshops on recognizing and addressing microaggressions. Online or in-person community education classes. App that provides scenarios what the disabled community experience in daily life. Short-form video series (e.g., TikTok, YouTube) on harms and counteractions.

Table 3. Sampled design ideas across all four themese identified: proactive interventions, rewards and punishments, community support, and long-term educational approaches.

science research [26, 109], participants proposed feedback mechanisms to assess and alert perpetrators. Effective interventions should be lightweight, contextualized, and explanatory. Since many perpetrators do not intend harm and may react defensively, feedback should focus on impact rather than blame. Participants considered interventions that were both subtle and more overt, such as flashing lights or alarms. Given recent advances in ubiquitous computing and environmental

sensing [112], smart sensors could monitor and detect verbal or behavioral microaggressions while preserving privacy. For example, Wall++ facilitates room-scale, context-aware sensing of gestures and behaviors. Extending such technology could enable conversational intent and emotional impact detection. Augmented reality (AR) and smart devices could also provide lightweight feedback, such as individual projected signals indicating a microaggression. These signals might suggest intervention strategies, empowering bystanders to step in and mitigate harm in real time [75].

5.2.2 Rewards and regulation. Participants proposed using rewards to reduce microaggressions and punishments to regulate behavior (N=22). Tangible rewards included monetary incentives or charitable donations (e.g., "*swear jar*" [G12P1]). Others favored intangible rewards, such as leaderboards or scoring challenges, though concerns arose about potential misuse, as when one participant warned, "*people might aim for a high score by producing more microaggressions*" [G2P3]. On the other hand, participants also suggested punishments, often leveraging social pressure (e.g., "*posting when they felt intervened*" [G11P2], "*notifying friends about microaggressions committed*" [G1P2]).

However, many participants talked about the risks confrontations and retaliation when reporting, particularly when punishments are involved. A number of participants feared direct reporting might escalate situations, "*reporting microaggressions could create more conflict*" [G1P3]. and emphasizing the need to be able to "*report issues without fear of retaliation*" [G8P2]. This was particularly relevant in workplaces where hierarchical dynamics make addressing microaggressions difficult, but in general applied to any situation where targets may not "*feel like they were safe to address them at that time*" [G4P2]. Participants did suggest workarounds, including anonymity-focused reports, "*it's not tied to anybody [...] just what has happened in your general area*" [G3P1] or anonymous "*airdrops*" [G10P2] of information, or through time delays. Research on racial microaggressions supports this, showing that anonymous reporting empowers individuals to disclose experiences without social or professional consequences [67].

Reward and regulation reinforces behavior through external support, aligning with micro-intervention goals [97]. Cognitive science research highlights the impact of rewards on behavior change, linking them to habit formation [88, 110]. Incentives and social pressure can also influence behavior [60]. Effective interventions must balance rewards and punishments to prevent unintended consequences while fostering intrinsic motivation, as intrinsic motivation is essential for lasting behavioral change [108]. However, these interventions could build on the many strategies developed for adaptive nudging tools that adjust based on user engagement.

5.2.3 Community Support. Another common theme was leveraging the power of communities, especially online communities, to support victims and provide safe spaces for discussing microaggressions (N=17). Participants emphasized that connecting with similar individuals reduces isolation and fosters affirmation. One participant highlighted the importance of this while coping, "*microaggressions make you feel isolated and you want to connect with others who've experienced the same thing for validation and support*" [G3P1], while another highlighted the unique challenges for those with an "*invisible disability*" [G6P2] that others may not recognize. To encourage sharing within these communities, participants suggested allowing anonymous logins, enabling users to discuss experiences and receive feedback at any time. Online communities could be general or narrower communities, depending on people's needs.

Ideas also considered the role of communities in raising public awareness of microaggressions. One participant suggested adding a forum to a reflection app, allowing users to ask why certain actions are considered microaggressions [G2P3]. While this could improve understanding, participants raised concerns that identity and cultural differences might affect judgments. Beyond online communities, participants explored raising offline awareness through visible cues. One idea involved a "*gigantic balloon that fills with microaggressions until it explodes*" [G1P1]. This

method could benefit passersby by quantifying microaggressions and promoting a collective effort to combat them.

Community Support aims to provide affirmation and shared experiences for those with similar backgrounds. Key attributes include resonance and fair decision-making. Social computing may use self-disclosure and networks to connect users for peer support, while virtual reality could enable cross-geographical connections [11]. Computing research has explored strategies for inclusive online spaces, such as digital juries with diverse members to ensure fair content moderation [34, 39], and noted how those with minority identities, such as LGBTQ+ groups, face challenges in online self-representation due to stigmatization [19, 31]. Technological affordances as well as community norms can help shape supportive communities, as has been shown for other online spaces [31, 43].

5.2.4 Long-term Educational Tool. Many ideas emphasized education to raise public awareness (N=34), as microaggressions are often subtle and unrecognized. Participants suggested tying education to empathy, such as "*a maze that helps the public experience life from others' perspectives and the microaggressions they face*" [G6P1]. To make the education more targeted, many sought to have individuals resonate with specific victims. Participants proposed tools like a watch that previews how words may sound before speaking or a cartoon replay of perpetrators' actions to increase awareness of their impact. For early education (N=5), participants stressed teaching kids about microaggressions through direct conversations with parents and teachers. One participant highlighted the importance of explaining why certain words are harmful, while another emphasized that "*it all starts in childhood, shaping their future*" [G3P2].

Beyond early education, participants emphasized the need for the general public to better understand marginalized communities, fostering inclusion and valuing diversity. One participant proposed training sessions connecting marginalized groups—such as people of color, disabled individuals, and those with mental health challenges—with others outside their communities, "*it would help if bystanders who overheard microaggressions could ask how community members prefer them to respond*" [G6P2]. Participants also stressed the importance of workplace training programs,for example, some "*terminologies need to be educated across the public*" [G4P1]. Other ideas included specialized training tools, such as a program for Uber drivers to help them recognize and address microaggressions toward disabled passengers.

Long-term educational tools aim to educate both offenders and the general public, fostering an environment of diversity and inclusion. Participants emphasized that education should be a continuous process for all. Since shifting values is challenging, experience-taking has been proposed as an effective strategy [55]. Interactive tools and training can incorporate perspective-taking to improve racial self-awareness and encourage proactive engagement [100].

5.3 RQ3: How do different groups react to interventions for microaggressions?

5.3.1 ***Education: Disagreements about its role in societal change.*** The gender groups were cautiously optimistic about education, seeing it as a tool for cultivating accountability and empathy in social interactions while acknowledging that it may need reinforcement through broader social change. On the other hand, the race/ethnicity groups emphasized that systemic reform is needed to dismantle institutional biases, and expressed skepticism about education's ability to achieve deep change within a structurally racist society. Similarly, the disability groups prioritized environmental and design changes, viewing accessible infrastructure as more effective than education for inclusion.

In the gender groups, participants framed education and public awareness about microaggressions through the lens of personal empowerment for social change, echoing feminist principles that "*the personal is political*" [45], which one participant called out specifically, "*it's like the feminist code: political is personal*" [G5P4]. For example, when the groups discussed approaches to educate

the public, they emphasized that microaggressions are not isolated incidents but deeply rooted in power imbalances present across various aspects of daily life, "*implicit bias happens in almost everything*" [G5P4]. In this view, public education is not just about addressing individual behaviors but also about fundamentally altering societal power dynamics. This perspective sees education as a form of empowerment, where individuals must be equipped to recognize, confront, and heal from microaggressions. The participants expressed a desire to not only address the personal pain caused by these interactions but also to use education as a tool to enact broader societal change. For example, a participant proposed the format of a "*daily quiz [...] to get better at recognizing microaggressions*" [G6P3], including those experienced by others. This aligns with feminist literature, which emphasizes education's role in shifting power relations and challenging ingrained biases [37]. The gender groups advocated for gradual societal change through individuals' evolving awareness and personal accountability, with education playing a strong foundational role in changing those perspectives over time.

On the other hand, while the race/ethnicity groups agreed that education is essential, they argued it is insufficient on its own to dismantle deeply ingrained societal structures that perpetuate racial microaggressions. They emphasized policy reform and social accountability as necessary for lasting change. One participant noted discriminatory behaviors remain as relevant today as "*they were 20 years ago*" [G15P3]. Education can also backfire if poorly framed, sometimes reinforcing stereotypes [32]; when this happens, it "*sometimes just makes it worse*" [G15P3]. Finally, some groups questioned whether education via technology could drive lasting change. One participant warned that, "*once you uninstall the app, you might go back to your old self*" noting that, "*if you modify your behavior but you don't really believe that what you're doing is wrong*", there's a risk that "*it might be a performative gesture [...] it might not produce any long term effect*" [G1P2]. This aligns with critiques of systemic racism, which argue that performative measures fail to dismantle deeper inequalities [16]. Without genuine internalization of systemic bias, education-based solutions risk being superficial fixes rather than drivers of lasting behavioral change.

Similarly, the disability groups noted that education can serve as a means to cultivate empathy within current social structures, but showed caution around its ability to drive large-scale societal change. Many felt that societal behaviors need to be directed towards accessibility and inclusion on a larger scale, with education acting as a supportive tool rather than the sole solution. Participants suggested interventions for specific and broad audiences, such as "*a tool for Uber drivers to recognize disability-related microaggressions*" [G12P1] or "*school events to educate about disabilities*" [G13P4]. However, many questioned how open people are to learn. One participant noted, "*you're preaching to the choir here*" [G15P4], arguing that the real challenge lies with those resistant to change. The participant pointed out how the word woke is now weaponized, "*tossed around like a bad word*" [G15P4], reflecting broader backlash against social change. This resistance underscores the limits of education alone, as deeper societal shifts are needed to overcome opposition [3, 54]. In summary, while all groups supported education, race/ethnicity and disability groups prioritized structural change, viewing education as a tool for awareness rather than the primary solution. Gender groups, in contrast, emphasized the cumulative impact of education on behavior over time. These perspectives highlight that while education is valued, its perceived role in social change varies based on the systemic barriers each group faces.

5.3.2 ***Punishment: Disagreement about how consequences shape people's behavior.*** Across their ideas, the gender groups favored restorative justice approaches, advocating for penalties that encourage behavior change without imposing severe judgment or consequences [111]. Several gender groups supported rewards as positive reinforcement for improved behavior, such as "*lower insurance*" or "*health premium payments*" [G4P1] for those who follow guidance on avoiding

microaggressions. This framing of self-correction as a learning opportunity, focusing on inadvertent rather than malicious microaggressions aligns with feminist pedagogy, which emphasizes fostering self-awareness through non-punitive, engaging methods [37]. Groups also supported reminders, visible warnings, and nudges to shape behavior. For example, one participant suggested that "*an app could prompt users to apologize*" [G4P2] in real-time. Another incremental intervention that aimed to both warn users and guide them toward restorative actions, proposed that when people reach a certain threshold of microaggressions within a day, they need to balance with a positive action, like, "*listen[ing] to someone speak about how they feel concerning microaggressions because that will actually let you know that your actions are actually affecting another person*" [G8P2]. Others suggested mediators as neutral educators, guiding individuals in communities less receptive to discussions on microaggressions. This approach fosters a collaborative, rather than punitive, learning process [17] and creates an atmosphere that supports self-correction [86, 111].

Race/ethnicity groups favored structured punitive measures to hold individuals accountable, advocating for account lockouts, mandatory sensitivity training, and temporary bans, particularly in social media and workplace settings. One participant suggested offenders be locked out after multiple reports on social media [G9P2]. Others proposed requiring workplace offenders to complete microaggression training before regaining access [G9P3]. Some even went further, advocated real-time punitive measures, including physical feedback: "*Maybe it zaps you every time you commit a microaggression. It won't harm the victim, but the offender will feel it*" [G7P3]. These immediate consequences aim to increase offender awareness, reinforcing accountability through direct feedback. This also included social accountability mechanisms, like "*an app that posts on your social media account as to whether or not you stepped up*" [G1P2] when witnessing microaggressions. Ironically, while prior research has often emphasized restorative justice approaches for racial and ethnic minorities—focusing on community-centered responses rather than punishment [87]—the race/ethnicity group in our workshop showed a preference for more structured, direct interventions. This preference also aligns with critical race theory, which emphasizes systemic accountability and the necessity of enforceable consequences to address deeply ingrained biases and prevent future offenses [30]. Their suggestions show a belief in structured penalties and real-time deterrents as effective tools for holding individuals accountable in public and online spaces [12].

Disability groups favored reflective, restorative, and community-oriented approaches over strict punitive measures. They advocated for gentle prompts, like a private "*red flag that only they can see*" [G13P3], to prompt offenders to reconsider their actions, or a "*reference*" that could "*break it down*" [G14P2] whether a joke is appropriate or not, assuming people would respond to these understated, tactful methods. In addition, disability groups emphasize social contributions over personal incentives, advocating for community-oriented rewards, like "*a collab with a food pantry or a humane society*" [G14P4] with a point-based system for recognizing and combating microaggressions, converting to tangible contributions like food for people or pets. This approach promotes collective responsibility, redirecting personal rewards toward community impact. Similarly, when punishments were called for, participants suggested community service obligations, recommending that offenders "*do like 30 hours of community service…[and] acknowledge and amend their actions*" [G15P4]. Others recommended moderated "*peer to peer*" [G14P1] dialogues between those who frequently experience microaggressions and those who commit them, fostering education and mutual understanding. This approach aligns with disability justice frameworks, which prioritize communal care and shared responsibility [61, 79].

The preferences of each group point to the importance of designing interventions that balance different forms of accountability. Race/ethnicity groups discussed more interventions that include structured, visible consequences (e.g., account lockouts, required training) to ensure accountability and deter repeat offenses, particularly in public or workplace settings. Gender groups discussed

prompts to help users to self-correct in a non-judgmental environment and reinforcing change through positive reinforcement, while disability groups emphasized community contributions, fostering a supportive environment where offenders consider their impact and contribute to communal well-being.

6 Discussion

In the microintervention framework, researchers summarized four strategic goals when dealing with microaggressions: make the invisible visible, disarm the microaggressions, educate the perpetrator, and seek external reinforcement or support [97, 100]. Interestingly, we found similar objectives in the four themes proposed by participants in the participatory design workshop. Proactive intervention has a similar strategic goal of disarming the microaggressions and making the behavior visible to raise the perpetrator's awareness and make timely changes. Reward and regulation have the strategic goal of obtaining external reinforcement and support. Long-term educational tools have the goal of educating the offender as well as the general public. One new theme raised in our workshops was the importance of getting support from the community. This collective effort made by the community or society can help bystanders build empathy with victims and targets experience fewer of the stress, anxiety, and self-esteem consequences.

Interaction research opens possibilities of integrating these themes into usable tools. To achieve proactive interventions' aims for immediate disarmament of microaggressions, emphasizing characteristics such as lightweight design, contextualization, and the provision of reasoning, researchers could borrow from ubiquitous computing and augmented reality to monitor and detect microaggressions while respecting privacy [112]. For reward and regulation, interactive nudging tools from the HCI and learning science fields could help establish optimal – or even adaptive –levels of rewards and punishment to regulate perpetrators without triggering negative consequences. To help enable community support, researchers could borrow stragies developed in CSCW research for creating inclusive and safe communities online [34, 39]. And while changes in values and beliefs are always a difficult and long-term process, educational tools can be integrated with tools and methods developed in learning science to build racial self-awareness [100]. We highlight two design implications suggested by our findings that may benefit any of these approaches.

6.1 Timing-Responsive Feedback Mechanisms for Immediate, Delayed, and Reflective Intervention

Throughout our workshops, participants highlighted the importance of timing as a critical factor in addressing microaggressions, as it can shape user responses and enable learning across different stages of awareness.

Immediate Moderation Mechanisms for Proactive Intervention: Participants emphasized the need for immediate feedback in managing recurring microaggressions in social and workplace settings. Suggested design options included unobtrusive notifications, such as subtle screen prompts or vibrations, allowing users a moment for self-correction without drawing public attention. This type of in-the-moment feedback facilitates direct behavioral adjustments, which are particularly beneficial for users needing quick, private reminders in social situations. Prior research on behavior modification supports that real-time cues, such as subtle vibrations or light signals, can immediately enhance self-awareness, making them especially useful for addressing unintentional microaggressions. This approach of content warnings is common in moderated online environments, which found that preemptive alerts can effectively prompt users to reconsider potentially harmful posts before publication and can reduce harmful interactions by promoting self-censorship, especially in environments where users are accountable to clear community standards [12, 52].

Delayed Feedback: However, real-time detection of microaggressions is difficult, as they often involve subtle language, context-dependent phrases, or nonverbal cues, such as tone of voice and gestures, that are hard for automated systems to interpret accurately [40, 81]. Studies indicate that real-time punitive measures in ephemeral spaces—such as warnings, muting, or removal—are limited in establishing norms and addressing complex behaviors. From our workshop, participants preferred tools offering tactful prompts alongside actionable guidance, such as bystander encouragement or alternative strategies, providing a more balanced approach to immediate moderation than punishment alone [53]. Reflection-based learning suggests that processing behavior in a low-stakes setting, removed from the immediate context, encourages deeper introspection and constructive change [37]. Several groups expressed a preference for end-of- or next-day summaries, which they felt would allow them to process feedback without the social pressures of immediate correction. Participants also suggested adopting an optimistic tone to support a positive learning experience.

Reflective Feedback: Reflective feedback, grounded in theories of transformational learning, supports the internalization of behavioral insights and gradual, sustained change [59]. Several groups envisioned personalized patterns paired with links to self-guided learning modules or a structured reflections. This approach enables users to monitor progress and focus on self-improvement long term. This three-tiered feedback design draws on psychological and educational insights into behavior modification and self-reflection. Real-time feedback, inspired by behavior modification theory, supports immediate adjustments [33]. Delayed feedback promotes reflection in a low-stakes context, aligning with trauma-informed approaches that prioritize non-confrontational learning. Reflective feedback, grounded in transformative learning, fosters cumulative self-awareness and behavior change. Together, these design options provide adaptable, context-sensitive feedback modes that accommodate different user needs for meaningful engagement and minimal disruption.

6.2 Community-Based Moderation with Context-Aware, Trained Peer Moderators

Community-based moderation system staffed by trained peer moderators offers a contextually nuanced approach to addressing microaggressions, fostering an inclusive environment for both accountability and learning. Such a model reflects findings from our study, where participants emphasized the need for moderation to be culturally and contextually informed, reducing the potential for misunderstandings and unintended escalation [23]. The approach aligns with existing literature on collaborative social spaces, which underscores the importance of peer support in minimizing harm and promoting constructive discourse within diverse groups, peer moderators could be trained not only to identify microaggressions but also to offer real-time guidance that respects individual group norms and values. For instance, a number of participants highlighted the importance of using empathetic and non-punitive responses to encourage behavior change, a nuance peer moderators could implement in practice. Furthermore, community-based moderation ensures that interventions are more responsive to situational dynamics, allowing for a spectrum of responses based on the specific interaction.

Instead of individual rewards, a system that incentivizes positive community actions (e.g., calling out microaggressions or demonstrating allyship) through collective action was often preferred by participants, for promoting communal responsibility over individual gain. This approach aligns with research on collective efficacy in community settings, where the emphasis on interdependence fosters a stronger, shared commitment to social equity goals. Instead of focusing on individual achievement, participants suggested that rewards contribute to a larger social impact, such as donations to community charities or causes. This design acknowledges many people's focus on communal responsibility and interdependence. Moreover, by framing positive behaviors within a shared goal, this design mitigates the potential for competitive or punitive undertones in intervention, a concern noted by many participants.

7 Limitations

The participatory design workshop format provided rich, qualitative insights but also introduced limitations in scope and generalizability. The study involved participants from specific identity groups (race/ethnicity, gender, and disability groups), potentially limiting the breadth of perspectives captured. In addition, while the number of workshops is large, any study of this kind will be limited in scope, and cannot provide estimates of the breadth or popularity of the ideas generated. Extending the participant pool to different groups, incorporating quantitative measures such as surveys or longitudinal assessments, and/or developing prototypes to evaluate could enhance generalizability and provide a more comprehensive evaluation of potential intervention impacts.

8 Conclusion

Microaggressions are subtle forms of discrimination that can have outsized negative impacts. While prior research has delved into understanding and addressing microaggressions, our study, comprising fifteen co-design workshops with 47 participants from communities frequently targeted by such acts, sheds light on the challenges faced when intervening around microaggressions. These workshops aimed not only to illuminate the specific difficulties participants encounter but also serve as a critical step toward designing future technological solutions. Our findings, which identified four primary themes in participants designs: proactive interventions, reward and accountability systems, community support mechanisms, and long-term educational resources. We found that distinct preferences emerged across groups in terms of the role of education and punishment, and suggest a number of productive directions for future designs for microaggressions, emphasizing the importance of contextual, tailored, and inclusive design.

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