Breaking the Silence: Unveiling Microaggressions and Cultivating Support for Women's Stigmatized Health Care

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Abstract

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Stigma surrounding sexual and reproductive health often silences women, limiting their access to essential care. Fear of social judgment deters many from seeking treatment for conditions like sexually transmitted infections, or even non-sexually transmitted conditions such as cervical cancer, as discussing these topics remains taboo. In South Korea, despite government efforts to promote sexual and reproductive health (SRH) care and shifts in sociocultural beliefs to decouple female sexuality from marriage, cultural norms continue to discourage unmarried women from seeking SRH care. This has resulted in significantly higher cervical cancer rates among Korean women compared to other populations and put them at high risk for severe health complications, including pelvic inflammatory disease, ectopic pregnancies, and infertility. Through my dissertation research, I aimed to empower and protect women seeking support on these culturally taboo topics while raising community awareness and building strategies to prevent the inadvertent

perpetuation of harmful microaggressions. Ultimately, I sought to foster resilience and safety within these communities.

In alignment with this goal, my research makes four contributions. First, I uncovered microaggressions as a primary barrier to accessing SRH care for unmarried Korean women, a contributor to health disparities that has received little attention in prior research. I identified how these microaggressions occur, who perpetrates them, and how emotional proximity shapes their harm. To explain these dynamics, I developed a framework illustrating how even well-meaning allies can become covert agents of stigma, reframing how microaggressions are understood in stigmatized healthcare contexts.

Second, I introduced culturally sensitive strategies to counteract microaggressions, co-developed with unmarried Korean women. These strategies emphasized reflection, empathy, and education over punishment, aligning with cultural values such as emotional restraint and not burdening others, and offering a constructive alternative to punitive approaches.

Third, I designed an anonymous online space using the Asynchronous Remote Communities (ARC) method that fostered mutual support and deep reflection among unmarried Korean women. This space enabled participants to safely discuss stigmatized health topics and reflect on in-group microaggressions, which are rarely addressed in existing research. Based on this study, I offer design insights for creating culturally sensitive and emotionally safe online spaces, emphasizing the importance of rapport-building, sequenced activities, and expanded evaluation criteria. These design choices supported meaningful engagement and led to real-world changes, including increased care-seeking and more open conversations. This work extends ARC beyond data collection to inform the design of empowering digital spaces for stigmatized communities.

Finally, I examined the limitations and unintended harms of generative artificial intelligence in producing counterspeech for culturally stigmatized health contexts. Current AI-generated responses often fail to recognize cultural nuance, validate the experiences of those targeted, or challenge the structural context of stigma. In response, I proposed a culturally sensitive framework for improving counterspeech generation that embeds cultural sensitivity, affirms users' perspectives, and accounts for social and structural factors shaping stigma.

Together, these contributions offer new directions for designing inclusive technologies and support systems that reduce stigma, challenge harmful norms, and promote culturally sensitive care. By reimagining how communities and technologies can respond to microaggressions, this work helps create a future where individuals navigating stigmatized health concerns feel seen, supported, and empowered to seek the care they deserve.

Table of Contents

List of Tables

List of Figures

Acknowledgments

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Chapter 1: Introduction

Many unmarried women suffer silently rather than seek care for stigmatized sexual and reproductive health (SRH) issues [1, 2]. This hesitation is a global phenomenon deeply influenced by cultural and gender norms that discourage open discussions about sexuality and health [8, 10, 14, 15].

Such hesitation is particularly pronounced in East Asian countries shaped by Confucian ideals, such as South Korea (hereafter referred to as Korea), China, and Japan, where long-standing norms around female chastity, family honor, and social conformity continue to regulate women's sexual and reproductive lives [6, 7, 122, 203, 204]. These cultural expectations often dictate that a woman's virtue is tied to premarital abstinence and that her social value is anchored in marriage and motherhood. In China, these ideals are reflected not only in family expectations but also in public discourse, where unmarried women over the age of 27 are often labeled as "leftover women" (剩女): a stigmatizing term that suggests they have failed to fulfill their filial duty and societal role [203]. This framing reinforces the belief that sexual and reproductive health is only relevant within the context of marriage. Institutional policies mirror this sentiment: for instance, fertility preservation procedures like egg freezing are legally restricted to married women, further marginalizing single women who seek to make autonomous decisions about their reproductive futures [204]. In Japan, where patriarchal structures and Confucian-influenced gender norms remain influential, reproductive decision-making is similarly constrained. Abortion access, while technically legal, often requires spousal consent, and emergency contraception remains difficult to obtain due to regulatory and cost barriers. These constraints implicitly reinforce the idea that SRH care is morally acceptable only within heterosexual marriage and that unmarried women's reproductive autonomy is deviant or unworthy of institutional support [122, 205]. These examples

highlight how intertwined cultural values and policy structures can be in stigmatizing unmarried women's sexuality and discouraging their access to essential health care, underscoring the broader regional relevance of the challenges examined in the Korean context.

In Korea, despite considerable advancements in healthcare accessibility and government efforts to encourage SRH care among unmarried women, stigma remains a significant barrier [6, 7, 9, 10]. Historically, Korean cultural norms, shaped profoundly by Confucianism, emphasize patriarchal authority, female chastity, and family honor [186, 187]. Confucianism places great importance on the family unit, which is viewed as a microcosm of society. Within this framework, women are often assigned roles that emphasize obedience, purity, and the preservation of family honor [186]. Sexual activity and reproductive health concerns outside of marriage are viewed as threats to family dignity, leading to harsh social judgment and marginalization of unmarried women who openly address or seek help for SRH issues [7]. These cultural norms strictly regulate women's sexuality, perpetuating a pervasive silence and stigma around SRH topics [6, 7, 9, 10]. While these themes echo the experiences of women in China and Japan, Korea presents a unique case due to its recent policy shifts and evolving public discourse around SRH care for unmarried women—changes that coexist with deeply entrenched cultural stigma.

SRH care in Korea has historically been framed exclusively within the context of marriage, primarily addressing maternal and child health [187]. Government policies and healthcare services traditionally prioritize married women's reproductive needs, thereby neglecting or actively marginalizing unmarried women's health concerns. For example, public health campaigns, healthcare educational programs, and clinical services often implicitly or explicitly target married women or mothers, reinforcing the notion that SRH is irrelevant or inappropriate for unmarried women [187]. Consequently, unmarried women internalize these societal expectations, viewing

their own SRH concerns as taboo or shameful, further exacerbating their reluctance to seek necessary care [6, 7, 11].

In everyday Korean society, this stigma manifests through various subtle and overt cultural practices. For example, unmarried women seeking SRH services may face implicit judgments or uncomfortable inquiries from healthcare providers regarding their marital status, sexual activity, or morality. Family members often discourage open dialogue about reproductive health, viewing it as inappropriate or shameful. Even peers may inadvertently reinforce stigma through casual remarks, insinuations about morality, or trivializing legitimate health concerns [5, 6].

The health consequences of stigmatized SRH are severe. Fear of stigma often results in delayed diagnosis and treatment of conditions such as sexually transmitted infections (STIs), cervical cancer, and reproductive tract infections, significantly increasing the risk of complications including pelvic inflammatory disease (PID), ectopic pregnancies, infertility, and chronic pelvic pain [3, 6]. Moreover, avoidance of preventive care, such as Pap smears and HPV vaccinations, contributes to higher incidences of cervical cancer [6, 7]. For instance, Korean women experience cervical cancer at rates 7.1 times higher than non-Latino White women and 5.95 times higher among Korean immigrant women [6].

Recognizing these significant health concerns, the Korean government has begun to shift its societal approach towards SRH care. Initiatives such as providing free HPV vaccinations and counseling for adolescent girls reflect an increasing awareness of the importance of preventive care regardless of marital status [10]. Moreover, healthcare coverage is expanding to encompass women's health needs throughout their life cycle, and efforts to destigmatize women's healthcare have led to changes such as renaming the medical department from Obstetrics and Gynecology to Women's Medicine [185]. Nevertheless, the deeply entrenched cultural stigma continues to

overshadow these positive shifts, significantly impacting unmarried women's proactive engagement with SRH care.

Further complicating these societal challenges are microaggressions: subtle, everyday comments or behaviors that demean, insult, or invalidate individuals, often unintentionally reinforcing stigma [9, 12, 13]. For unmarried Korean women, microaggressions frequently occur within close interpersonal relationships, including interactions with family, friends, and romantic partners. Examples include dismissive comments like, "You're overreacting; nobody cares if you visit a women's clinic.", or accusatory remarks such as, "Why are you worried about something like that unless you've done something inappropriate? [9]" Online spaces that unmarried women use for support seeking on SRH issues replicate and sometimes amplify these interactions. Unmarried women sharing their experiences online may encounter invalidating comments suggesting they are oversensitive or morally questionable, perpetuating stigma and isolation [9, 12, 13]. Many perpetrators of online microaggressions are within-group members, such as other women, who unintentionally reinforce stigma by dismissing legitimate concerns, criticizing emotional reactions, or perpetuating harmful stereotypes (e.g., women condemning other women for being overly sensitive or dramatic) [9, 12, 13].

Despite their profound impact, the concept of microaggressions remains poorly understood and inadequately recognized in Korean society. The term "microaggression" lacks a direct translation into Korean, and media portrayals often inaccurately define it as "aggression that seems aggressive but isn't", leading to misconceptions and undermining its severity [188]. This linguistic and cultural gap contributes to widespread misunderstanding, underreporting, and insufficient recognition of the harm these subtle acts inflict.

My dissertation investigates how to build safe, supportive, and stigma-resilient online spaces for unmarried Korean women navigating SRH challenges. I explore the role of cultural stigma, everyday microaggressions, and the potential for technological interventions-including community design, and generative artificial intelligence to mitigate harm, empower women, and improve care-seeking. This work is organized into four studies:

Study 1: Revealing How Microaggressions Suppress Care-Seeking

I conducted a study analyzing social media posts to examine how microaggressions manifest in everyday discourse. The findings showed that even in peer-to-peer spaces, stigma is perpetuated through subtle messages that shame care-seeking or moralize SRH topics. This study was published as Paper 1 in the Journal of the American Medical Informatics Association.

Study 2: Co-Designing Women's Strategies for Supportive Online Spaces

To explore how unmarried Korean women resist stigma and build safer online spaces, I conducted co-design workshops. Participants shared strategies for creating support through boundary-setting, emotional care, and informal education. This study was published as Paper 2 in the Journal of Medical Internet Research.

Study 3: Designing for Resilience and Reflection with Asynchronous Remote Communities

I conducted a nine-week asynchronous remote community study that included guided and unguided activities to foster empathy, support, and care-seeking. The findings showed that these activities mitigated in-group microaggressions and fostered reflective dialogue. Results were published in Paper 3 in the AMIA 2024 Annual Symposium Proceedings, Paper 4 in CSCW 2025, and Paper 5, which is currently under review for a special issue of ACM Transactions on Computing for Health. In addition, I published a case study version of this work as Paper 6 in CHI 2025, which is not included in the dissertation.

Study 4: Identifying and Addressing AI's Cultural Blind Spots and Proposing a Culturally Sensitive Counterspeech Generation Process

In the final study, I evaluated how well generative artificial intelligence models respond to microaggressions related to SRH stigma. The analysis revealed that current models often fail to challenge stereotypes or validate targets, and instead reinforce cultural harms. I propose a new, more culturally grounded counterspeech generation process. This work is currently under review as Paper 7 for the AMIA 2025 Annual Symposium.

For detailed descriptions of the study purpose, methods, findings, and discussions, please refer to Chapter 2 for Study 1 (Revealing How Microaggressions Suppress Care-Seeking), Chapter 3 for Study 2 (Co-Designing Women's Strategies for Supportive Online Spaces), Chapters 4 and 5 for Study 3 (Designing for Resilience and Reflection with Asynchronous Remote Communities), and Chapter 6 for Study 4 (Identifying and Addressing AI's Cultural Blind Spots and Proposing a Culturally Sensitive Counterspeech Generation Process).

Collectively, these studies form the foundation of my dissertation and have contributed to seven peer-reviewed research publications in top human-computer interaction and health informatics venues, including CHI, CSCW, AMIA, JAMIA, and JMIR:

1. **Paper 1 (Study 1):** Ryu, H. and Pratt, W. (2022). "Microaggression clues from social media: revealing and counteracting the suppression of women's health care." JAMIA. https://doi.org/10.1093/jamia/ocab208
2. **Paper 2 (Study 2):** Ryu, H. and Pratt, W. (2024). "Women's Educating and Coping Strategies for Cultivating Supportive Web-Based Spaces for Discussing Sexual and Reproductive Health: Co-Design Study." JMIR. http://dx.doi.org/10.2196/62716

3. **Paper 3 (Study 3):** Ryu, H. and Pratt, W. (2024). "Reducing the Stigma of Sexual and Reproductive Health Care Through Supportive and Protected Online Communities." AMIA 2024 Annual Symposium.
4. **Paper 4 (Study 3):** Ryu, H., Kim, J., Kang, S., and Pratt, W. (2025). "Improving Online Communities for Stigmatized Healthcare: Countering In-Group Microaggressions and Fostering Supportive Connection." CSCW 2025.
5. **Paper 5 (Study 3):** Ryu, H. and Pratt, W. (Under Review). "Enhancing Participation, Engagement, and Reflection in Asynchronous Remote Communities Research with People Facing Stigmatized Health." ACM Health Special Issue.
6. **Paper 6 (Study 3 - *not included in dissertation*):** Ryu, H. and Kang, S. (2025). "Exploring Design Tensions in Countering Microaggressions in Online Communities for Stigmatized Health Support." CHI 2025 Case Study. https://doi.org/10.1145/3706599.3706702
7. **Paper 7 (Study 4):** Ryu, H., Kang, S., and Pratt, W. (Under Review). "Mitigating Stigma and Fostering Support: Improving AI-Generated Counterspeech for Microaggressions." AMIA 2025 Annual Symposium.

Together, these studies offer a layered understanding of how stigma operates in digital contexts and how culturally sensitive technologies, ranging from online communities to generative AI, can support unmarried women in navigating taboo health topics. My dissertation contributes actionable frameworks for mitigating microaggressions, empowering users, and fostering safer, more inclusive care-seeking experiences.

Chapter 2: Unveiling Microaggressions Hindering Women's Sexual and Reproductive Health Care

This chapter reproduces the following article in full, with reuse allowed under Oxford University Press author rights: Ryu, H., & Pratt, W. (2022). *Microaggression clues from social media: revealing and counteracting the suppression of women's health care. Journal of the American Medical Informatics Association*, 28(11), 2345–2354. https://doi.org/10.1093/jamia/ocab208.

2.1. Study Purpose

Many people facing stigma seek online communities for health information and support, expecting these spaces to offer judgment-free environments where they can connect with others in similar situations and find the support they need [110-112]. Such safe spaces are particularly critical when necessary but stigmatized health care such as SRH care is discouraged [113-115]. However, online communities do not always provide the safety people expect. Unintentional harm can occur as deeply ingrained cognitive patterns and systemic forces within the surrounding culture may emerge, even in well-intentioned words of support [20, 23, 30].

To date, there has been little to no investigation into how stigma is propagated within these spaces or how the experiences shared by unmarried Korean women reflect the offline stigma they encounter, which ultimately discourages them from seeking care [3, 7, 11, 116, 117]. To address this gap, I chose to investigate these issues through the lens of the microaggression framework,

which highlights the subtle, implicit, and often unintentional harm that may be perpetuating stigma in these spaces [20, 23, 30].

In Study 1, I aimed to provide an illustrative example of how analyzing social media posts through the microaggression framework can help us understand why women may avoid recommended health care, identify key influences shaping their decisions, and suggest potential intervention points to counteract microaggressions and promote quality health care for Korean women.

2.2. Methods

To determine the cultural influences on unmarried women's gynecologic visits in Korea, I examined descriptions of their experiences in publicly available social media. Because all the posts I examined were publicly available, this study was considered exempt from Institutional Review Board review. All posts were written in Korean, but I translated the search terms, hashtags, and example quotes into English for this study.

2.2.1. Social Media Sources

I scraped posts between the dates of February 22, 2008 to February 9, 2021 from two sources: Nate Pann and Twitter. Nate Pann is the largest anonymous online discussion forum in Korea and does not require a login. Nate Pann users most frequently use the TokTok section of the forum, where they share personal stories and experiences as well as ask questions or seek advice. The search queries used to identify posts related to microaggressions and gynecological care were: *unmarried* AND (*obstetrics* OR *gynecology*) AND (*examination* OR *experience* OR *check-up*). The search resulted in 428 posts from Nate Pann. For Twitter, hashtags used were shocking one-liners I heard from the doctor (limited to obstetrician-gynecologist) and combinations of the search queries from Nate Pann. From the scraped data, I excluded posts or tweets about President Park's

obstetrician and the incident where a famous Korean rapper wrote an offensive lyric about the "shame chair" (a euphemism for the gynecological examination chair). I also removed posts that consisted only of advertisements or article links. After removing excluded posts, the total number of analyzed posts was 393 for Nate Pann and 705 for Twitter. I also analyzed all the comments corresponding to these posts, for a total of 602 comments for Nate Pann and 315 for Twitter.

2.2.2. Analysis

For the analysis, I followed guidelines by McDonald et al. [25] for an analysis that generates new themes and requires knowledge of the research context–in this case, Korean culture. I initially analyzed the original posts and identified quotes that reflected microaggressions. I translated the quotes as a native Korean with schooling in Korea and additional intensive English education during middle and high school. One other researcher (Wanda Pratt) and I reviewed and discussed the translated quotes, deciding which quotes were microaggressions, which were not microaggressions, and when applicable what type of microaggression it was. We discussed all codes and iteratively reached a consensus. I first used an open-coding approach [26] to analyze the posts and identify categories of themes as well as subthemes within each category. Next, I conducted deductive coding within each identified theme from the open-coding process by reviewing each quote in accordance with the microaggression framework [20, 23, 24] to identify the three types of microaggressions: microassaults, microinsults, and microinvalidations. Note that the first analysis phase of open coding was completed independent of the microaggression framework. Next, I analyzed each post's comments and investigated the types of microaggression responses.

2.3. Results

Women's posts described unpleasant experiences that happened pre-, mid-, and post-visit. I found that 72% of the original posts contained evidence of microaggression, although not all microaggression types were present in each theme, and some types were more prevalent than others. From the open coding of the posts that included microaggressions, I identified four categories of themes: (1) reasons for the uncomfortable/unpleasant experiences related to visits to the obstetrician or gynecologist (OB-GYN), (2) microaggressions at the OB-GYN, (3) responses to shared experiences, (4) non-supportive expected supporters of unmarried women, and (5) responses to microinvalidations in other commenters' responses. I present the findings for each of these high-level categories and the sub-themes within each. Illustrative quotes are shown in the theme-specific tables. Authors of original posts and commenters are identified with a code: the letter designates author (A) or commenter (C) or comment repliers (R), and the number is a unique identification provided by the research team. Example quotes translated in English for all themes and subthemes are in Tables 1-3.

2.3.1. Reasons for Uncomfortable Experiences

Many authors of original posts do not directly state why they feel uncomfortable going to the OB-GYN. However, for posts that do explain, the authors provide the following reasons: (1) fear of disappointing their mothers and male romantic partners, (2) belief that women should not have a child without a spouse, and (3) belief that women are required to have a socially justifiable reason for going to the OB-GYN (see examples in Table 1). Students below the age of 18 (A29) and even unmarried women in their late 20s (A46) shared their fear of disappointing their mothers because they are accused of being promiscuous for going to the OB-GYN by their mothers. Their male romantic partners also expressed extreme discontent about their partners being examined by

a male gynecologist (A51, A60). Some even discouraged gynecological care because the act of opening one's legs to others is deemed disrespectful (A60).

Table 1. Themes from Unpleasant/Uncomfortable OB-GYN Experience Shares. Phrases highlighted in grey were ones that the authors found difficult to convey the exact meaning with Korean-to-English translations.

Theme	*Author*	*Quote*
Unexplained Fear of Feeling Uncomfortable Going to the OB-GYN	A12	I'm suffering from severe dysmenorrhea and I think I need to go to the OB-GYN, but I've never been there and it's somewhat embarrassing for an unmarried woman to go to the OB-GYN.
	A28	I don't want to go to the OB-GYN because I'm unmarried...I've washed (my vagina) with the vaginal cleanser and vinegar, but it's still itchy...It looks fine on the outside, but I don't know what's going on inside...so I don't know if it's okay..The vulva and the outside parts of the vagina are itchy...Do I need to go to the hospital? Is it not possible to get off-the-counter medications from the pharmacy by explaining my situation?
Reasons for Uncomfortableness in Receiving Gynecological Care		
Subtheme 1-1. Fear of Disappointment - Mothers	A46	My mother has the mindset of "why does an unmarried virgin need to go the OB-GYN?", so I couldn't go to the OB-GYN until I was out of her care. However, when I finally went to the OB-GYN voluntarily, it was already impossible to cure...T.T* So these days I go to the OB-GYN regularly. It's livable now.
	A29	I've had an examination at the OB-GYN recently..I had severe vaginitis, so I told my mom and she was initially furious that an unmarried women went about to the OB-GYN..She got furious for the second time saying that vaginitis gets cured when you get married...I thought I was going mad..T.T
Subtheme 1-2. Fear of Disappointment – Male Romantic Partners	A51	My boyfriend found out that I went to the hospital and kept on asking why I went there. It was embarrassing to tell him that I went to the OB-GYN, so I avoided the question, but I also thought that it would be better to share my concerns with him. So I told him what was wrong...But then...out of the blue...he asked "You just went ANYWHERE and not to a female gynecologist, right?"
	A60	Few of my ex-boyfriends felt very uncomfortable with me getting examined by male gynecologists. That I open my legs to other men...

Subtheme 2. Belief that Women Should Not Have a Child Without a Spouse	A34	So I reluctantly told the doctor that the baby's father is out of the picture. Come think of it, I should have told him that he was dead T.T When I told the doctor that I will be the primary and sole caretaker of the baby, the doctor and nurse were both surprised. When I told them that I won't be able to get the baby's father's signature (for the amniocentesis), they discussed and the doctor told me that this was the first time he experienced anything like this hehe† Then is everyone lying and getting amniocentesis? T.T
	A48	(after receiving the result of not being pregnant at the OB-GYN) I was relieved at the moment, but come to think of it, the OB-GYN I had been going to previously was so out of line. Every time we went, they would reprimand my boyfriend (for having intercourse with his girlfriend) and disregard me for being a student.
Subtheme 3. Unmarried Women Need a Socially Justifiable Reason to Go to the OB-GYN	A06	I'm still unmarried...I'm 27 years old~~!!§ I haven't had intercourse yet...I mean everyone, even unmarried women, these days gets regular check-ups at the OB-GYN these days~~People around me tell me that I should at least get a cancer check-up...It felt weird to go to the OB-GYN, so I had been pushing it off, but others keep on telling me to take care of my health when I'm healthy.
	A18	I'm an unmarried woman....T.T But my menstrual periods were too irregular, so I plucked up the courage to go to the OB-GYN...
	A47	When I ask my mom about dysmenorrhea, my mom also just says that she has similar experiences at times...When my dysmenorrhea is severe, the coffee-colored blood clumps up and blood does not come out and this continues for 4 to 5 days...This time, this is continuing for 2 months in a row and I haven't had my period yet...I'm still unmarried, so it's a little weird to go to the OB-GYN..Does anyone know why this is happening?
	A51	I'm 28 years old this year and I haven't had my period for two months. I have irregular menstrual periods, but as I get older, I am getting concerned (about the irregularity)...I'm thinking of going to the OB-GYN, but since I am still unmarried and I have never been there, I don't have the courage to go...
Microaggression at the OB-GYN		
Subtheme 1. Women have a duty to give birth after marriage (mostly microinsults)	A72	(after notice of possible inability to have children) You're not going to marry any time soon, right?
	A73	(after saying that the examination hurts) Women have to go through the pain of birth anyway. Just do it.
	A78	(after saying that the patient has no intention of giving birth) You're going to be married someday. You need to have children. They bring joy.

Subtheme 2. Women should be enforced purity before marriage to prove their celibacy and innocence (mostly microassaults)	A85	(with a look of confusion) You're too wide for an unmarried woman. Do you use self-pleasure tools (in a condescending tone)?
	A88	(after saying that rectal examination is not preferred) You're really okay with losing your hymen?
	A90	(after the patient saying she has no chance of pregnancy) You still might since you have had intercourse before.

** T.T should be understood as the crying emoji.*

† hehe or its original form (᷅ ᷅) should be understood as another form of period rather than a smiling or laughing emoji.

§ ~~ is commonly used to lighten up the tone of the text.

¶ – – can be translated into a frowning emoji.

The belief that a woman cannot have a child by herself also contributes to their reluctance to visit the OB-GYN. Social structures fuel that belief. For example, Korean women are required to have the baby's father's approval to get amniocentesis even if the father is absent in her life. As A34 pointed out, even when the baby's father is present, gynecologists reprimand men who do not marry their pregnant partners. A48 also described a gynecologist reprimanding the couple for having had intercourse before marriage when they sought a pregnancy test.

Many post authors demonstrated that they had internalized such messages by starting their posts with "I am unmarried, but –." Although one of the search terms was "unmarried", I focus on the part following "but", where unmarried women express the need to defend themselves from others' or their own family members' accusations of promiscuity when seeking gynecological care prior to marriage. Such framing indicated the underlying assumption that unmarried women felt they needed a socially justifiable reason for going to the OB-GYN. In these posts, I found three types of justifications: (1) having an extremely irritating or severe medical condition that could not be treated without gynecological care (A18, A47), (2) having an unresolved medical condition that she has tried to solve with time or methods not requiring an OB-GYN visit (A47, A51), and (3) positing that everyone around the unmarried woman is getting tested for cervical cancer(A06).

2.3.2. Microaggressions at the OB-GYN

In Korea, the term "microaggression" is not conceptually defined. Yet, women posted about incidents from their OB-GYN visit that exemplify microinsults and microassaults. Based on the data, these microaggressions appeared to be fueled by two assumptions: (1) women have a duty to give birth after marriage, and (2) women should prove their purity prior to marriage.

For the first assumption, women described microinsults that doctors offered. For example, when A72's examination results showed that she may be infertile, she was discouraged from marrying. In addition, when an unmarried patient (A78) said that she has no intention of giving birth, she was nonetheless encouraged to give birth as she will be married someday. When A73 complained of physical pain during examinations, the gynecologist instructed her to endure the pain as she would during the birth process later, regardless of her intentions to have children.

For the second assumption, microassaults were used to insinuate promiscuity. For A90, even when she explicitly denied any chance of being pregnant, the fact that she had previously had intercourse seems to give the gynecologist the right to disregard her thoughts and evidence. Before a physical examination, unmarried patients were encouraged or even forced to choose the rectal examination because they believe the vaginal entry of the examination tool would result in the woman losing her hymen, which is still considered the symbol of women's purity. For example, when an unmarried patient (A88) refused the rectal examination, she was accused of not caring about her duty to be pure before marriage and was considered promiscuous. The continuous request to verify the patient's decision showed the gynecologist was judging her for promiscuity, which is also regarded as a microassault. Also, during physical examinations, women would be shamed for having a non-normative sexual organ width by their gynecologists. For example, A85's

wide vagina was attributed to frequent usage of pleasure tools and was considered impure and deserving of condemnation.

2.3.3. Responses to Shared Experiences

When unmarried women share their uncomfortable/unpleasant experiences online, they seek support rather than shame [27, 28]. Yet, many of the post-visit microaggressions they received stemmed from responses to their online posts. I noted three types of responses, two were unsupportive through either superficially supportive microinvalidations or accusatory microinvalidations, and only one offered support through me-too responses (see examples in Table 2).

Table 2. Themes from Comments to Unpleasant/Uncomfortable OB-GYN Experience Shares. Phrases highlighted in grey were ones that the authors found difficult to convey the exact meaning with Korean-to-English translations.

Theme	***Microinvalidation/ Support Subject***	***Author***	***Quote***
Superficially Supportive Microinvalidation	*Fear of Other Women's Judgments on Promiscuity and Unexplained Fear*	C12	It's because you think that way (others will judge you for promiscuity if you go to the OB-GYN as an unmarried woman). You look at others as if they are going to look at you. You don't need to keep your head down and not look at others, but just go (to the OB-GYN) in the carefree manner as you would go to a general hospital. If you don't put your attention on others, they don't even care about you.
		C28	Just go (to the OB-GYN) and keep your head held high. Be confident. They won't be able to say anything to you or look at you with negative judgments. I mean you have to go to the OB-GYN for menstrual symptoms, vaginal infections, vaccines for cervical cancer and stuff like that. I've never seen women who talk in whispers (at the OB-GYN). I look young for my age and you just need to be confident.
	Fear of Judgment on Not Having Had Intercourse Until Early 30s	C08	It's only going to be your loss if you are embarrassed (about not having had intercourse until your age)…Just think that it (going to the OB-GYN) is the same as going to the hospital.

	(Age Expected to be Married)	C11	What do you mean (obstetricians and nurses at the OB-GYN) look at you like a weird person if you haven't had sex until your age. It's all just a feeling of inferiority, so don't think like that and go. They've seen all kinds of patients, so they won't even look at you like you're weird;;
Accusatory Microinvalidation	*Fear of Other Women's Judgments on Promiscuity and Unexplained Fear*	C21	Don't overreact. They just glanced at you to see how you looked like without putting much thought into it. Why are you overreacting? Do you have inferiority issues? There are tons of students who go to the OB-GYN for menstrual symptoms and stuff, not just abortion – –¶ It's just you who thinks like that. Don't overreact. You can just leave it alone. No one even said anything – – Why is she mistaking things? That's absurd...kk
	Uncomfortable/ Unpleasant Feeling After Obstretrician's Comments	C74	You may have been alarmed since it's your first time at the OB-GYN. More than 90% of the people who go to the OB-GYN are married, so the doctor didn't mean anything when he said that. He was probably thinking that you were pathetic to be at his office when you're younger than his daughter who's also a minor. The important thing is that he advised you to not get pregnant. When you go there after you're married, you'll be less embarrassed.
	Frustration with Boyfriend's Discomfort with OB-GYN Visit	C38	Men who are of an older age don't say it out loud, but they don't want their girlfriends or wives to go to a male obstetrician. It (men's reaction to their partners going to a male obstetrician led session) will be much more impulsive and showing in the case of young men. It doesn't make sense that men can just let it slide and be okay with it...hehe†
		C61	Hmm. It's like the reaction when a dad meets his daughter's boyfriend. Your boyfriend likes you, so that's why he reacted that way. Just say sorry and console him by saying that you will go to a female obstetrician next time.
Me Too Support	*Fear of Other Women's Judgments on Promiscuity and Unexplained Fear*	C72	I have a similar experience. My friend didn't have her period for a couple of months, so we went to a clinic with a female gynecologist, but even when we went there (a clinic with a female gynecologist), the gaze of others from the entrance made me feel as if my body was burning. This was 15 years ago, but the social shaming is still (continuing)...We were waiting for the examination, but others at the OB-GYN talked loudly enough for us to hear that we had no shame coming to the OB-GYN in our school uniforms, that the world was ending. They tsked

			at us as if their tongues were going to break. I mean it's obvious that students go to places with their school uniforms on after school...oh my god~~§ It's disheartening to hear that social shaming from others at the OB-GYN still exists.
		C91	I really feel you…When I was a student, I went to the OB-GYN because I had a lump in my stomach wearing my school uniform. At first, I didn't know that I had a lump, but I went there because my stomach hurt badly. The doctor said that I had to have surgery, so I was really scared and tears were filling up. My mother also came out of the examination room with a concerned face and everyone who was waiting outside looked at me as if I had been knocked up. They looked at me as if I was a whore...I can't forget that experience hehe What I experienced at a young age...hehe
	Fear of Family's Judgments on Promiscuity	C20	My mother also does that (accuses me of being promiscuous), but I go anyways hehe. My body is important and getting condemned by mom is only temporary! I went to the OB-GYN to get prescriptions for birth control pills to rearrange my period. (After my mother found out about it,) she said something about how a virgin could go to such places blah blah, yes...
		C48	When I told my mom that I had vaginitis, my mom also said that it would be cured on its own and that I should leave it alone…So I was stressed out about the smell until I turned 20. When I turned 20, I told my mom that I'm going to the OB-GYN with my own money, so do not say anything. When I went there, all the young and middle-aged women looked at me with the expression that said "Why is she here?"...Is the OB-GYN a place to only go for abortion? Why does the person who pays to get treatment have to endure the unwelcoming gaze?

** T.T should be understood as the crying emoji.*

† hehe or its original form (ᵒ̴̶̷̤ ̫ ᵒ̴̶̷̤) should be understood as another form of period rather than a smiling or laughing emoji.

§ ~~ is commonly used to lighten up the tone of the text.

¶ – – can be translated into a frowning emoji.

Me-too responders shared similar accounts of negative experiences related to the OB-GYN or asked the author if she had also been through the same experience. This type of support shows clear empathy to the shared emotion, especially fear, without any judgments or second-guessing the author's experience. Me-too support is demonstrated in posts expressing fear of other women's (C72) or family members' (C20, C48) judgment on promiscuity. Also, it is shown in posts that do not explicitly explain the cause of their fear of going to the OB-GYN (C91).

Microinvalidators could be superficially supporting, yet they fundamentally invalidated the feelings and experiences shared in the original post. They started by assuring the authors that no one is judging them but then assert that it is all in their heads (C12, C28). They offered the unmarried patients advice that they just need to be more confident and adopt a carefree attitude. These responders seem genuinely compassionate at a superficial level, but they invalidated the unmarried patients' experience by insinuating that it could be resolved by changing perspectives.

Other microinvalidators were accusatory when they responded to the unmarried patients' problems by condemning the patients' oversensitivity (e.g., "Why are you overreacting?"). When unmarried patients expressed fear of judgment on not having had intercourse until their early 30s, which is the age when they are expected to be married, microinvalidators dismiss their concerns as also being overly sensitive (C08, C11). In addition, when patients shared their incomprehension of male romantic partners' discomfort in them receiving care from a male gynecologist, the responders stated it was just an act of care, like how a father would feel when he protects his daughter (C61). They accused the women of wrongdoing (C38). In even more accusatory responses, when unmarried patients expressed feeling uncomfortable/unpleasant after microaggressions by their gynecologists, the responders justified the gynecologists' actions even when their statements were obviously inappropriate (e.g., comparing the gynecologist's "pure"

daughter to the student who had intercourse as a teenager or harshly reprimanding the patient for not caring about getting pregnant since the patient had intercourse as a minor) (C74).

I also investigated the frequency of each type of online response to posts where women shared uncomfortable/unpleasant gynecological care experiences (see Figure 1). For experiences where the mothers contributed to the uncomfortableness/unpleasantness, the only type of response was the me-too support. However, in most other cases, especially experiences where male romantic partners contributed to the uncomfortableness/unpleasantness, the online responses were microinvalidations–the exact opposite of me-too support. This stark difference in responses could indicate that women's experiences were invalidated when they experienced microaggressions by their male romantic partners; whereas the women's experiences were validated when they were prompted by other women, such as their mothers.

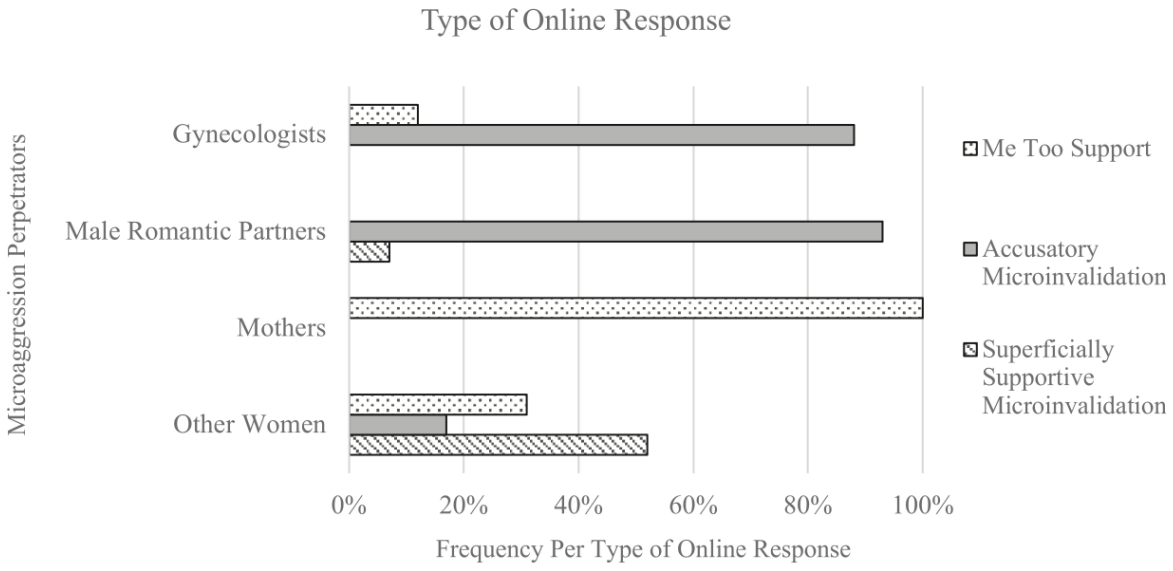

Figure 1. Types of Online Responses to Microaggressions. X axis shows the frequency (represented in %) and type of online response to the microaggressions caused by each kind of microaggression perpetrator. The types of online responses are shown in the legend: me too support, accusatory microinvalidation, and superficially supportive microinvalidation. Y axis shows the four kinds of microaggression perpetrators: gynecologists, male romantic partners, mothers, and other women.

2.3.4. Unsupportive Expected Supporters of Unmarried Women

Both mothers and male romantic partners are generally expected to be supportive; yet, in the data, they were distinctly unsupportive. Mothers told their daughters that unmarried women do not need to go to the OB-GYN even when timely care is required (A46, C48) and certainly not for non-urgent medical treatments (C20) or regular check-ups (A29). Moreover, mothers invalidated their unmarried daughters' experiences by judging their verity because of their marital status; unmarried women—assumed to be virgins—would not need to seek gynecological care unless they are impure (A46, C20). Although women have physical access to gynecological care, they were unable to receive timely care because their caregivers told them that changes in their marital status (A29) or time (C48) would resolve their medical problems.

Male romantic partners also were unsupportive. On an individual level, male romantic partners were expected to be emotionally supportive agents whom their unmarried female partners could share their intimate concerns with (A51). Socially, however, they were expected to take charge and decide what is right for the women to do, and women should not be questioning the decisions (C61). Thus, when women received accusations of being promiscuous after sharing their concerns and expressing discontent with the accusations, women were told that they should perceive the men's discomfort as an expression of affection and care (C38).

2.3.5. Responses to the Microinvalidations in Other Commenters' Responses

Some responders also explicitly called out the microinvalidations (see examples in Table 3). These responders acted as whistleblowers and informed the unmarried patients and other users that such responses were unacceptable, while reassuring authors that they were not overly sensitive (R16, R22). Moreover, these responders advised the authors against seeking others' validations for their own unpleasant/uncomfortable feelings since the existence of their feelings cannot be

denied –they were the ones who felt them (R22). However, the responses to the whistleblowers' comments incited the microinvalidators. The microinvalidators then accused the whistleblowers of being triggered whenever the word sensitive or unpleasant appeared (R31, R18).

Table 3. Themes from Replies to Comments on Unpleasant/Uncomfortable OB-GYN Experience Shares. Phrases highlighted in grey were ones that the authors found difficult to convey the exact meaning with Korean-to-English translations.

Theme	*Author*	*Quote*
Acknowledgement of Commentors' Microinvalidation	R16	After reading others' comments, I think there are a lot of comments saying that the author (of the post) feels that way because she thinks that way, but that's not true. I also had irregular periods when I was in high school, and I went to a famous OB-GYN in Apgujeong with my friend after school wearing a uniform. I really did not think that there was anything wrong with my actions and because the OB-GYN was famous, I did not think that going to a place like that (OB-GYN) was bad at all. However, the moment I stepped into to the OB-GYN, everyone, I mean everyone, turned around and placed their attention on me. Is it still an imagination in my head even in this situation? What's even worse was that the nurses were talking amongst themselves about me.
	R22	Are all of the commentors below out of their minds? They gaslighted you into thinking that you are too sensitive. You're not sensitive at all and if you felt unpleasant, then it IS an unpleasant experience. Don't try to get other's validations (for your own unpleasant feeling). Next time, don't go to that hospital...you must have been very upset...and there's also a lot of male obstetricians who sexually harass their patients (search for articles, there's a lot), so if you can, I recommend that you go to a hospital with a female doctor.
Response to Microinvalidation Acknowledgement (Acknowledger is Also Too Sensitive)	R18	I read your comment and now I feel "unpleasant". This means that you've done something wrong right? (The author) just asked if this was a general situation or not, but you're so fixated on the words "sensitive" and "unpleasant" to the level of nonsensical empathy.
	R31	Why did the commentor say that this is gaslighting when the post was about asking if the author was sensitive and if her experience was really an unpleasant one, and people just answered that it was a normal experience hehe† You don't use that word in this situation.

** T.T should be understood as the crying emoji.*

† hehe or its original form (ᵒ̴̶̷̤́ ⌓ ᵒ̴̶̷̤̀) should be understood as another form of period rather than a smiling or laughing emoji.

§ ~~ is commonly used to lighten up the tone of the text.

¶ – – can be translated into a frowning emoji.

2.4. Discussion

This study highlighted how social media can be mined to uncover the socio-cultural context needed for culturally competent care, particularly gynecological care for unmarried women. I identified which online and offline agents, external to the clinical setting, contribute to pre- and post-OBGYN visit microaggressions and how they affected unmarried women's healthcare-seeking practices. In the discussion, I start by describing the social media-derived model of how people connected to the unmarried women contribute to pre, post, and mid-visit microaggressions (see Figure 2). Next, I offer two options for counteracting the biases that lead to these microaggressions. First, I discuss how public health campaigns could use insights from the model to target offline and online connections. I also suggest approaches for social media systems and moderators to detect and discourage microinvalidations.

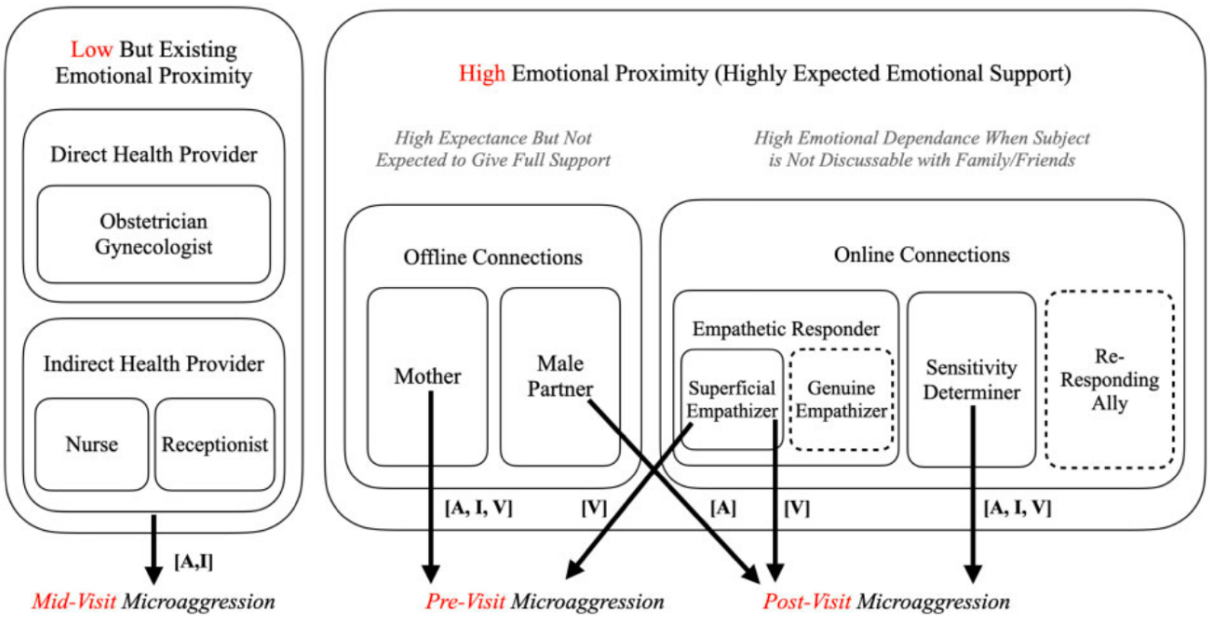

Figure 2. Emotional Proximity Connections and Microaggression Framework. A - microsassaults, I - microinsults, and V - microinvalidation. Starting point of the arrows marks the microaggression perpetrators and the ending point marks the occurrence period of the microaggressions (pre-, mid-, and post-visit). The types of microaggressions (A, I, V) committed by each perpetrator is marked on the right side of the arrows

(e.g., Mothers commit pre-visit microassaults, microinsults, and microinvalidations which is shown with the "[A, I, V]" placed next to the arrow starting from the lined frame with the text "Mother" and its tip placed above "Pre-Visit Microaggression"). Connections in dotted frames (i.e., genuine empathizer and re-responding ally) refer to allies who support the microaggression targets and whistle-blow the microaggressions of other connections in the lined frames.

2.4.1. Modeling Women's Connections and Their Contributions to Microaggressions

Because microaggressions can poorly impact health outcomes, increase health disparities [21, 22], and lower emotional well-being [29, 30], we need models to help guide interventions aimed at counteracting such microaggressions [23, 24, 31]. Current interventions for microaggressions have been mostly directed towards people with weaker ties with the target of microaggression (i.e., strangers, colleagues, and classmates) [23, 24]. Few studies have suggested interventions for women's health [31], and few target people who have high emotional proximity–who are expected to provide high levels of emotional support. Yet, these expected supporters are the people who commit most of the pre- and post-visit microaggressions (see Figure 2), which are more challenging to control than mid-visit microaggressions.

For mid-visit microaggressions, patients have low emotional proximity to the health providers. Other researchers have proposed interventions that target microaggressions in the clinic [20, 24] through workplace and student training, such as continuing medical education (CME) that teach knowledge, attitude, and communication skills for culturally competent care [16, 34,35]. However, such programs resolve only the mid-visit problems; they do not affect agents outside the clinical setting. Yet, women's experiences at the OB-GYN are affected more by microaggressions by people in high emotional proximity to the patient–people such as mothers, male partners, and online support group participants who are expected to provide high levels of emotional support. In

the model, I only present mothers and male romantic partners for the offline agents in high emotional proximity to the patient because other agents were not mentioned in the posts. Both online and offline high emotional supporters perpetrate microaggressions that unmarried women experience before and after OB-GYN visits. Microaggressions by offline supporters are particularly challenging to counteract because they are perceived as the caretakers in nurturing and affectionate relationships. In a culture with rooted Confucian ideals, disagreeing with such caretakers is condemned [36].

The role that mothers, as key offline emotional supporters, play in future decision-making is crucial, especially while young women remain under their care. In Korea, mothers' roles as caregivers extend to adulthood, especially since many women continue living with their families until they move into a new house after marriage [32, 33]. Thus, as the time for which unmarried women rely on their mothers as a primary emotional supporter is prolonged, they learn from their mothers what causes disappointment. Mothers show all three types of microaggressions even though they are expected to provide the highest emotional support for unmarried women. Getting invalidated by their mothers makes unmarried women question the verity of their experiences or feelings. The mothers' accusation of promiscuity leads to the added fear of disappointment when they continue disapproved acts, such as going to the OB-GYN. Moreover, such accusations make it more difficult for women even to bring up the subject of gynecologic care because they fear condemnation and loss of important emotional support.

As other high emotional proximity supporters, male romantic partners are expected to support their women partners' decisions but simultaneously take charge and make decisions for those women, even today. Thus, their irrationality is assumed to be an excessive expression of care which should be understood. If a male gynecologist treats a man's female partners, they are given

the right to reprimand their partners and accuse them of promiscuity because that is accepted as an act of care. When women express discomfort with their partners' irrationality, they are criticized for not comprehending their partners' paternal and protective love expression. The mere discussion of microaggression experiences is helpful [23], providing feelings of universality. However, since offline supporters are responsible for the microaggression experiences, such feelings of universality are not offered.

Thus, we need to adopt a systems approach [37, 38] by understanding how the agents outside the clinical setting holistically shape unmarried women's OB-GYN visit hesitancy. Even when they are in a new socio-cultural context, unmarried Korean women will still have unresolved uncomfortableness prohibiting them from receiving the gynecologic care they require. Thus, systemic approaches such as culturally competent public health campaigns are needed to balance rather than just improve access to care [39] for unmarried Korean women in other countries.

2.4.2. Targeting Public Health Campaigns

Public health campaigns provide one important avenue for broadly reaching offline and online emotional supporters and for encouraging people to make and support healthy choices [40-42]. For example, in 2013, the United States' Center for Disease Control (CDC) developed the Show Your Love campaign to improve women's and their unborn babies' health by promoting preconception health. The campaign's two primary targets were women preparing for pregnancy in the age range of 18 to 44 and those who were not currently preparing for pregnancy [43]. The partner organizations of this campaign were asked to use the banners made to promote the campaign. For women who were preparing for pregnancy, the wording of the banner was "your baby will thank you for it," [44] and for those who were not, it was "your body will thank you for it" [45] (see Figure 3). Although such a specified approach to encouraging OB-GYN visits is

appreciated, such a message was not culturally competent for Korean women in the USA; it did not incorporate women's fear of condemnation in accessing gynecological care or the belief that their caretakers are the gatekeepers in determining their access to care.

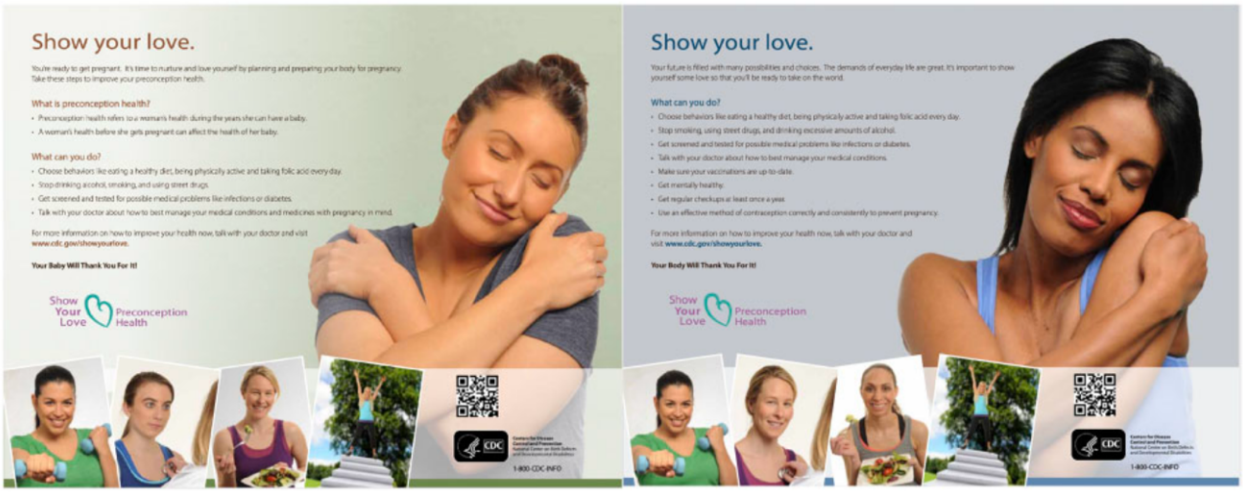

Figure 3. Show Your Love Campaign Banners. The left image shows the banner for women preparing for pregnancy, and the right image shows the banner for women who are not preparing for pregnancy.[1]

In Korea, recent attempts to incorporate cultural competence were demonstrated in the 7th Purple Ribbon campaign–the Beautiful Womb campaign to promote cervical cancer prevention [46]. The campaign's banner had a picture of a mother hugging her daughter, emphasizing free vaccinations for teenagers and regular cervical examinations for women in their 20s (see Figure 4). The imagery change—from the regularly used pregnant woman caring for her baby to the mother approving of the daughter's cervical examination—should be highly valued. However, a more comprehensive approach with culture-centric narratives as well as multiple images would likely be more effective because narratives that resonate with cultural identifications engage and transport the listeners through a sense of identification with their cultures [47]. Such an approach has the potential to not only better engage women who have been deterred gynecological care by

[1] Retrieved from May 31, 2019 snapshot on Web Archive: https://web.archive.org/web/20170613170638/https://www.cdc.gov/preconception/showyourlove/posters.html

their mothers, but also to help the mothers regard OB-GYN visits as more accessible and acceptable than the status quo.

Figure 4. Beautiful Womb Campaign Banner. This is the banner for the 7th Purple Ribbon Campaign: The Beautiful Womb Campaign. The image shows a smiling mother hugging her smiling daughter who appears to be a minor. The slogan for the campaign is written under the title and is as follows: "My beautiful womb, keep it that way with cervical cancer vaccination". Descriptions for the encouraged health services for minors and women in their 20s are also included in the banner. For minors, cervical cancer vaccination is recommended, and for women in their 20s, both cervical cancer vaccination and free regular checkups are recommended to protect cervical health.

2.4.3. Detecting and Discouraging Social Media Microinvalidations

Detecting and discouraging microinvalidations on social media could provide an additional intervention to improve women's healthcare. Online connections provide an important source of emotional support, particularly when the subject cannot easily be discussed with family or

friends[17-19]. The types of support most appreciated by online support seekers are emotional or confirmatory advice messages [27, 28]. Consistent with previous literature [27, 28], the first type of support unmarried women seek online is emotional advice; yet, sometimes that advice includes pre- and post-visit microinvalidations with a sincere, concerned tone. Online experience sharers expect more emotional support from sympathetic supporters and value their opinion [28]. The second type of support that unmarried women sought online in this study was through sensitivity determiners—people who could help them assess whether they were really being overly sensitive. However, these sensitivity determiners committed all three microaggression types in response to questions about incidents before or after the unmarried women's OB-GYN visits (see Figure 2). Thus, although the unmarried women superficially received the types of support they sought, they were also exposed to microaggressions.

Online moderators could play a pivotal role in resolving how women's health is being affected by such microaggressions. However, current online moderators (i) are likely to overlook key current forms of microaggressions and (ii) do not incorporate the learning of what is prudent in their post removals without explanations. Moderators regulate uncivil and unproductive discussions [48] and help address illegal content, terrorism, extremist content, revenge porn, online harassment, hate speech, and disinformation [49]. Developing effective models for automatic content regulation has been the focus of research (e.g., classifiers using a large corpus of previous moderation decisions and macro-norm violations [50] or detecting and mitigating public shaming tweets [51]). The macro-norm violations [50, 52] and shaming tweet categories [50] effectively correspond to microassaults and microinsults, but such approaches would likely miss superficially supportive microinvalidations because they often do not use abusive language that automatic moderation detects, which is often limited to ethnic slurs and LGBTQ+ and disability-related terms

with negative connotations [53]. Although further research has incorporated practical and low-cost text classification methods to support online health communities [54], they still lack the ability to detect the types of microaggression I saw, particularly the microinvalidations. To improve the comprehensive detection of microaggressions, the training data for the moderator model should include the degree of concern [55] of the comments. Also, the sentiment average used to determine negativity in the comments should be recalculated with microinvalidating comments to better detect them. Moreover, the phrase "Am I too sensitive?" often yields microinvalidations in response and can be used to flag potential superficially supportive but invalidating statements. With this revised informatics approach, pre- and post-visit microaggressions in the online space could be detected and flagged for moderator intervention.

However, the revised informatics approach would not be effective if it does not incorporate an educational explanatory approach. Jhaver et al. investigated how users feel when their content is removed from online communities [56]. Their findings showed that over one-third of the study participants complained about a lack of clarity for why the posts were removed and one-half of the participants thought that the moderation was unjust or frustrating. The participants thought that their content creation was not appreciated, and they felt out of the loop when they did not receive an explanation for the post removal. As both Jhaver et al. [56] and Myers West [57] mention in their studies, moderation systems have the opportunity to serve an educational rather than a punitive role by providing moderated users with an explanation for why their posts were removed. Following their shared view, pre- and post- visit microaggressions in the online space should be detected and flagged with an educational explanation that makes the consequences of the created content understood by the microaggression perpetrators and acknowledges the harm to the target. Moreover, the original poster should receive support and additional resources when they receive

replies with microaggressions. This approach could help perpetrators evaluate their content's ramifications and reconsider causing future harm. In addition, such an approach would validate the target's exposure to microaggressions, acknowledge potential damage to their health, and provide them with alternative forms of support.

2.5. Limitations and Future Work

The findings revealed the underemphasized yet critical factors external to the clinical setting that could help balance gynecological care for unmarried women. However, I recognize limitations to this study. Although both authors discussed the translated quotes, only one person reviewed the original Korean text. The social media source that I used did not reflect those of women-only discussion forums. Future studies should investigate the experiences and support shared to probe how women further support or invalidate other unmarried women's experiences. Also, as this study examined a specific population of unmarried women in Korea, it would be difficult to generalize this study's findings to the general population of unmarried women from similar societal value-sharing contexts. Nonetheless, this study showed how we can understand the socio-cultural context from social media to implement cultural competence outside the clinical setting more effectively to balance care for underserved populations.

2.6. Conclusion

In this study, I analyzed social media posts to investigate the socio-cultural context that feeds into the suppression of recommended gynecologic care for women. The analysis revealed that online and offline agents–whom unmarried women highly depend on for emotional support–contribute to pre- and post-visit microaggressions for Korean women. I also uncovered how social media was reinforcing these views. Informatics methods helped us dive deep and wide into the underemphasized yet consequential suppression of women's healthcare. In addition, informatics

tools could help us identify and counteract microaggressions in the online space and signal new approaches to encourage recommended healthcare for women in other cultural contexts.

2.7. Chapter Summary and Contributions

Summary

This study investigates how microaggressions visible in social media reflect and reinforce unmarried Korean women's hesitance to seek sexual and reproductive health (SRH) care. Through content analysis of online forums frequently used by unmarried Korean women, I identified microaggressions occurring both online and offline, applying a microaggression framework to examine their types, sources, and contexts. The findings revealed that even superficially supportive online messages can contribute to the suppression of care-seeking behaviors, while in offline interactions, close emotional ties (e.g., mothers, male partners) often play a paradoxical role as microaggression perpetrators.

Contributions

- I uncovered microaggressions as a primary barrier to healthcare access for unmarried Korean women—a previously underexplored contributor to SRH disparities.
- I identified where and how these microaggressions occur and who is responsible, revealing emotional proximity as a key factor in their impact.
- I developed the *emotional proximity connections and microaggression framework*, illustrating how perceived allies can serve as covert agents of stigma.
- These findings were published in: Ryu, H. and Pratt, W. 2022. "Microaggression clues from social media: revealing and counteracting the suppression of women's health care." *JAMIA Special Focus Issue on Informatics for Sex- and Gender-Related Health 2022*. https://doi.org/10.1093/jamia/ocab208

Chapter 3: Co-Designing Online Interventions to Counteract Microaggressions

This chapter is based on the following open-access publication: Ryu, H., & Pratt, W. (2024). *Women's Educating and Coping Strategies for Cultivating Supportive Web-Based Spaces for Discussing Sexual and Reproductive Health: Co-Design Study. Journal of Medical Internet Research*, 2024; 26(1):e62716. http://dx.doi.org/10.2196/62716.

3.1. Study Purpose

Many people turn to online communities for support on stigmatized health topics [110, 112]. However, these spaces often contain microaggressions—comments that demean, insult, or invalidate them. Such microaggressions not only harm physical and psychological health [13, 20, 23, 118, 119], but they can also discourage individuals from seeking necessary healthcare [120, 121]. This issue is particularly pronounced for women seeking SRH care, as it remains a taboo topic in many cultures [15, 14, 122]. In Study 1, I found that for unmarried Korean women, microaggressions often come from both intentional and unintentional perpetrators, including other women within their support community, both online and offline [9]. To address these challenges while respecting users' agency and cultural context [88-90], I co-designed solutions with unmarried Korean women who have used online communities to seek support on SRH issues.

The focus of this study was to co-design interventions that counteract online microaggressions with the people facing stigma and foster a resilient, supportive space for

stigmatized SRH. The goal of Study 2 was to explore how to transform these last-resort safe spaces into truly supportive environments by reducing the harmful impact of microaggressions on the health and well-being of both targets and allies, while emphasizing a restorative and educational approach for perpetrators rather than the predominant focus on punishing them for their wrongdoings.

3.2. Related Works

In this section, I connect with three bodies of work related to my research. First, I describe how current approaches to counteracting harmful content online heavily focus on detection and deletion, and how alternative approaches help address gaps and missed opportunities of the current online content moderation focus. Second, I explain how I can support vulnerable users by incorporating crucial, yet rarely used coping strategies that could decrease the negative health outcomes for microaggression targets. Third, I elucidate the importance of designing without compromising vulnerable users' agency and discuss empowerment-focused, human-centered strategies, which I have adapted into this study's design process.

3.2.1. Going Beyond Detection and Deletion of Problematic Content

In the realm of social media governance, platforms like Facebook and Twitter have undergone profound transformations in their strategies for combatting oppressive content, with a focus on countering the dissemination of misinformation [58-60]. Their approaches involve comprehensive evaluation of various parameters, including the velocity of content propagation, its severity, and its adherence to platform policies.

Facebook employs a dual-flagging approach, featuring informative banners that direct users to authoritative sources and fact-check flags that assess the accuracy of content [58]. Conversely, in the past, Twitter (now known as X) utilized labels or interstitials to redirect users

or provide cautionary alerts regarding potentially sensitive content [59]. Despite these efforts, scholarly examinations, as exemplified by Sharevski et al. [61], have underscored the limitations of existing warning tags. They advocate for the development of more distinct and attention-grabbing alternatives to mitigate user apathy or inadvertent reinforcement of misinformation beliefs [61].

Moreover, Ma et al. [62] identify a notable gap in prevailing moderation methodologies concerning content situated within a nebulous "gray area" that eludes clear policy violations. Moderation predominantly adopts a reactive stance, intervening post-flagging, thereby often leaving users feeling inadequately supported and perpetuating an adversarial platform-user dynamic [62]. Scholars like Myers West [57] advocate for increased support, particularly in nuanced cases like microaggressions, emphasizing the cultivation of a culture of responsible online citizenship.

Educational approaches play a crucial role in addressing microaggressions and other forms of problematic content within this "gray area" [57, 62, 63]. By providing users with comprehensive guidance on acceptable online behavior, platforms can empower them to navigate complex social dynamics responsibly. Such educational initiatives can include interactive tutorials, community guidelines, and informative resources aimed at raising awareness about the impact of microaggressions and promoting empathy and understanding among users [57, 63].

Despite significant advancements in automated moderation algorithms, the predominant focus remains entrenched in the detection and eradication of harmful content. This approach sidelines potential allies and frequently engenders user frustration and bewilderment [63]. Jhaver et al. [63]'s research elucidates the discontent among users whose content is removed, citing ambiguities and feelings of injustice. In response, scholars such as Kiritchenko et al. [64] proposed

alternatives beyond mere content deletion, including strategies such as quarantining potentially abusive posts, translating the style of abusive texts to non-abusive ones, and providing counterspeech that offer logical, fact-based, non-aggressive deconstructions of stereotypes and misinformation in abusive content. However, these methodologies are underutilized despite evidence suggesting that the wholesale removal of abusive content may not effectively address underlying issues [64-66]. Furthermore, counternarratives, an underused approach in counterspeech, aim to create positive stories that promote tolerance and challenge the assumptions behind hate speech by triggering positive emotions like empathy for victims, which can lead to attitude changes [67-69]. Counternarratives are effective at making perpetrators more empathetic and less likely to retaliate, yet they remain underutilized even within these alternative approaches [67-69].

Given these nuanced insights, this study aspired to transcend the prevailing detection and deletion-centric moderation paradigm. Instead, I engaged in collaborative design efforts aimed at devising alternative approaches to address microaggressions. This study's findings emphasize leveraging educational initiatives to foster a more inclusive and supportive online environment for unmarried women to seek support on or discuss stigmatized SRH experiences and concerns.

3.2.2. Supporting Vulnerable Users' Coping

The current narrow focus on detection and deletion often results in harm to the very communities that I am trying to support or protect [70, 71]. For instance, Thach et al. [70] demonstrate how the invisible process of online content moderation makes marginalized social media users face disproportionate content moderation and removal (e.g., computational model could flag a person of color's post about racial justice or racist experience as hate speech). Thach et al. [70] state that the content removal or banning of the poster from the online community would

bring further marginalization of the already marginalized users. Thus, in an attempt to better support and protect marginalized social media users, researchers from the University of Michigan School of Information developed Online Identity Health Center—a website that helps marginalized users (1) understand different social media platforms' policies and rules about content takedowns and (2) provide easy-to-understand resources on different social media guidelines and what to do if your content is taken down [72].

In support of alternative approaches that extend the online content moderation task beyond detection and permanent removal, studies on dealing with the negative consequences of microaggressions [23, 64-66] have also emphasized the importance of coping in reframing online content moderation to better support marginalized users. Coping with negative emotions and stress induced by microaggressions is crucial to reducing the negative effects on the targets' health and wellbeing [23]. Microaggressions are perpetrated and experienced subtly and often unconsciously; the target often questions the reality of the oppression [73, 74]. Thus, victims of microaggressions frequently blame themselves for being overly sensitive and dismiss (if not excuse) the behavior of the perpetrators. Targets of microaggressions also show a pattern of quietly shouldering the impact of such behavior, sometimes out of fear of retaliation from the perpetrator or others involved. They also worry about reinforcing negative stereotypes (e.g., women are emotionally needy and overly sensitive) if they choose to confront the perpetrator [75]. Targets of microaggressions often experience negative impacts on their well-being (e.g., feelings of guilt, embarrassment, shame, regret, and remorse) after unconfronted microaggressions. Furthermore, internalizing these feelings has long-lasting effects on the target's self-confidence and mental and physical health [76, 77].

In contrast, if targets or allies choose confrontation, they must take on additional risks for themselves. Targets frequently need to circumvent fears either of being further invalidated or of reinforcing negative stereotypes about their group if they were to confront microaggressions. Empirical evidence supports this notion; targets report that using confrontation opened them up to further microaggressions (e.g., being further invalidated, being called "oversensitive" and "paranoid") [78, 79]. Thus, coping is essential to dealing with microaggressions for targets and allies.

Coping can be carried out through two emotion regulation strategies: cognitive reappraisal and expressive suppression [80, 81]. Cognitive reappraisal refers to re-evaluating the meaning of a given situation to reduce its emotional impact [80, 81], whereas expressive suppression refers to the inhibiting of an emotional response [80, 82]. Although suppression may help a person avoid undesirable interpersonal consequences that can follow from expressing negative emotions, suppression has generally been found to be ineffective in reducing the negative emotions themselves [83-86]. Thus, Juang et al. [82] suggested combining the use of both emotion regulation strategies when people encounter microaggressions. With the combined use, Juang et al. [82] indicated that expressive suppression will help in avoiding further negative interpersonal interactions and cognitive reappraisal will help ease the emotional burden of denigration. This combined use is further corroborated by Hernandez and Vilodas [87]' study where the sole use of reactive and suppressive coping was discouraged. Only reflective coping (which relates to cognitive reappraisal) was associated with more positive mental health, whereas reactive and suppressive coping (which relates to expressive suppression) were associated with poorer mental health after experiencing microaggressions [87]. Thus, in this study, I aimed to design features that

help counteract microaggressions but do not merely detect and delete content but rather support people in reflective coping.

3.2.3. Designing Without Compromising Vulnerable Users' Agency

The population I am designing for are microaggression targets within an oppressive social structure, where support for SRH care is difficult to find [9]. Thus, understanding how to design within oppressive social structures without compromising the agency of vulnerable users was pivotal to my work. Sultana et al. [88] conducted a study on designing within a patriarchal society and investigated the economic, social, and cultural challenges faced by rural Bangladeshi women. They then presented two user-centered strategies for design to empower the vulnerable users. The first strategy was to try to empower women within the structures of their society, instead of trying to destroy those structures [88]. This strategy was also supported by Alsheikh et al. [89] who suggested designing for openness which supports Islamic feminist values that posit women as having agency, but also operating under a set of Islamic cultural assumptions. Alsheikh et al. [89] defined supporting agency as allowing women in Arabic culture to enact particular cultural roles in the context of their relationships rather than designing for Western feminist values (e.g., demanding equality) or the patriarchal values underlying the Arabic sociocultural context.

The second strategy was to shift focus from the problems that women face to the tactics they already use to cope and look for opportunities to support these tactics [88]. Rabaan et al. [90] resonated with this strategy and emphasized the importance of understanding the interwoven complexity of the sociocultural dimensions of the problem, considering historical developments, and accepting and respecting the different choices people make while understanding why they make them. With an in-depth understanding of the scarce structural support in protecting Saudi women from domestic abuse, they uncovered that resiliency was a valuable strategy for Saudi

women to sustain moving forward and even to take action to end the violence. To design for a customized interactive system that supports resiliency, Rabaan et al. [90] suggested designing a screening tool to measure where a woman is at in her options, resources, needs, concerns, and what she perceives as expected or abusive.

In this study, I incorporated the two strategies into my design considerations. First, I designed within existing structures using the online forums that unmarried Korean women often use to not only seek SRH care support but also reflect the oppressive social structure in Korea [9]. Second, I focused on the tactics that unmarried Korean women already use to cope and looked for opportunities to support those tactics.

3.3. Methods

In this section, I describe this study's co-design process, which includes co-design session 1—the creation of a base design template for improvisational enactment and co-imagination of new ideas—and co-design session 2. Lastly, I describe this study's co-design session analysis process.

3.3.1. Co-Design Process

Co-design, defined by Sanders and Stappers [91] and Kleinsmann and Valkenburg [92], involves collective creativity and shared knowledge among participants, leading to a comprehensive understanding of design content and process [91-93]. This process, also known as joint inquiry and imagination, encourages ethical engagement and starts with abduction, suggesting potential solutions [93, 94]. This study utilized a modified approach for remote co-design sessions, aiming to stimulate creativity and facilitate discussions on sensitive topics like SRH care [9, 95]. In the following sections, I describe this study's participants, details for each of

the co-design procedures, and the analysis approach. This co-design study received Institutional Review Board approval from the University of Washington.

3.3.1.1. Co-Design Session 1 Procedure

I conducted co-design session 1 as contextual research to provide the necessary background for the co-design session 2 (i.e., support the creation of the base design components for the co-design sessions). Co-design session 1 was conducted in a virtual setting, and each session lasted approximately 50-60 minutes. Participants received $25 for participating in co-design session 1. In co-design session 1, I asked questions about who should be responsible for counteracting microaggressions and how technology could support them. As the topic of gynecological care is taboo, I told participants that they could answer for themselves or someone they know. I first asked participants about their SRH care support-seeking experiences. Then, I explained to them what microaggressions are and showed them examples of microaggressions derived from Ryu and Pratt [9]'s study. Afterward, I asked them to think of microaggression counteraction or prevention design ideas based on their online SRH care support-seeking experiences (Appendix A).

After I received participant-generated design suggestions without specific design scenarios, I asked them about specific features (e.g., flagging comments, blocking content, content alerts) derived from currently implemented measures of major social media platforms such as Facebook [58, 60] and Twitter [59, 60]. Further, I asked them about specific situations that social media platforms have not been able to resolve, such as "gray area" cases of moderation [62]—instances where the removed content was not wildly in violation of explicit guidelines and required some interpretation [57] (e.g., when the perpetrator and/or target is unaware of the harm caused by microaggressions). During co-design session 1, I told participants to ignore current technological or financial limitations when ideating their designs.

3.3.1.2. Co-Design Session 2 Procedure

Based on co-design session 1, I created a base design template that I showed to the participants during co-design session 2. I made a post-comment sample using a hypothetical scenario with a post topic commonly seen in the online forums that unmarried Korean women seek SRH care support on. The hypothetical scenario focused on vaginitis and clinical visit concerns (Figure 5) because it is one of the most common concerns shared by women in online forums [9]. Based on my reviews of existing forum posts, I included comments that reflect those that showed genuine support or microaggressions from other users. I also included the ally's response to the microaggressions and showed the microaggression perpetrators attacking the ally to reflect the current state of online support and microaggressions [9, 75, 39]. For the format and features (e.g., post and comment like/dislike functions with the number of likes/dislikes displayed, comment filter options), I made the post-comment sample reflect those of online forums that unmarried Korean women typically seek support from. To provide an initial design that participants could react to and provide feedback on, I presented templates for each participant-suggested design found in co-design session 1 next to the post-comment sample.

Co-design session 2 was divided into three sections: (1) viewing only the post-comment sample (Figure 5) without the base design template, (2) designing after viewing the base design template, which were reenactments of the participant-suggested designs (Figure 6), and (3) designing for a situation where the participant themself would be the support-seeking post author. Each design session was held with each participant individually using Lucidchart software[2] as the co-design tool and lasted approximately 50-60 minutes. I used the same group of participants from the initial design needs interviews because I wanted to empower them by actualizing their own

[2] https://lucid.app/

designs and reflecting on not only their own but also others' designs to counteract microaggressions. Participants received $25 for participating in co-design session 2. I audio-recorded the interviews and used a professional transcription service to have the recordings transcribed verbatim.

Figure 5. Study 2 Design Session Sample Scenario. It mimics the format and features of forums that unmarried Korean women currently go to seek gynecological care support. The features that the design session sample scenario reflects from the original forum are the (1) post structure (title, author ID, date, post views, post content, number of post recommendations and oppositions), (2) comment structure (comment filtering options and replier name, reply date, number likes and dislikes and a comment flagging button for each comment or replies to head comment), and (3) reply/comment posting structure (reply writing box and reply posting button).

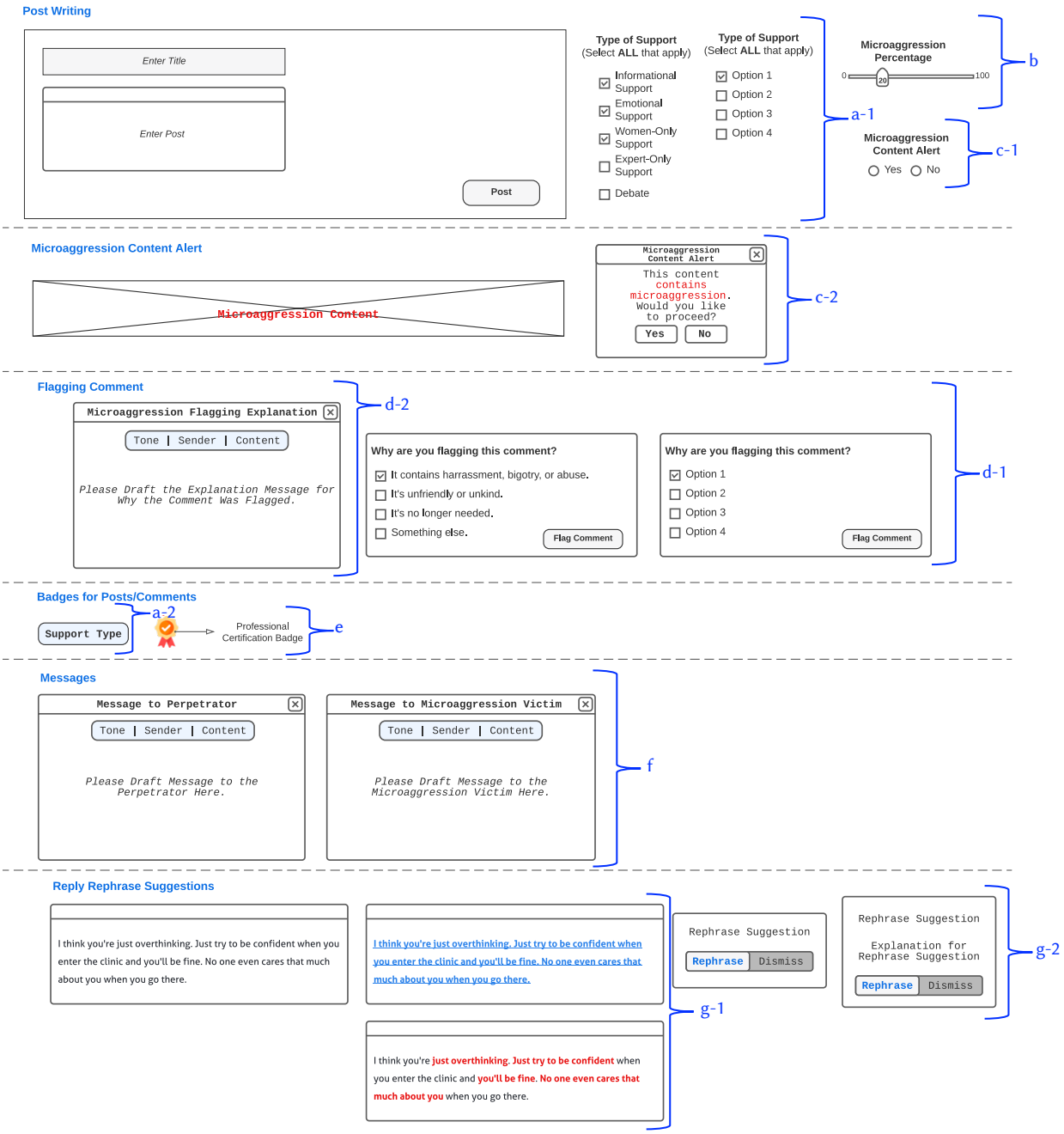

Figure 6. Study 2 Co-Design Session Base Design Template. It shows the set of designs derived from the design requirements found in the initial needs assessment. For during post writing support, participants had the option to design with labeling the type of support post authors needed (a-1) which would be shown with the support type badge on the post (a-2), microaggression percentage (b), and microaggression content alert (c-1) which would be shown on the comments as (c-2). For during comment writing support, participants

were able to design reply rephrase suggestions by highlighting the rephrase needed parts (g-1) and offering the rephrase suggestions with or without explanations (g-2). For support after a comment has been posted, participants could choose to implement the professional certification badge (e) and design the flagging options (d-1), flagging explanation messages (d-2), and messages to microaggression targets and perpetrators (f).

I wanted to learn about the participants' design ideas when they saw the post-comment sample, so I first asked the participants to review only the post-comment sample and tell us about their thoughts on how they would design the forum to counteract online microaggressions. Then, I asked them the same question after showing the base design template for counteracting online microaggressions and prototyped each design and their suggested usage. I encouraged them to talk aloud as they created their designs and prompted them to explain why they wanted the microaggression counteraction feature to be designed a certain way. I asked the participants to make edits on their own but assisted them when they were experiencing difficulties.

Before and during co-design session 2, I explained that they did not have to use the design in its suggested form or at all if they did not want to use the feature. Also, I emphasized that they could alter the design to better reflect their intended use of the design (e.g., adding/removing options, changing the phrases). At the end of the session, I reviewed the designed online microaggression tool together to check if there had been any misinterpretations and to give them the opportunity to edit their designs.

Lastly, to understand how the online microaggression counteraction design would change if they had designed it only for themselves, I asked the participants if they would change anything if they were the ones writing the posts and receiving the microaggressions (Appendix B).

3.3.2. Co-Design Session Analysis

Two researchers participated in the analysis. The first researcher was myself and I acknowledge my standpoint as an educated, unmarried Korean woman. I am a native Korean who received primary education in Korea and received additional intensive English education in middle and high school. Although I am not an avid participant in the comment sections of the online spaces where unmarried Korean women seek support, I have investigated numerous interactions of other users, advocated for safe online spaces free of microaggressions, and am intrigued by the use of language to mark and protect microaggression targets. I acknowledge that my positionality influenced this study to some extent, but also helped me make meaning of the participants' design ideas and influences from the Korean sociocultural context. The second researcher, Wanda Pratt, is from the United States and has done extensive research on online health communities as well as design research with people from marginalized communities.

I completed the analysis of both co-design sessions 1 and 2, with support from the second researcher using the ATLAS.ti analysis software. Both co-design sessions were analyzed using the same procedure. I cycled between field notes kept during the co-design sessions and the co-design session transcripts in an approach meant to build on themes in real-time. To begin, I coded 5 co-design session transcripts using an open coding approach [96], labeling what I saw in the data. Then, I discussed the codes with the second researcher, refined these into a revised codebook, and finished coding all the remaining transcripts. Following another round of discussion and clarification, we finalized the codebook. As open coding was completed, I conducted a round of deductive coding that focused on sentences about each microaggression counteraction feature. We then discussed interpretations and addressed any discrepancies in the application of the code set of

features to counteract microaggressions and adjusted their coded data as needed. We reached saturation after coding 6 co-design session 1 transcripts and 8 co-design 2 transcripts.

3.4. Results

First, I report on the participant information and participant-suggested designs and how they envisioned their designs to be enacted from co-design session 1. I further show how the designs were enacted as a design template for them to use during co-design session 2. Second, I discuss six goals that participants had for creating a safe and resilient online community that would allow them to seek support for the culturally taboo topic of SRH.

3.4.1. Participants

As the co-design participants were asked to share their experiences that are not frequently or overtly discussed and are considered a sensitive topic in the culture, I used snowball sampling to recruit a total of 14 participants (Table 4); the mean age was 24 years (SD=2.73). I recruited adult Korean women below the age of 30, which is the average age of first marriages for Korean women [97]. These younger women are most susceptible to microaggressions around gynecologic care because they are assumed to be unmarried. All participants sought online support for SRH care, although only 7 participants sought support for SRH care in a clinical setting (e.g., OB-GYN office, women's health clinic, public health office). Both women who have and have not sought SRH care in a clinic, use the online forums to seek SRH care support; thus, I interviewed both types of participants to gain a holistic understanding of the designs to reduce microaggressions targeting unmarried Korean women.

Table 4. Study 2 Participant Demographics Table.

ID	Age	Grew up in Korea	Currently living in Korea	Knowledge of microaggression prior to study	Experience seeking SRH care in a clinical setting
1	24	Yes	Yes	Yes	No
2	24	Yes	Yes	Yes	No
3	24	Yes	Yes	No	Yes
4	24	Yes	Yes	No	Yes
5	23	Yes	Yes	No	No
6	23	Yes	Yes	Yes	No
7	26	Yes	Yes	No	Yes
8	24	Yes	Yes	Yes	No
9	20	Yes	No	Yes	No
10	25	Yes	Yes	No	Yes
11	31	Yes	No	No	No
12	25	Yes	No	No	Yes
13	20	Yes	No	No	Yes
14	27	Yes	Yes	No	Yes

3.4.2. Initial Design Results

In co-design session 1, I identified the features participants wanted and by whom they intended the features to be used (Table 5).

Table 5. Participant-Suggested Features from Co-Design Session 1.

Feature	Actor Using Feature
(1) Labeling type of support (2) Choosing percentage of microaggression to view (3) Alerting about microaggression content with extra step of consent to view content	Woman seeking support (post authors)
(4) Microaggression comment rephrasing suggestions	Potential microaggression perpetrator or ally (commentors)
(5) Microaggression flagging explanations	Woman seeking support
(6) Messages to microaggression perpetrators and/or targets	Woman seeking support; Potential microaggression perpetrator or ally
(7) Professional certification badge	Woman seeking support

To ensure that post authors receive the type of support they want, participants suggested three design features or functionalities that could be used while people are writing their posts. The first feature would allow post authors to label their posts with the type of support sought.

Participants identified five types of support: (1) emotional support, (2) informational support, (3) women-only support, (4) expert-only support, and (5) debate. Second, participants suggested choosing the percentage of comments with microaggressions post authors were willing to view. Participants suggested the inclusion of viewing all microaggression comments (100%) and no microaggression comments (0%) as options. Finally, inspired by the idea of content blocking on Instagram, participants wanted a microaggression content alert to initially block comments with microaggressions but allow people to view the comment if they click the button to view the comment.

To reduce the microaggressions received and to educate people writing comments, participants wanted support for people while they are writing comments. Participants envisioned features that would suggest rephrasing a microaggression with explanations for the suggestions. They either wanted the whole comment or specific parts of the comment to be highlighted. For the highlighted parts, participants wanted features that would provide rephrasing suggestions that could be applied with a click of a button. Some participants also wanted features that would provide the comment writer with explanations for why the rephrasing suggestion would make their comment not a microaggression. Other participants did not want a feature with rephrasing suggestions because they wanted to protect comment writers' freedom of speech.

To identify microaggressions for the original poster, commenters, and readers, participants suggested three types of features for after a comment has been posted. First, participants wanted to be able to flag comments that contained microaggressions along with an explanation for why it was a microaggression. Participants explained that the current social media platforms allow them to report or flag comments but that their choices for indicating why a comment should be flagged are too general to help commenters understand why their comments contained microaggressions.

In particular, participants wanted the flagged reason to be shown in the public explanations for each flagged comment, which would help the community, as well as the commenter, learn about microaggressions. Second, participants wanted features that would send messages to the microaggression perpetrators or the targets of the microaggressions—who could be either the original poster or another commenter. To provide reassurance and validation of the targeted person's thoughts and feelings, participants wanted to send messages letting them know that the microaggressions were noticed. For the perpetrators of the microaggressions, participants thought that perpetrators might continue to write microaggressions if they were merely given warnings that their comments had been flagged. However, participants were uncertain about the exact content they would include in such messages or the flagging explanation, and the interviews didn't include time for them to think through and compose a sample. Thus, in the design session, I provided an opportunity for participants to compose their explanations or messages if they wished to.

As a justification for their final post-comment design suggestion, participants wanted health professionals to have more accountability for their words because the participants placed higher trust and reliance on these professionals. Participants suggested a feature that would flag comments from health professionals. Participants wanted health professionals to make their status as a health professional public, thus putting their status and reputation on the line and making them more responsible for what they say. Participants wanted to create a professional certification badge based on the badges stamped next to the professionals' replies in Naver Jisikin—a widely used question-and-answer forum in Korea.

With the participant-suggested designs and their descriptions of how they should be envisioned, I made templates for each design (Figure 6). These designs allowed participants to experience their designs' enactment in co-design session 2.

3.4.3. Design Goals

Through the analysis of the co-design sessions, I found that participants had six goals in counteracting online microaggressions to create a safe and resilient online community for seeking support on the stigmatized SRH. These goals arose in co-design session 1 but were further expanded upon in co-design session 2 after they had learned more about microaggressions and were able to tangibly interact with their envisioned designs. I first describe each of the goals and participants' design ideas for achieving these six goals. The figures of the design ideas shared in this study were created by the participants using Lucidchart software.

- Goal 1. Having shared knowledge of microaggressions amongst all users.
- Goal 2. Indicating positive support numerically.
- Goal 3. Responding with less emotion to microaggressions.
- Goal 4. Having forum-approved experts guide the discussions.
- Goal 5. Respecting perpetrators' freedom of speech while educating them to understand their words' negative impact.
- Goal 6. Knowing the "reality".

Furthermore, I describe how the six goals were affected by three cultural characteristics: the nebulous nature of microaggressions, discouraging the burdening of their social support network, and questioning the validity of their own thoughts due to the social perception that women are too emotional.

3.4.3.1. Goal 1: Having Shared Knowledge of Microaggressions Among All Users

Participants advocated for providing people with educational resources about microaggressions and supporting people harmed by microaggressions. They wanted unmarried Korean women post authors to be more informed about microaggressions by adding links to

microaggression educational resources and support groups under the microaggression content alert option (Figure 7).

First of all, we have to understand that there's a lack of shared knowledge here. People don't know what microaggressions are. How are we supposed to defend ourselves without knowing what to defend ourselves from? When we see the (microaggression) content alert, we need to have additional resources or groups we can access to get support or a better understanding of microaggressions. - P3

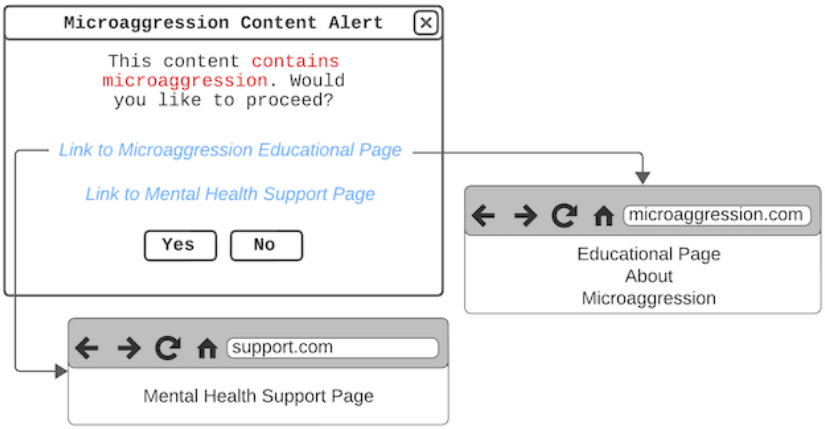

Figure 7. Microaggression Content Alert Design by P6. On the microaggression content alert, links to a mental health support page and an educational page about microaggression are added.

Beyond the post authors, participants also wanted other online forum users to learn about microaggressions and their impacts. Thus, participants suggested adding microaggression educational resources to explanations next to flagged comments (Figure 8).

It's not just people who post on the (online) forums that need to know about microaggressions. Other people using the (online) forums also do too. I think the best way to do that is to have information (about microaggressions) or (website) links to microaggression information right next to the comments, the ones that are flagged, so everyone can see it. - P11

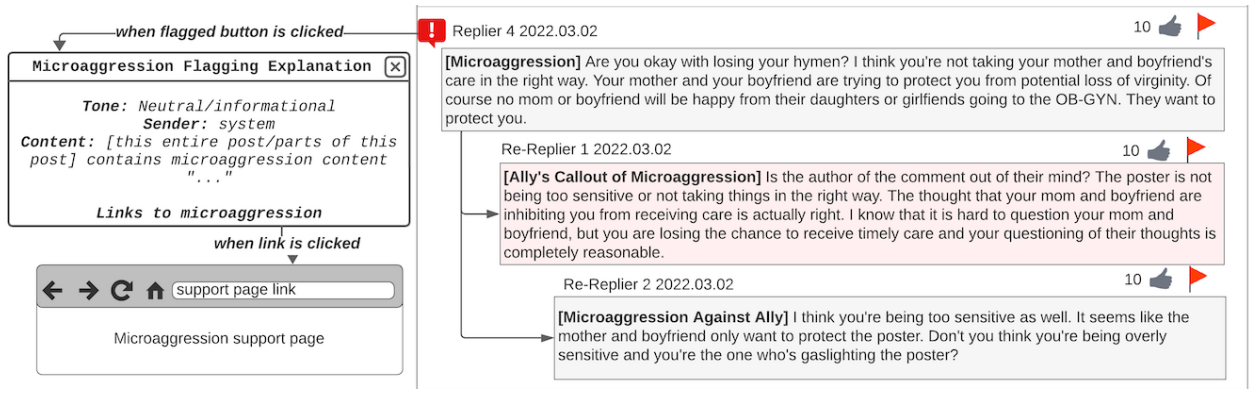

Figure 8. Educational Flagged Reason Explanation Design by P11. When the flagged button next to a flagged comment is clicked, the user can see a message that the comment contains microaggression content and links to microaggression support pages.

Furthermore, they wanted to ensure that perpetrators were educated on microaggressions by sending them a private message with additional microaggression educational resources attached to the explanation of why the comment was flagged (Figure 9).

*I don't want the so-called perpetrators to be confused and be like what the f***? when they get a message after writing something that they think in their head is supportive. I don't want them (perpetrators) to be mad. I want them to understand. Having the message (sent to microaggression perpetrators privately) would point them to the right direction of understanding their "unintentional" wrongdoing. – P4*

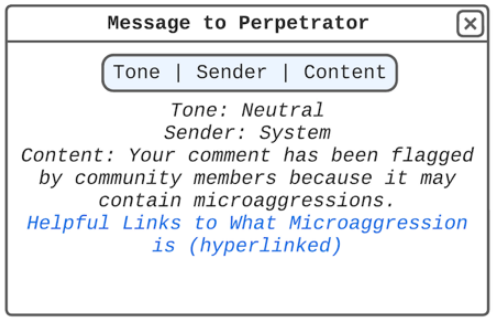

Figure 9. Message to Perpetrator Design by P8. The message to the microaggression perpetrator is designed to have a neutral tone and shows the message that the perpetrator's comment has been flagged

because it may contain microaggressions. The message also has links to help the perpetrator understand what microaggressions are.

3.4.3.2. Goal 2: Indicating Positive Support Numerically

Participants advocated for emphasizing positive support through numerical indicators and deleting negative support indicators such as thumbs-down or dislike options for posts and comments. They suggested transforming the like button into more supportive options (e.g., text forms: helpful supportive; icon form: heart) (Figure 10).

Why does the like button have to be a thumbs-up button? I think it could be words like "supportive". It shows more of why people clicked the button. People have to put in another layer of thought before pressing the button. They would have to think like "Oh was this actually supportive?" – P8

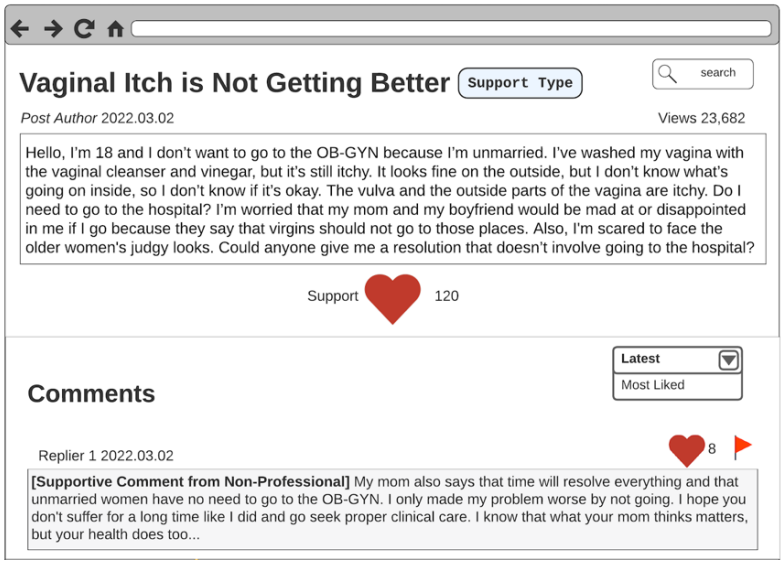

Figure 10. Support Button Design by P13. Instead of the like/dislike button, only the support button was made available with a heart icon to indicate support. The number of people who pressed the support button was displayed next to the support button.

All participants except one suggested the number of clicks on the transformed like button to be displayed next to each post or comment (Figure 10). With the number of likes, participants

stated that they could organically find the comments most people found most supportive, which they would also likely find helpful.

Numbers are produced naturally. That sounds weird saying it out loud but it's something you can't refute. The more numbers, the more support (for the comment). – P6

As participants perceived that the numerical indicators would be helpful in finding truly supportive comments, many of the participants did not choose to send the messages to post authors who have faced microaggressions in the comment sections. Participants thought that sending the messages to post authors would be "unnecessarily coddling (P6)" when they could be given the agency to learn how to sort out truly supportive comments on their own with the help of numerical indicators.

I want to give women the strength to defend and sort out helpful information on their own. I don't know if I would describe the internet as a jungle, but it sometimes is. You got to know what's poison and what's not. Like the color of mushrooms, the brighter they are, the more poisonous they are. The numbers (of support) next to a comment is the color (of mushrooms). – P1

3.4.3.3. Goal 3: Responding with Less Emotion to Microaggressions

After evaluating widely used flagging options in social media, participants perceived the currently used flagging options to be too emotional. Participants stated that emotive language such as unfriendly or unkind is too subjective and suggested changing it to less emotive words (e.g., It contains misinformation; It promotes bullying or harassment) (Figure 11).

Words like unfriendly, unkind are too whatever you make of it. Microaggressions are already subjective or at least in how I understood it (microaggressions are subjective). I think it amplifies that subjectiveness in the flagging explanation if we continue with the emotive language. We need to be less emotive using phrases like "It promotes bullying or harassment." – P5

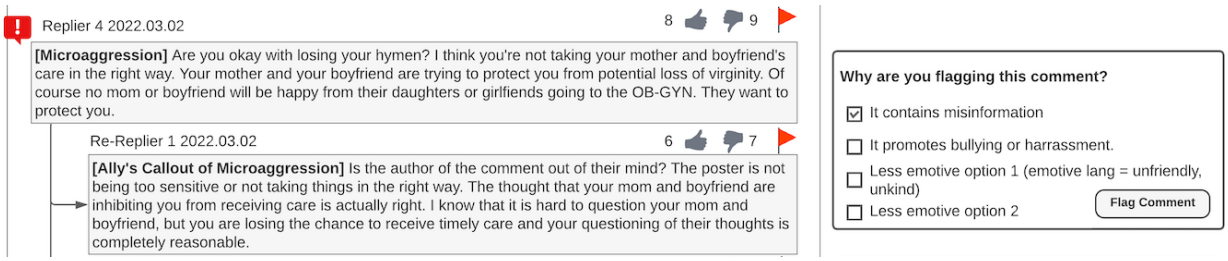

Figure 11. Less Emotive Flagging Option Design by P2. Less emotive flagging options (e.g., It contains misinformation, It promotes bullying or harassment) were used to replace the more emotive current flagging options (e.g., It's unfriendly, It's unkind).

Participants who wanted private messages to be sent to microaggression perpetrators thought that using a neutral tone stating why the comment was flagged would be sufficient. Participants did not think a more threatening or emotionally intense response would be needed. They stated that guiding microaggression perpetrators to the microaggression educational resources and providing opportunities for microaggression perpetrators to learn the impacts of their microaggression comments on their own would be more valuable than penalizing them.

Neutral (tone for the private messages sent to microaggression perpetrators) is good. We don't want to threaten them. What if they retaliate? I don't want them to keep causing harm. We want them on our side. In that case, opening their eyes to what they are not seeing is better. Make them learn more and realize on their own. – P14

3.4.3.4. Goal 4: Having Forum-Approved Experts Guide the Discussions

Participants wanted experts to help provide guidance in sorting out helpful comments since participants expected the forum-approved experts only to post helpful and truthful comments. To ensure that the forum-approved experts were posting only helpful and truthful comments, participants requested online forums to include the process of professional certification in the forum description page. Also, they requested more information about the forum-approved

professionals, such as their names, the clinics they work at, their comment histories, and a summary of the reviews about the professionals on their user page (Figure 12). With this information, participants wanted forum-approved experts to help guide users to disregard comments with microaggression as well as comments containing misinformation.

People can lie about being professionals and go around spreading misinformation, so for people who are seeking support, the badge would be helpful to differentiate between certified and non-certified professionals. – P2

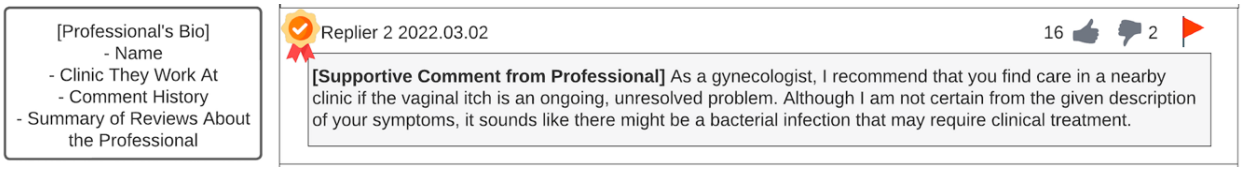

Figure 12. Professional Certification Badge and Information Page About Professional Design by P4. Professionals who are certified by the forum would have a badge next to their names when they post a comment. When other users click on the professional's ID, they would be able to see a hovering information page with information about the professional's name, the clinic they work at, comment history, and a summary of reviews about the professional.

Participants also requested certifications and badges for active forum users (Figure 13). Participants wanted the active forum users to be differentiated from people who were inexperienced about the topic or new to the forum. They wanted the active forum users to act as the "older sister (P9)" role by guiding the discussion in the right way for topics they were more knowledgeable about. With both types of certified experts, participants thought that microaggression comments that are disrespectful and contain misinformation could be weeded out and counteracted.

Kind, emphasis on the kind, experienced, or more knowledgeable users should be differentiated from people who are inexperienced in the topic space or forum itself. They know

how to deal with people who are acting disrespectfully and fend them off, you know like an older sister protecting her younger sister at a playground. – P9

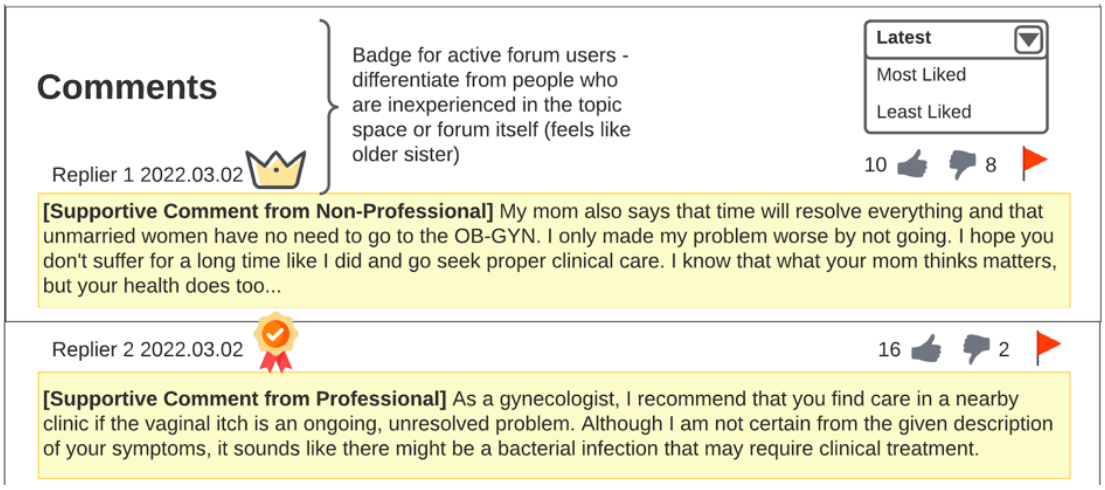

Figure 13. Active/Experienced User Badge Design by P9. Active or more experienced users who could act as the older sister guide for less experienced users were identified by the forum with a crown badge.

3.4.3.5. Goal 5: Respecting Perpetrators' Freedom of Speech While Educating Them to Understand Their Words' Negative Impact

Most participants did not think that microaggression perpetrators would be willing to change their microaggression comments when given a choice. Thus, they chose not to implement the microaggression comment rephrase suggestions.

It's rarely incidental when people are writing microaggressions. Deep down in their hearts, they probably do really know that they are causing harm or at least that what they're posting could be harmful. These people know what they are doing, so rephrasing suggestions or explanations for them is only helpful if they want to know. – P2

Yet, participants also wanted to respect the perpetrators' and potential allies' freedom of speech rather than add a burden on people who were merely offering help or support. They wanted microaggression perpetrators who had the potential to become allies to be less burdened by this "big brother monitoring (P9)".

I like the idea of a little fixing (of microaggressions) but having it still be optional. Something just doesn't sit well with me if I am forcing the person writing the comment to change it before they even post it. I hope that they are smart enough to make the right decision and I want to believe that they could change the parts they want and make it less harmful on their own. – P7

Although the microaggression comment rephrasing feature was considered an unnecessary burden by most participants, the few who wanted to provide potential microaggression perpetrators or allies the option to rephrase their comments saw potential in it. The few participants who wanted to implement the microaggression comment rephrasing feature suggested providing both the rephrasing suggestions and explanations of why the suggestions would make the comment genuinely supportive (Figure 14). These participants firmly believed that potential allies "have a good heart (P12)" and would see the value of choosing to rephrase with the rephrasing suggestion when they see the explanation attached to the suggestion.

Commenters may not have had any intention to cause microaggressions, so to further decrease microaggressions that were not intentional, having explanations (for why their comments are microaggressive and how the suggested changes make them less microaggressive) would be helpful. They don't know the why, and people need to know the why, if there was no ill-heartedness behind their actions, to make changes to them. – P4

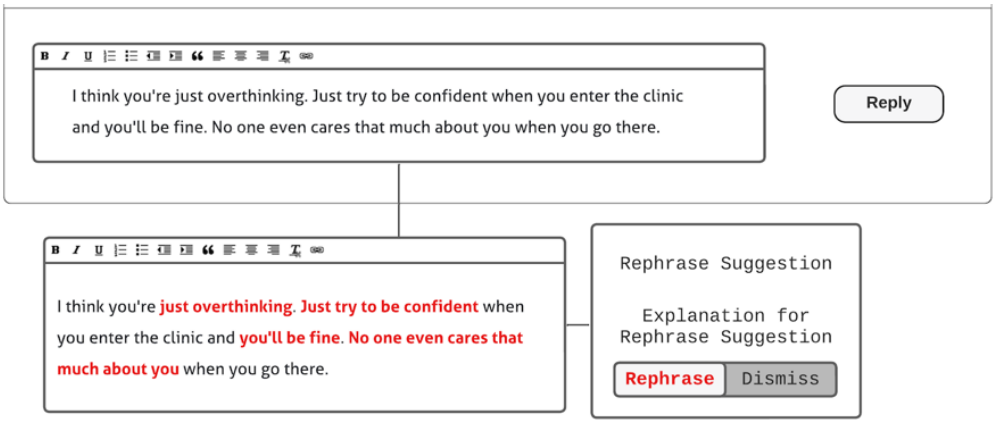

Figure 14. Microaggression Comment Rephrase Suggestion and Explanation Design by P10. While writing the comment, the user is notified which parts of the comment contain microaggression. Then, the user receives a rephrase suggestion and an explanation for why the rephrase suggestion would make the current comment genuinely supportive. The user could choose to rephrase the comment by clicking on the "Rephrase" button or choose to not rephrase by clicking on the "Dismiss" button.

3.4.3.6. Goal 6: Knowing the "Reality"

Disclaimer: This section is not about findings on microaggression counteraction, but rather the byproduct of participants' evaluation of the effects of counteracting or blocking all microaggressions. During co-design session 1 ideation and at the beginning of co-design session 2, participants were focused on finding ways to counteract and combat microaggressions, as shown in the earlier subsections. However, near the end of the co-design session 2, when they were asked if there was anything they would like to change if they were the sole users of the online community and the microaggression counteraction features, participants stated that they had the right to know the truth or reality they were facing, even if it meant that they had to directly interact with microaggressions. Participants were concerned that showing a rosy environment where "everything is unicorn and rainbows (P2)" is deceptive and thought that users should be aware of the reality. Thus, they suggested the implementation of the debate/seeking opinions option for the support type labels and controversiality as a comment sorting option when they were designing microaggression counteraction measures for solely themselves (Figure 15).

I can honestly handle whatever it is because I want to get the whole picture – both sides, not just one cuddly side. I want to be able to face reality. It would be even better to not only have the true opinions accessible, but also easier to access. Maybe by sorting the comments here (the comment sorting button) with a controversiality sorting. – P3

Figure 15. Support Type Label and Comment Sorting Option Design by P2. The "Debate" option was added as a type of support that post authors could indicate on their posts. In the comment sorting options, the "Controversial" option was added to see comments that had the most controversy amongst users.

The change in design for themselves showed that the participants found value in incorporating all opinions, even negative, discriminatory, and disheartening ones, to help them make a decision about their SRH care with the information gathered. However, they still wanted to have other microaggression counteraction measures put into effect, which showed that even with the features suggested to know the reality, microaggression counteraction was still deemed by the participants as pivotal and necessary.

I still want everything else (the other microaggression counteraction features P2 applied to the design for other unmarried Korean women users) there. I still want to be protected. I just

also want to know the controversial opinions to make sure that I have all the information I need to make the most right? I'm not sure if that's the right word, but you know what I mean. The most optimal decision. – P2

3.4.4. Cultural Characteristics Affecting Microaggression Counteraction Goals

I uncovered cultural characteristics that affected the six microaggression counteraction goals and participants' designs and ideas to support those goals. First, microaggressions are nebulous in nature, particularly in the Korean culture, where the language does not even have a term for microaggression. Second, participants rejected approaches that would burden their social support network. Third, participants questioned the validity of their own thoughts due to the social perception that women are too emotional and sensitive. The first two cultural characteristics jointly influenced goals 1 and 5; the third cultural characteristic influenced goals 2, 3, 4, and 6 (Figure 16).

During the discussions for goal 1 (having "shared" knowledge of microaggressions amongst all users), participants brought up that they did not want to burden their social support network, but due to the nebulous and subtle nature of microaggressions, they were inclined to have a shared knowledge of microaggressions amongst all users.

You might not know if you have just said already harmful words in your daily life, so I don't think it's a very terrible thing. Maybe it depends, but I don't think it should be taken that seriously. So it's okay to give some experience and time for people to get through the flags and learn through all the comments that they said that are harmful without removing them. Support the women who could be supporters! – P7

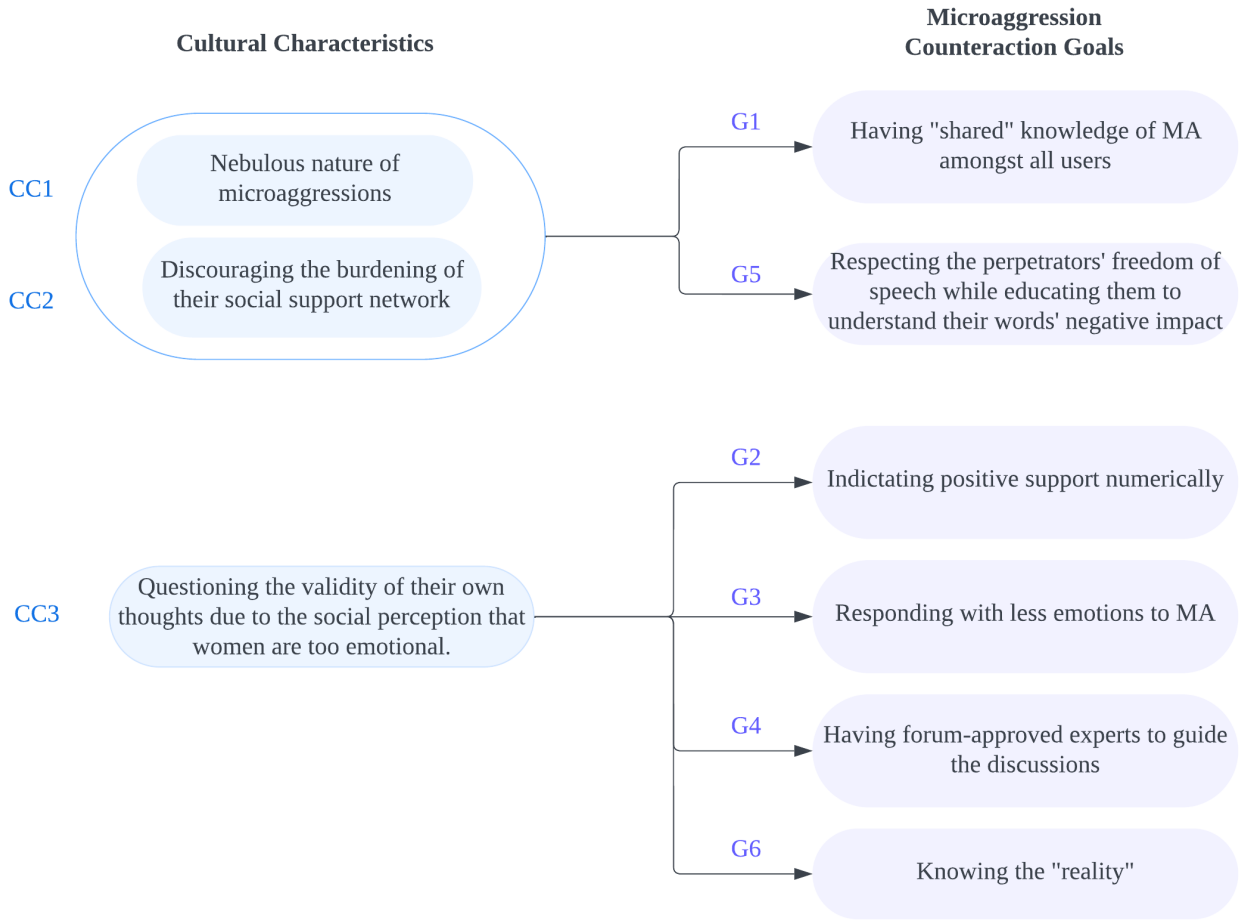

Figure 16. Cultural Characteristics (CC) Affecting Microaggression Counteraction Goals (G). CC1 is that the microaggressions are nebulous in nature, particularly in the Korean culture, where the language does not even have a term for microaggression. CC2 is that participants rejected approaches that would burden their social support network. CC3 is that participants questioned the validity of their own thoughts due to the social perception that women are too emotional and sensitive.CC1 and CC2 jointly influenced G1 and G5. CC3 influenced G2, G3, G4, and G6.

Participants were concerned that acquiring the knowledge of what microaggressions are and how they affect the targets would be cumbersome for male perpetrators who were not interested in putting in the time and effort to see from the target's perspective.

I would give all of them (male microaggression perpetrators) vaginas and uteruses and have them go get a pap smear done or understand the process of seeking SRH care so they can become more empathetic towards the situations and experiences that women go through every day. – P6

However, they thought that in the long term, it would help their social support network (fellow female users who have the intent to help them) be less burdened to provide the support they were trying to offer.

This microaggression thing is hard to pinpoint and I just don't want to make everyone who is trying to help feel like it's too hard to help. I think that having a communal sense of knowledge would be better. I know that it's going to burden women who are only trying to help at first, so I'm kind of iffy about the idea, but I think in the long term, it would help much more (to counteract microaggressions). – P7

While ideating the design ideas to support goal 5 (respecting the perpetrators' freedom of speech while educating them to understand their words' negative impact), participants further reflected on how making judgments about users with supportive intentions based on microaggressions which are so subtle in nature would encumber users who were merely trying to be supportive. They elucidated that in the Korean culture, support is sometimes provided in the form of hard-hearted advice rather than a warm and sympathetic embracement, which would often be associated with microaggressions. Although most participants did not know what microaggressions were prior to this study, they acknowledged that the current delivery of support is not ideal and could be ameliorated.

You know how we (Koreans) can be. Words of affirmation are definitely not our (culture's) love language. We (Koreans) give it to you straight and don't want to just tell you things that will

make you feel better at the moment. Although it might sound uncaring, giving you that push to snap out of it and solve your problems is our way of showing that we care. Though I agree that it doesn't always make things better. It sometimes just hurts, and it could be (delivered) better. – P6

During the discussions for goals 2, 3, 4, and 6, participants constantly stated that sociocultural context shaped them to question their own thoughts and depend on others' judgments to determine what is right for them. However, the same design-influencing cultural characteristic affected the designs of each goal-supporting features in different ways. For goal 3 (responding with less emotion to microaggressions) supporters, the need to respond with less emotion to microaggressions stemmed from them wanting to be treated less as an emotional or sensitive person and their want to be treated as a person who can justify their opinions or decisions with logic.

*(Unmarried Korean) women are just framed to be these emotional beings who are just too da** sensitive. In our society, whenever women bring up discomforts or problems, we're told that we're being sensitive and somewhat irrational, even by other women. I think we need the preset options for why a comment is a microaggression to be as coherent and rational as possible to help our case. – P13*

Similarly, goal 2 (indicating positive support numerically) and goal 6 (knowing the "reality") advocates indicated unmarried Korean women users need to be more logical in their justifications of their thoughts. However, goal 2 and goal 6 supporters had different opinions on what was required for logical justifications. Goal 6 proponents claimed that to provide a logical rationale, they needed to comprehend the diverse perspectives that other users hold to better defend themselves.

I need to know what I'm dealing with as a whole to better understand how I should be taking something. Without the whole picture, how do I know that I am making a sensible judgment of what I am reading and the people who are writing what I am reading? After I see the complete picture, I will know who I agree with more and who I agree with less. – P9

On the other hand, goal 2 supporters argued that logical rationales for one's own thoughts could be supported by the number of support that a comment or claim has. Participants who advocated for goal 2 claimed that showing the number of negative responses to a comment would only make the questioning of their own thoughts worse rather than help them get the evidence they need to make themselves not be seen as overly emotional people.

I am uncomfortable with the idea of just having two options (thumbs-up button and thumbs-down button). Well, I'm more uncomfortable with the thumbs-down button. Seeing the number of thumbs-downs would just make me feel uneasy when I'm trying to make sure that what I'm thinking is right. It would just make me question my decisions when I don't have to. I shouldn't have to (question my decisions), but it's making me do that. – P8

In contrast to goals 2, 3, and 6 advocates, goal 4 (having forum-approved experts guide the discussions) proponents expanded the process of finding logical justification for their own thoughts to include the opinions of verified experts. Goal 4 proponents' proposed ideas should not be evaluated as ideas that comply with the social perception that women are too emotional. Instead, they should be regarded as expanding the sources of knowledge they could utilize in strengthening their logical justifications, as shown in the following quote.

We just cannot do it all - not be sensitive or emotional and find all the medical, factual, and experiential knowledge. We need help, and that's where experts, of course those who are certified, could help. – P12

3.5. Discussion

In the discussion, I elucidate how the goals identified from the participants' co-design could be leveraged to build a more resilient and safe online space to discuss and seek support on SRH care issues. In the first part of the discussion, I describe how the goals that I identified from participants' co-design activities would also support known psychological strategies for coping with microaggressions. In the second part of the discussion, I detail how participants' goals support educational and explanatory approaches to counteracting microaggressions.

3.5.1. Coping Strategies for Online Microaggressions

The combined use of reflective coping (re-evaluating the meaning of a given situation to reduce its emotional impact [81]) and suppressive coping (inhibiting of an emotional response [82]) have been proven to be effective in coping with microaggressions [81, 82, 87]. Participants' goals uncovered in the co-design sessions show how to achieve reflective and suppressive coping strategies in online microaggression counteraction measures.

Goals 2 (indicating positive support numerically) and 6 (knowing the "reality") supported the microaggression targets to achieve reflective coping. Individuals using reflective coping styles examine causal relationships, reflect, and engage in behaviors that are intended to produce changes in their affective states and cognitive processes [98, 99]. Indicating positive support numerically and seeing the whole picture by understanding both sides was suggested by participants to help them re-assess the given situation with an objective standard, which is pivotal to cognitive reappraisal or picturing the provocative situation from a third-person perspective [79, 81]. By understanding how many people explicitly support an opinion or argument, participants thought that they would be able to evaluate whose opinions they should trust. Also, by seeing the whole picture and not just the positive support numerical indicators, they thought that they would not be

making a judgment based on viewing only one side and be able to change their affective states and cognitive processes with a holistic understanding of the provocative situation [98, 99].

For suppressive coping, participants suggested goal 3 (responding with less emotion to microaggressions) with an added level of agency. In a notable study that investigated strategies to counteract online ableist microaggressions, coping mechanisms for ableist microaggressions were found to be aligning with traditional suppressive coping mechanisms (e.g., deleting comments and letting it go, blocking rather than reporting, taking a break from social media) [100]. However, in this study, I found that responding with less emotion to microaggressions did not necessarily mean to "avoid" dealing with microaggressions. Rather, suppressive coping was transformed into active responses to microaggressions but with less emotive words. By using less emotion in response to microaggressions either in private messages or through flagging options, participants thought their claims that a comment contains microaggression would be less subjective. Making their claim seem less subjective was pivotal because microaggression targets tend to blame themselves for being overly sensitive and worry about reinforcing negative stereotypes [9, 73, 75, 78, 79].

Thus, with tools to support the stated goals, I hope to expand the ways to incorporate reflective and suppressive coping mechanisms for the targets of online microaggressions. However, I advise designers to implement the participant-suggested designs with caution, especially for reflective coping supporting designs. The goals that were identified to support reflective coping (goals 2 and 6) were influenced by the cultural characteristic that unmarried Korean women are often exposed to situations where they question their own thoughts and value the public's account of their opinions because they are socially perceived to be overly emotional and sensitive. Thus, the implementation of tools to support reflective coping would need to be provided with constant exposure to microaffirmations: subtle verbal remarks and storytelling microaggression targets

engage to affirm each other's dignity, integrity, and shared humanity [102]. Jones & Rolon-Dow [69] support the notion that constant exposure to microaffirmations helps targets understand what microaggressions and microaffirmations are, how they are perpetuated, and how they impact the target. With the benefits of repeated listening to microaffirmations, women would be able to achieve deeper reflective coping [69, 101, 102]. Targets of these microaggressions would be able to better construct a narrative about the microaggressions they experienced and develop more effective action plans to change their affective states and cognitive processes [69, 101].

3.5.2. Educational and Explanatory Approaches to Counteracting Microaggressions to Increase Awareness of Microaggressions Among All Users

Goals 1 (having shared knowledge among all users) and 5 (respecting perpetrators' freedom of speech while educating them about the negative impact of their words) can be achieved by using approaches that focus on educating people about microaggressions and their harmful effects, as well as explaining why certain comments are considered microaggressions. By highlighting the harmful consequences of microaggressions, such approaches can help perpetrators evaluate the ramifications of their comments and reconsider causing future harm.

Explanations of what microaggressions are and their harmful impacts make current perpetrators aware of the problem and provide them with a chance to become proper allies by re-examining their own and others' roles and responsibilities [57, 63, 103]. Potential allies or perpetrators, especially those of the same gender who are experiencing similar oppressions or have overcome them, need to be more aware of their roles and responsibilities in reducing online in-group microaggressions. When people normalize oppression rather than acknowledge it, they unintentionally reinforce it with further microaggressions [9, 12]. In contrast, when those who

have overcome oppression offer empathy, support, or acknowledgment of the harm, they help others recover and learn [9, 12]. As suggested by the study participants, I deem the rephrasing suggestions feature helpful in preventing unintentional harm or discouragement of support, even by those experiencing similar oppressions.

Support for encouraging perpetrators or potential allies to rethink their messages can be found in counterspeech research [67-69, 104]. Unlike content moderation, counterspeech does not suppress free expression but aims to reduce hate through persuasion [68]. Counterspeech involves two main approaches to responding to and deflecting hate speech. The first approach is a non-aggressive response to abusive content, deconstructing stereotypes and misinformation with thoughtful reasoning and fact-bound arguments [69, 104]. The second approach, sometimes termed counternarratives, involves creating positive stories to encourage tolerance and disprove the assumptions underlying hate speech [67-69]. Counternarratives focus on triggering positive feelings, such as empathy for victims, that could lead to attitude changes [67-69].

Participants were concerned that perpetrators might feel unappreciated and think moderation was unjust or frustrating, potentially leading to retaliation. While participants did not strongly advocate for counterspeech explicitly, they thought educational explanations would support users “who have a good heart (P12)” to become allies and adopt rephrasing suggestions. This supports using counternarratives, which aim to foster empathy towards microaggression targets and prompt perpetrators to rethink their actions without feeling wronged.

Furthermore, goals 1 and 5 were influenced by participants' cultural characteristics, rejecting approaches that would burden their social support network. Participants’ definition of social support includes current allies and microaggression perpetrators who have supportive intentions. Participants noted that the fine line between harmful comments and hard-hearted advice

can be hard to identify. Through thoughtful reasoning and positive narratives, counterspeech can support unmarried people's extended support network, such as microaggression perpetrators with supportive intentions. Moreover, counterspeech would help perpetrators feel empathy for targets and reconsider their delivery of support, which is currently difficult to achieve for "gray area" moderation cases [57, 62].

Goal 4 (having forum-approved experts guide the discussions) offers further insight into who should lead counternarratives. By having forum-approved medical experts and experienced users lead discussions, participants thought counternarratives could help re-evaluate factually wrong, disrespectful, or invalidating content. Leading critical and logical reactions to microaggressions by experienced users is supported by strategies for dealing with racial microaggressions [105]. Eschmann [105] suggested online counterspaces—where "activisty" students of color challenge dominant paradigms—highlight and critically react to experiences with microaggressions, providing ample support and counteraction for targets. In these counterspaces, "activisty" students lead critical reactions using counternarratives, similar to the "older sister (P9)" role suggested by the participants.

To nudge authors to revise or delete offensive text, recent work identifies offensive parts of a message [106] and suggests less offensive alternatives through paraphrasing and style transfer [107, 108]. Style transfer aims to translate abusive text into non-abusive while preserving its non-offensive meaning [109]. The study participants also advocated for low-effort approaches. This appreciation of reducing effort for potential allies is supported by other studies on online microaggression counteraction strategies [100, 105]. Heung et al. [100] recommended reactive approaches providing corrective information in response to microaggressions, similar to counternarratives [4, 104]. However, participants also expressed concern about making

microaggression perpetrators (potential allies) feel unjustly attacked. Thus, public or private rephrasing through style transfer should be further studied to determine whether it could be interpreted as harmful in certain contexts.

Most approaches limit education and explanations to perpetrators, but the participants suggested that all users be educated on microaggressions, how to cope with or address them, and how to find and receive support after experiencing them. They recommended that explanations for flagged comments be made public and include pointers to support groups and resources. They also suggested that educational resources and support groups be added under the microaggression content alert feature for those who do not want to be exposed to microaggressions at all. Thus, social media platforms should extend their educational approaches to benefit *all* users, not just perpetrators.

3.6. Limitations and Future Work

One potential limitation stems from the interviewer also being an unmarried Korean woman and the study participants being attained using snowball sampling. In investigating the design needs of the population that the interviewer is in and may have weak ties to, the participants may have felt a connection with the interviewer and enabled thoughtful responses. However, they may also have felt pressure to be portrayed as strong, independent women who did not need emotional support, especially when asked how they would alter or not alter their designs if they were the only post author users. Future studies should explore how having a design session facilitator who is not an unmarried Korean woman and does not have weak ties with the participants affects the participants' designs. Also, I acknowledge that the findings of this study have been based on a somewhat small number of participants. Although I reached saturation with 14 participants, the microaggression counteraction designs from this study could still be expanded

upon. Thus, I encourage future studies to explore co-designing with a larger number of participants to reach further consensus on the microaggression counteraction designs.

Moreover, I suggest future studies delve into how the proposed microaggression counteraction designs could potentially be weaponized against those who are already vulnerable. In this study, the focus was to design with unmarried Korean women to counteract the microaggressions suppressing their healthcare and to explore how the corrosive harm of microaggressions and social and cultural norms were reflected in their needs and preferences. I acknowledge the possibility of weaponization for the microaggression counteraction features. For example, automatically deleting a comment after a set number of negative reactions from the community may easily enable orchestrated actions to take non-harmful comments down. Also, individualized messages to targets could be used to annoy the target if sent automatically by triggering multiple messages. Furthermore, an expert with a badge who writes microaggressions may encourage higher acceptance of the microaggressions. I suggest subsequent studies investigate how to protect people from the potential weaponization of their designs to ensure their safety.

3.7. Conclusion

In this study, I co-designed with unmarried Korean women participants with the aim to create a resilient and safe space for support on stigmatized SRH by preventing and counteracting online microaggressions that suppress women's healthcare. During the co-design sessions, I identified six goals participants had for counteracting online microaggressions that discourage SRH care support seeking. Connecting back to these goals, I also encourage educational, rather than the more common punitive detection and deletion designs that counteract microaggressions. We should help targets and allies cope with microaggressions, and help perpetrators reflect on the

consequences of their words. With these design strategies and examples, I hope to encourage new moderation approaches within online communities. These approaches should support women in seeking essential care for stigmatized SRH, while reducing the occurrence and detrimental impact of microaggressions on their health and well-being.

3.8. Chapter Summary and Contributions

Summary

This study explores how culturally responsive design can counteract microaggressions while preserving the agency of vulnerable users. Through co-design sessions with 14 unmarried Korean women, I developed strategies to create a safe and resilient online space for discussing SRH care. Participants identified microaggressions and collaboratively designed features to mitigate their effects. Their designs, rooted in cultural values such as avoiding excessive emotional expression and not overburdening support networks, focused on reflection, constructive support, and education rather than punishment.

Contributions

- I contributed culturally reflective design strategies that help targets and allies manage the psychological effects of microaggressions.
- I introduced design features that prioritize empathy and education over punishment, offering a culturally relevant alternative to punitive approaches.
- I demonstrated that a co-design approach can empower vulnerable users while preserving their agency in the face of stigmatization.
- These findings were published in: Ryu, H. and Pratt, W. 2024. "Women's Educating and Coping Strategies for Cultivating Supportive Web-Based Spaces for Discussing Sexual and Reproductive Health: Co-Design Study." *JMIR*. http://dx.doi.org/10.2196/62716

Chapter 4: Leveraging Asynchronous Remote Communities to Design Safe and Supportive Online Spaces for Stigmatized Health Care

This chapter is based on the following accepted publications: (1) Ryu, H., Kim, J., Kang, S., & Pratt, W. (2025). *Improving Online Communities for Stigmatized Healthcare: Countering In-Group Microaggressions and Fostering Supportive Connection. Proceedings of the ACM on Human-Computer Interaction (CSCW 2025).*

(2) Ryu, H., & Pratt, W. (2024). *Reducing the Stigma of Sexual and Reproductive Health Care Through Supportive and Protected Online Communities. AMIA 2024 Annual Symposium.*

4.1. Study Purpose

Study 3 had two main objectives: (1) exploring how to improve the structure and design of online communities to better support unmarried women in discussing and seeking care for stigmatized SRH, and (2) developing and evaluating an educational and reflective approach to addressing in-group microaggressions. Online communities have been instrumental in connecting people facing stigma and supporting their discussions of stigmatized healthcare topics, such as acquired immunodeficiency syndrome [124, 150] and miscarriage [151]. In particular, ARCs provide structured activities within a supportive and protected environment, encouraging participants to reflect on and openly share their experiences [124, 150, 151]. These reflections and discussions foster feelings of liberation and empowerment to challenge the prejudices that negatively affect their health [124]. However, little work has explored how the structure and design

of online communities could be improved to better support unmarried women in discussing and seeking SRH care, which remains stigmatized in many cultures.

In Study 1, I found that in online spaces where unmarried Korean women expect safety and support, microaggressions often originate from both anonymous ill-intentioned users and fellow Korean women who, while attempting to enforce social norms, inadvertently perpetuate stigma [9, 12]. These in-group microaggressions are particularly distressing because such spaces are supposed to foster solidarity and mutual understanding around the challenges of facing stigma [143, 184]. When these expectations of safety and support are broken, the online communities fail to genuinely support these women [143, 184]. Therefore, addressing this issue is crucial to creating a safe environment for discussing stigmatized SRH concerns.

To address these challenges, in Study 3, I created an online community of 26 unmarried Korean women, where they could anonymously discuss SRH topics through both structured and unstructured activities for 9 weeks. These activities were designed to foster open discussion and support on SRH, a culturally taboo subject, and to counter in-group microaggressions. In Study 3, I evaluated the effectiveness of my ARC-based approach in creating a safe, supportive environment for participants, helping them reflect, discuss, and in some cases, seek SRH care. Furthermore, I investigated how the ARC and the specific activities related to in-group microaggressions influenced the participants' perception of microaggressions, their willingness to counteract microaggressions, and their reflections on their own experiences with microaggressions.

4.2. Related Works

In this section, I connect with three key areas of research relevant to this study. First, I review the current focus of online content moderation and its effectiveness in addressing online

microaggressions. Next, I examine how existing microaggression interventions primarily target inter-group microaggressions, often neglecting the in-group microaggressions that further harm marginalized communities. Finally, I explore potential directions for counteracting these harmful in-group microaggressions.

4.2.1. Microaggression Interventions

Microaggressions are often committed unintentionally by individuals who do not intend to cause harm [129]. These acts result from deeply ingrained cognitive patterns and systemic forces prevalent within the surrounding culture [30]. Additionally, microaggressions are typically subtle and implicit, which makes it difficult for those targeted to recognize and respond to them effectively [73, 129].

To address the impact of microaggressions, microinterventions have been introduced [24, 69]. These interventions, carried out by the target, an ally, or a bystander, aim to improve the psychological well-being of the affected individual [24]. The primary objectives of microinterventions are to expose the microaggression, neutralize its negative impact, educate the perpetrator, and seek external support if necessary [24]. By doing so, microinterventions strive to discourage harmful behaviors and reinforce positive social norms [24, 69, 130].

However, the responsibility for detecting microaggressions and implementing microinterventions often falls on the targets and their allies [24, 100, 129]. This responsibility is particularly burdensome, as targets and allies may fear retaliation from perpetrators or may be uncertain about the most effective course of action [24, 129]. Consequently, in many online communities, moderators are tasked with filtering or removing offensive posts [131]. Despite this, current online moderation practices provide limited support for identifying microaggressions [132,

133] and justifying their moderation decisions to other users [71, 134], thereby missing crucial opportunities to educate the community about the nature and impact of microaggressions.

This issue is exacerbated by the limited assistance that moderators receive from Artificial Intelligence (AI) models currently deployed in online communities. Predominantly, research on online content moderation has concentrated on automated content regulation [53, 135] targeting macro-norm violations [50, 52, 53], shaming tweet categories [50], and lexical variations of moderated tags within communities that promote deviant behavior [136]. These approaches focus on identifying explicit insults or discriminatory language (e.g., ethnic slurs and derogatory terms related to LGBTQ+ and disability issues) [50, 52, 53, 135], but they often fail to detect comments that unintentionally invalidate individuals' experiences or feelings due to the absence of overtly abusive language. Many forms of abusive behavior, including microaggressions, are linguistically subtle and implicit [20, 30, 73]. Identifying such subtle yet emotionally harmful abuse [137, 138] necessitates advanced reasoning capabilities. These negating comments can be particularly harmful as they may be misconstrued as supportive while actually undermining individuals' beliefs, feelings, or experiences [73].

Although Bardal et al. [139] have developed high-accuracy machine learning classifiers for detecting and categorizing microaggressions in 2023, these classifiers have yet to be integrated into existing online communities. Moreover, even with the development of effective microaggression categorization models, AI systems remain prone to errors, especially when encountering out-of-distribution examples [65]. These systems also produce false positives [66] and are subject to systemic biases stemming from flawed assumptions inherent in the machine learning process [138, 140].

Furthermore, even if the accuracy of microaggression classifiers improves, the challenge of educating offenders persists. Current AI systems are not able to reliably generate articulations of content moderation reasons; at the present time, the most achievable sense of explanation is to provide the user with a reliability score of the model's predictions [141, 142]. In other words, moderated users are left on their own to make sense of the moderation [62]. Jhaver et al. [71] investigated how users feel when their content is removed from online communities. Their findings showed that over one-third of the study participants complained about a lack of clarity as to why their contents were removed, and one-half of the participants felt unappreciated and perceived the moderation to be unjust or frustrating. Even though explanations are pivotal, as Jhaver et al. [71] and Ma et al. [62] uncovered, explanations for why content was removed or how content sorting algorithms operate are not often offered for perpetrators after content moderation [72].

In response to the current state of lacking explanations that could help educate the perpetrators, scholars such as Kiritchenko et al. [64] have proposed alternatives to mere content deletion, including strategies such as quarantining potentially abusive posts, translating abusive texts into non-abusive language, and providing counterspeech that offers logical, fact-based, non-aggressive refutations of stereotypes and misinformation present in abusive content. Moreover, Mayworm et al. [72] developed the Online Identity Help Center for marginalized social media users to understand platforms' policies and access appeal resources. However, these approaches for increasing explainability for online content moderation remain underutilized despite evidence indicating that the wholesale removal of abusive content may not effectively address underlying issues [64, 65, 66]. Consequently, the responsibility of educating offenders continues to impose a significant burden on microaggression targets and their allies [24, 30, 73, 137].

4.2.2. In-Group Microaggressions' Harm

Although educating offenders about intergroup microaggressions is challenging, as discussed in section 4.2.1, educating offenders within the same identity group as the target is even more complex. Much of the existing literature on microaggressions focuses on intergroup dynamics, where one identity group directs microaggressions toward another, typically a more powerful or higher status group targeting a minority group. Examples include microaggressions issued by Whites toward Blacks or men toward women [20, 69, 129]. For these intergroup microaggressions, several strategies for microinterventions have been developed [24, 69].

However, in-group microaggressions—those that occur within the same identity group—are often more harmful. These microaggressions, directed by individuals within a minority group toward other members of the same group, can significantly damage one's identity and self-worth. The harm is intensified as the perpetrator shares the same identity as the victim [9, 143].

In-group microaggressions typically stem from the internalization of oppressive sociocultural norms [9, 143]. For instance, Nair et al. [143] demonstrated how Black women feel pressured to conform to certain beauty standards and are judged based on their perceived level of "blackness". Similarly, Ryu & Pratt [9] showed how unmarried Korean women face pressure to avoid seeking SRH care before marriage and are judged by other unmarried Korean women for being overly sensitive or impatient in dealing with health issues. These in-group microaggressions can cause severe and lasting damage to the self-worth of marginalized individuals [9, 143].

Despite the significant impact of in-group microaggressions, specific interventions are not designed to counteract or prevent them. These interventions would need to address the unique dynamic where perpetrators and allies belong to the same group [9, 24, 69, 143]. Therefore, there

is an urgent need to explore how to better educate offenders who inflict substantial and enduring harm on members of their own identity group.

4.2.3. In-Group Microaggression Interventions: Re-Defining Allies and Educating Offenders

Although significant progress has been made in developing measures for intervening in intergroup microaggressions, interventions specifically targeting in-group microaggressions have not been extensively explored. Therefore, I draw upon feminist human-computer interaction (HCI), educational moderation, and microintervention literature to envision potential directions for addressing in-group microaggressions.

Interventions targeting in-group microaggressions necessitate a fundamental shift in understanding allyship and fostering heightened awareness among participants. Traditionally, allyship involves individuals from dominant groups assisting the oppressed [144]. However, this definition can inadvertently reinforce social hierarchies and overlook the nuanced identities of individuals [145, 146]. Therefore, as others have also suggested, I **re-define allies as those who challenge bias within their own affinity groups and actively support people even within their own marginalized communities** [88, 103, 147].

Feminist HCI scholars emphasize the importance of re-educating potential allies by promoting comprehensive stakeholder awareness [88, 103, 148]. For instance, Sultana et al. [88] highlight design strategies that empower users from vulnerable populations to transition from potential or current perpetrators to allies. Educational moderation systems, advocated by researchers such as Myers West [57] and Jhaver et al. [71], provide explanations to offenders about the harm caused by microaggressions and offer opportunities for reflection and amendment. These systems hold perpetrators accountable while acknowledging the experiences of targets [57, 71,

103]. As Schoenebeck et al. [148] argue, punitive moderation systems fail to acknowledge the experiences of targets and hold perpetrators accountable for harm, whereas educational systems provide explanations and opportunities for learning and growth.

Furthermore, raising awareness among potential allies or perpetrators, especially those who share similar identities or have faced comparable forms of oppression, is crucial. Normalizing oppression inadvertently perpetuates microaggressions, while acknowledging and empathizing with the harm fosters resilience and growth [9, 12]. Sue et al. [24] propose an "educating the offender" strategy, which emphasizes tactics such as appealing to shared values, fostering empathy, and differentiating between good intent and harmful impact. These tactics are essential for counteracting and preventing microaggressions. By educating individuals who may unknowingly engage in microaggressions within their own identity group, Sue et al. [24] aim to promote awareness and empathy, ultimately reducing harm and fostering a safer and more supportive environment.

Building on these principles, I aimed to create educational and reflective opportunities within online communities where unmarried women seek support on stigmatized health issues from fellow women. By encouraging learning and reflection on in-group microaggressions, my goal was to enhance allyship and awareness, ultimately counteracting and preventing such microaggressions.

4.3. Methods

I created an online community for unmarried Korean women using the ARC method to support two main objectives: (1) structured reflection and discussion on the culturally taboo topic of SRH, and (2) learning about and reflecting on in-group microaggressions related to SRH. First, I explain how I leveraged the ARC method to create an online community for unmarried Korean

women to freely discuss and reflect on stigmatized SRH and in-group microaggressions, providing support and learning in a safe and structured environment. Then, I describe the participant characteristics, platform selection, privacy measures, activities, study procedures, positionality statements, and analysis in the following sections. This study was approved by University of Washington's Institutional Review Board.

4.3.1. Utilizing the ARC Method to Address In-Group Microaggressions and Support Stigmatized Healthcare Discussions

The ARC method, developed by MacLeod et al. [150] and further strengthened for supporting stigmatized individuals by Maestre et al. [124], serves as an online community with structured activities for research purposes. This method allows participants to join a community focused on a shared interest and connect through activities created by researchers [124, 149, 150]. ARC is particularly useful for studies involving people facing constraints related to location, time, privacy, and stigma [124, 149, 150]. Participants can engage in the community without researchers being physically present, preserving their privacy and anonymity [124, 149, 150, 151]. This anonymity enables participants to share their thoughts and experiences freely, without inhibition due to social, cultural, and political climates [124, 150]. ARC studies benefit people from marginalized communities by creating supportive spaces for socializing, venting problems, and seeking support without identity disclosure [124]. Consequently, I **identified the potential of ARC to help women safely discuss and reflect on the culturally taboo topic of SRH**.

An ARC study involves a group of participants in a private online community created by the researcher, where they complete periodic activities both individually and as a group [149, 150]. These activities are based on MacLeod et al.'s [150] original set, inspired by traditional HCI research methods (e.g., focus groups, surveys, diaries, photo elicitation, and personas), and

expanded by Prabhakar et al. [151] and Maestre et al. [124]. Participants can complete ARC activities at any time during the specified period (e.g., a week) [149, 150], allowing them to contemplate each topic, organize their thoughts, and articulate them through written or verbal expression, while also delving into the experiences of others. This asynchronous approach alleviates the pressure of formal, in-person research activities [124, 150, 151]. These practices enable deeper understanding and insight, fostering richer discussions and more thoughtful contributions [124, 150, 151]. As a result, many HCI researchers have adopted the ARC method to leverage these advantages [152, 153, 154], and better understand the challenges and uncover community-sourced design directions for various needs. Examples include technology-supported solutions for families during prolonged social isolation [154], social media privacy measures for youth [152], and relationship platforms for marginalized sapphics [153].

I thought that ARC would present a unique opportunity for participants to learn about and reflect on in-group microaggressions. Maestre et al. [124]'s study on creating ARCs for individuals with AIDS demonstrated the value of safe spaces for stigmatized populations to share experiences and engage in reflection. While ARCs have not been used to address in-group microaggressions, their potential lies in fostering allyship and expanding awareness through activities that facilitate learning and reflection. **By providing a safe environment for stigmatized individuals to connect, learn, and reflect, ARCs hold promise as interventions for in-group microaggressions, empowering participants to become true allies who support, rather than harm, in-group members.**

4.3.2. Participants

I recruited 26 unmarried Korean women participants, ranging in age from 20 to 34 (M = 26.8, SD = 3.1), through university research-study recruitment boards, social media, and snowball

sampling. Three of the participants were recruited through snowball sampling. As MacLeod et al. [150] emphasized, informed consent, or ensuring that the participants understood what they are consenting to, is crucial to remote studies. I used email to send our informed consent document to anyone expressing interest in the study and called each potential participant to walk through the document and answer any questions they had about the study. After the call, I asked them to send the signed document if they were interested in participating and reach out to the study team with any questions they may have had after the call ended.

All participants received primary and secondary education in Korea and were all currently living in Korea. No participants were currently married, nor had they been married before. All participants had used online communities prior to the study. In this study, I define the term *used* as not solely the active usage of posting or commenting but also the passive usage of viewing posts and comments of the participant's interest. 21 participants did not know what microaggressions were before joining the study, and 5 participants had heard of microaggressions but did not have a detailed knowledge of microaggressions. Each participant was compensated $70 for completing the study, regardless of their level of activity. Participants who completed the evaluation interview received an additional $30.

4.3.3. Platform Selection and Privacy

I built the ARC on its own platform using Wix.com[3]. I chose not to use private Facebook groups because the participants preferred online communities separate from their social media accounts for seeking SRH information or advice, primarily due to privacy concerns. Also, to ensure the users' privacy when discussing a highly taboo topic, I randomly assigned each participant a Korean pseudonym as a username that was not associated with any participants' names.

[3] https://www.wix.com

4.3.4. Activities and Study Procedures

I prepared a set of activities inspired by Dunbar et al. [149]'s and MacLeod et al. [150]'s ARC method blueprint of activities prior to the study. I adapted the content of the activities to fit this study's topic of (1) supporting reflection and sharing of thoughts and experiences on SRH and (2) creating education and reflection opportunities on in-group microaggressions. I recognized that the activities might cause discomfort or unpleasantness for participants. Therefore, I encouraged them to contact us with any questions, concerns, feedback, or requests for clarification [124]. In Table 6, I elucidate the activities participants completed during their 9-week study participation, which is a typical length for ARC studies [149]. Two activities—Ask Me Anything (A10) and Diary (A11)—were available from the study start date to the study end date to facilitate socializing and communication among participants [113, 150].

Table 6. **ARC Activity Descriptions.** ARC Activity = Title of ARC activity. Week = The week the activity was introduced in the study. Completion = The percentage of participants' corresponding activity completion.

Week	Activity	Description
1	A1: Introductions	Participants introduced themselves without direct identifiers (e.g., name, age, address, region, contact information).
1	A2: Ranking of Problems	Participants chose the relevant reasons for difficulties in seeking support for SRH care from the list of reasons and ranked the top three reasons that make it personally difficult for them to seek support.
2	A3: Advice Columnist	Participants acted as advice columnists giving advice to a fictional character going through a common SRH care problem that unmarried Korean women face.
3	A4: Open-Ended Questions	Participants posted replies to two prompts given by the researchers. The first prompt was on the appropriate timing and place for women's health issues education. The second prompt was on how they would approach or not approach their hypothetical daughters when they are experiencing SRH care problems.

4	A5: Circle Network Diagram	Participants used household objects to illustrate how comfortable they were sharing information with different people by drawing circles with themselves at the center and placing people at different distances from the center.
5	A6: Personas	Researchers explained microaggressions and their negative impacts on health. They created two perpetrator personas based on a common situation for unmarried Korean women: a friend sharing concerns about vaginitis after a long period of contemplation. The personas varied in microaggression severity, both unintentional. Persona J was sympathetic but implied that better hygiene could solve vaginitis, indirectly suggesting Target K was not clean, dismissing the complexity of the issue, and unintentionally insulting K. Persona H lacked empathy, implied blame for the condition, and dismissed the reality and seriousness of K's concern. Participants critiqued the perpetrator personas and discussed their relevance to their own lives.
6	A7: Things I Wish I Knew & Photo Elicitation	Participants were asked to share what they wished they knew when they were younger related to their SRH care. Participants were also instructed to upload 1-2 photos (either self-taken or stock photos) representing the content or theme of their letter to their younger self if they were comfortable with it.
7	A8: Microaggression Counteraction Tool Testing	Participants provided feedback on four microaggression counteraction tool prototypes, each designed to address the negation or invalidation of unmarried Korean women's SRH challenges on social media platforms. The prototypes included the following features: indicating the type of support needed, blocking microaggression comments with the option to view them, featuring only positive support expressions, and offering the option to change microaggression comments before posting with suggested rephrasals.
8-9	A9: Debrief Survey & Reviewing Others' Responses	Participants were asked to complete a survey to debrief their experiences in the study. Also, the participants were asked to review the Q&A board and the diary board during weeks 8 and 9.
1-9	A10: Ask Me Anything	Participants posted questions on SRH issues or problems and received feedback from other participants.
1-9	A11: Diary	Participants wrote down details about a specific type of SRH event as it occurs.

For the weekly activities, I started with activities for participants to find similarities with others–Introductions (A1), Ranking of Problems (A2), Open-Ended Questions (A4), and Circle Network Diagram (A5). By understanding similar hardships in seeking support for SRH (A1, A2, A3, A4, A5), I thought that participants would be able to open up and share more about their SRH-

related concerns and experiences as shown in Maestre et al. [113]'s study. I also hoped to instill a sense of belonging in the group and camaraderie with fellow ARC participants, as found in Prabhakar et al. [151]'s study.

Then, I employed in-group microaggression education and reflection activities–Microaggression Perpetrator Personas Critique (A6) and Microaggression Counteraction Tool Evaluation (A8)–to enhance allyship and awareness among participants. I developed A6 based on the findings of MacLeod et al. [150] and Cooper [155], which highlight that being a victim of a particular problem does not inherently grant one the ability to identify its solution. With A6, I aimed to introduce the concept of in-group microaggressions, provide opportunities to apply this knowledge, and understand the subtlety and nuance of microaggressions [129, 24] by evaluating perpetrator personas rather than victim personas, and discuss how representative these perpetrator personas are of the participants' own experiences. I also wanted to provide participants time to reflect after the first in-group microaggression activity, so I conducted the second in-group microaggression activity two weeks after the first. I conducted another activity that would support understanding of similar hardships in seeking support for SRH, Things I Wish I Knew & Photo Elicitation (A7), in between the two in-group microaggression activities. The second in-group microaggression activity, A8, was conducted for further exchange of ideas on microaggression counteraction and prevention and reflection [124, 151] on how to help each other [124].

I created a discussion board for each weekly activity, with the most recent weekly activity posted on top to increase its visibility [150] (Figure 17). All activities' responses were visible to other participants except for the Debrief Survey & Reviewing Others' Responses (A9). Weekly activities were posted on the same day and time, and participants were reminded about them on the same days and times every week [124]. Additionally, reminder emails were sent three days

before the activity, and participants who had not completed the activity one day before the deadline were sent another email. Each weekly activity was designed to take approximately 15 minutes to complete, being mindful of the number of steps needed to complete an activity [151]. The activity completion deadline was set to one week after the activity had been posted, but participants were granted deadline extensions upon request.

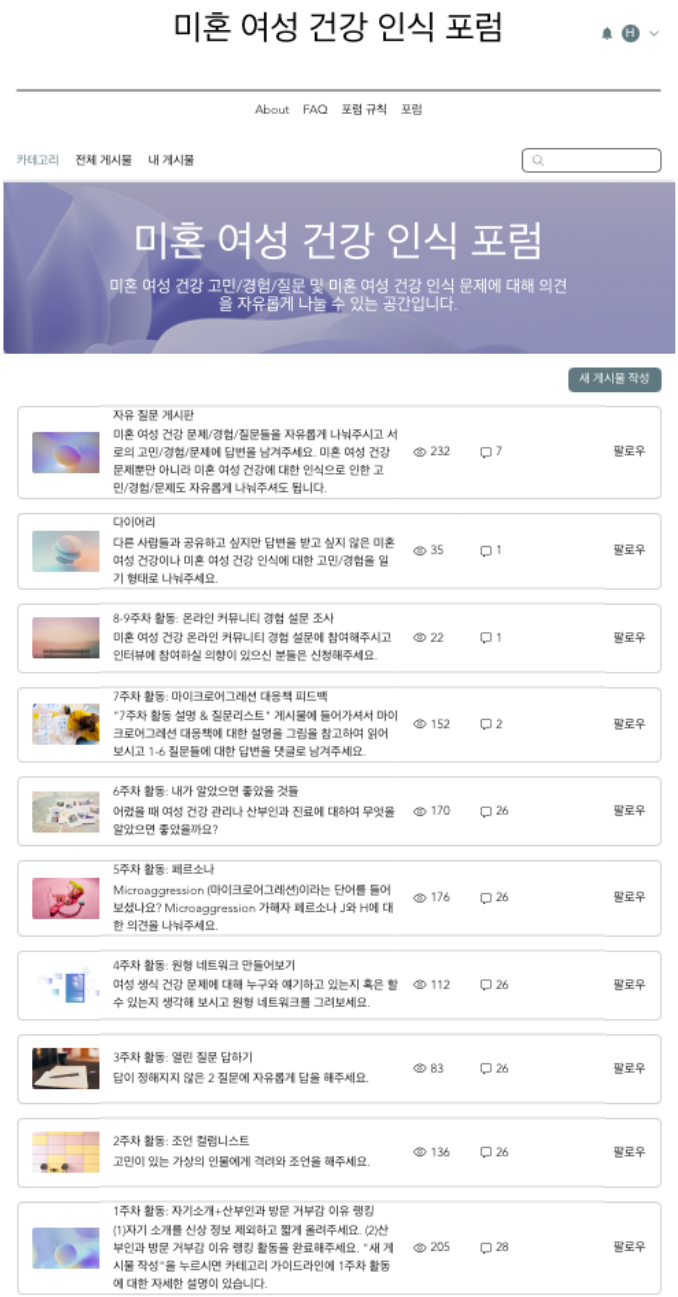

Figure 17. Home Page of Asynchronous Remote Community Created for Study 3. Discussion boards are boxes designed with a white background and a black frame. They include an image on the left, the title and explanation text in the middle, and the number of views and posts on the right. The follow button is located on the right. The top two discussion boards were the two activities that were available from the study start date to the study end date. The third discussion board from the top is the latest weekly activity discussion board.

All participants completed all the weekly activities (A1-A9). After the 9-week study participation, participants were asked to participate in an optional evaluation interview that lasted approximately 50 to 60 minutes. I asked about their overall experience with the ARC, the enjoyability and difficulty of the activities, what activities supported them in thinking about and discussing the stigmatized topic of SRH, whether and how the activities helped them discuss the culturally taboo topic, and their perceptions of microaggressions (Appendix C). Twenty-one participants completed the evaluation interview. For the 5 participants who did not participate in the evaluation interview, their study participation ended after week 9.

4.3.5. Positionality Statement

Three researchers who participated in the analysis were unmarried Korean women who received their primary education in Korea. I, the first researcher, have personally used online communities to seek support for sexual and reproductive health concerns and have conducted research on microaggression prevention, counteraction, and empowerment of marginalized communities. My positionality influenced the study, shaping my interpretation of unmarried women's experiences with online communities and their challenges in seeking SRH support. It also provided valuable insights into understanding in-group microaggressions and the Korean sociocultural context.

The second researcher has conducted multiple studies on designing for online communities and social technologies. Although she did not seek online communities for SRH concerns prior to conducting this study, she has a generally positive view of their potential to support information seeking and validation, especially for culturally sensitive or taboo topics.

The third researcher has not used online communities for SRH concerns, but her prior experience with microaggressions on social media platforms helped provide insights into unmarried women's subtle discrimination experiences in online communities. Additionally, her research experience with the harms and support women face in various online communities provided insights into the contextual understanding of harm and support in online communities.

The fourth researcher is a White American woman who has done extensive research in online health communities and has used such communities to seek support for her own or her family's health needs. These experiences have led her to a positive view of such online communities.

4.3.6. Analysis

I audio-recorded the evaluation interviews and used a professional transcription service to have the recordings transcribed verbatim. First, the second and third researchers and I co-coded three transcripts with the ATLAS.ti software[4] using an inductive approach [174]. Second, to derive codes representing dominant concepts in the data, I clustered related codes into overarching categories using an affinity diagramming approach, wherein I arranged coded excerpts into clusters according to similarity. To validate the coding scheme, I iterated on affinity diagramming with the second and third researchers. With the codebook, the second and third researchers and I co-coded two more transcripts together and iterated on the codebook. Third, with the finalized codebook, I

[4] https://atlasti.com/

coded the remaining transcripts. Discussions were conducted with all researchers at every stage to further ensure validity.

4.4. Health Care-Seeking Outcome Findings

First, I provide a high-level evaluation of how reflecting on experiences about SRH every week in a supportive and protected online community led to the two primary health care-seeking outcomes (Figure 18): (1) being more open-minded about SRH and expanding SRH discussions with others and (2) making or considering making visits for SRH care. In this section, I focus on elucidating activities A2, A4, A5, and A7 because they were most relevant to the two healthcare-seeking outcomes.

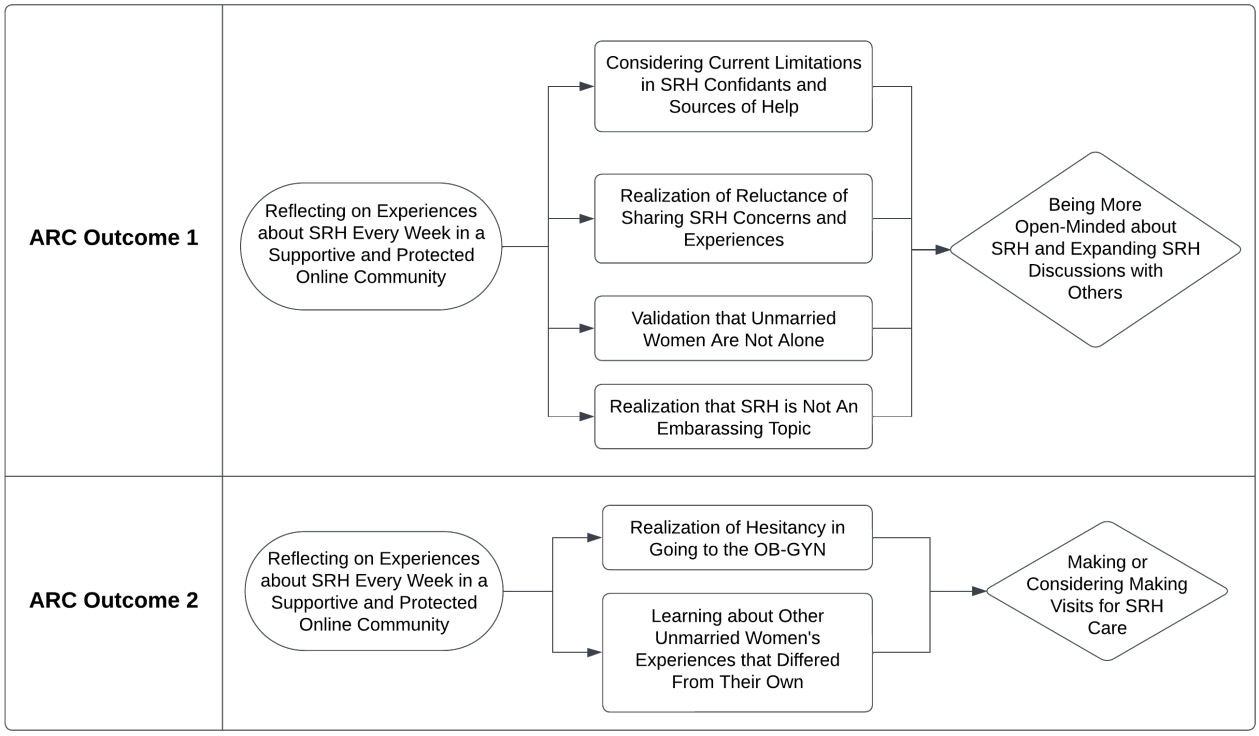

Figure 18. **Healthcare-Seeking Outcomes from ARC Participation.** The flowchart diagrams describe how reflecting on experiences about sexual and reproductive health (SRH) every week in a supportive and protected online community supported women's reflections and realizations (represented in the rectangle

diagram shapes) and led to the healthcare-seeking outcome (represented in the diamond diagram shape) in each row.

4.4.1. Outcome 1: Being More Open-Minded about SRH and Expanding SRH Discussions with Others

While thinking about and verbalizing their responses for the weekly activities, participants **reflected on their current limitations in SRH confidants and sources of help, especially with the Circle Network Diagram (A5) activity**. Most participants did not share SRH concerns with even their close friends or mothers because of a psychological barrier.

I thought that I could have shared these issues with my friends (although I'm not sharing right now). I also thought that I couldn't even share it with my mom even though she's family. I felt a psychological barrier of some sort. – P1

P6 elucidated on the psychological barrier that thinking about SRH is not easy for unmarried women because of the deeply rooted societal perception that the OB-GYN is a place for only married women who have had sexual experiences.

I hadn't really thought about the topic of women's health before I joined this study. I just thought of it when I was thinking of the broader category of my personal health. I think it's harder for unmarried women to think about this (SRH concerns, issues, and experiences) compared to married women. Although women's rights in our country (Korea) have been improved, it's still unnatural (for unmarried women) to go to the OB-GYN. The OB-GYN is limited to married women. Going to the OB-GYN is connected to your sexual experiences, symptoms or illnesses related to your sexual experiences. That's still seen in a very negative light. – P6

While completing A5, many participants had the opportunity to **realize that they were reluctant to share SRH concerns and experiences even if they thought they were not reluctant**

before. This realization led them to think that they would benefit from talking about these concerns with others.

I thought that I wasn't reluctant to talk about sexual/reproductive health concerns, but I realized (while participating in this study) that the reason I don't talk to others about these (sexual/reproductive health concerns) is that I am reluctant because of the negative societal perception. I thought that it would be beneficial for me to talk about these concerns with others. – P22

Another factor that led participants to become more open to the idea of discussing or even initiating SRH discussions was **finding validation from other participants' responses that they were not alone**. Participants felt reassured that other unmarried women had similar concerns that were rooted in the social prejudice against unmarried women seeking SRH care.

It was reassuring in a way to get to know that other people had similar or the same concerns, especially about being hesitant to seek SRH care because of others: what they say or how society will judge you. – P16

Thus, with these realizations and reflections through talking about their SRH experiences in the ARC, many participants found value in these discussions about the culturally taboo topic. The values they found in the online discussions transferred over to offline discussions, and many participants found themselves to have more open-mindedness in discussing SRH concerns and experiences outside the ARC.

Although this is a study and not a currently usable community, providing the opportunity for people to talk about their experiences and thoughts had a meaning of its own. I felt like I could talk about my thoughts and experiences (on SRH) better in real life. – P1

Participants further wanted the confidants with whom they were sharing their SRH concerns to better understand and resonate with them.

I felt that I could bring up things like "My period is irregular." with more ease now. I now have this feeling that I hope that the person I'm sharing this with knows this about me and can resonate. – P26

Moreover, a few participants took the initiative to discuss or share their SRH concerns and experiences. These participants realized that discussions about SRH are not occurring because no one initiates these discussions, even though they all share similar concerns. They thought that if they initiated the SRH conversations, other unmarried women who have similar concerns could join the conversations and support each other by sharing more about their concerns and experiences on the culturally taboo topic.

I thought about initiating these conversations (about SRH) more. It's just that no one initiates these conversations. Everyone has similar concerns, so if we open up the space for these conversations, people could resonate and share more. – P6

Participants stated that they did not expand their SRH conversations with others in the past because they were worried about how others would perceive them as the conversations were related to sexual experiences, and most people around them do not discuss SRH explicitly.

I thought more about why I don't talk to others about this (SRH) and why I thought that it was kind of unnecessary. Since it's related to sex, I don't want the person I'm sharing this with to look at me in a weird way. Also, a lot of people don't talk about this, and the symptoms of the commonly discussed topic of vaginitis are kind of disgusting. - P22

After their reflection on the current limitations of discussing SRH-related topics with others, they **realized that SRH is not an embarrassing or shameful topic to discuss**. This

realization occurred especially with the second prompt of the Open-Ended Questions (A4) activity: how unmarried women would approach or not approach their hypothetical daughters when they are experiencing SRH care problems. While thinking about and verbalizing the response to the A4 prompt, they realized that SRH is not a shameful topic and that it should and could be discussed with even their future daughters.

While I was thinking about how to talk to my (future) daughter if she is having problems or concerns related to sexual or reproductive health, I realized that these issues are not something to be embarrassed about. I wanted to discuss these things in a warm and inviting manner with my daughter in the future. – P8

With this realization that SRH is not an embarrassing topic and could and should be discussed with others, many participants considered expanding whom they shared SRH-related issues and concerns with–participants' SRH confidants and sources of help–after the circle network diagram exercise in A5. The realization that occurred in A4 was put into practice with A5.

I never explicitly perceived who I was sharing my concerns or experiences about SRH with. Through the Circle Network Diagram activity, I was able to specify the abstract "others that I share with" into specific groups and set up clearer boundaries for whom I want to include. I thought hard about the distance between me and others. I thought about which friends I could share with, how close I am with them, and what situations they are in. – P6

Many participants who had not shared their SRH-related concerns and experiences online also considered extending the range of people with whom they share to online communities. These participants felt more comfortable sharing with others online after participating as members of an online community through the ARC.

I considered broadening the range of people with whom I share concerns about SRH. I considered if I should only tell people who are close to me or also share online which I wasn't comfortable with. I decided that I'd be able to share with my mom, my close friends, and online communities after participating in this community (ARC). – P2

Participants who expanded their network of people with whom they share their SRH-related concerns and experiences during or after the study further broadened what they discuss about the culturally taboo topic with their family and friends. With friends, they were able to share concerns or fears that they had not shared with them before, such as their fear of seeking care for SRH.

I thought I was pretty open about SRH care, but I realized that I was scared about going (to the OB-GYN). It was not something I would have wanted to share before, but I shared that with my friends. – P16

With family members, participants experienced having conversations about SRH that they had never had with them prior to their participation in the ARC. These new discussions occurred with female family members, especially with their mothers, and they were initiated in two ways. The first way was them initiating these conversations with their mothers after thinking about how they would approach their hypothetical future daughters if they had SRH-related concerns with the second open-ended prompt of the A4 activity.

My mom says that I don't need to talk about sexual and reproductive issues with her, but while doing the activity on what I would say to my (future) daughter if she came to me with her own concerns, I realized that I wanted to talk to my daughter about these things. I thought more about what exactly I wanted to share with her and how I wanted to share those things with her. These considerations helped me communicate with my mom more about these things. – P18

The second way the conversations about SRH were initiated was by participants' mothers asking about the gift cards the participants were given as compensation. Regardless of the way the conversations were initiated, the conversations with their mothers on a topic they had not discussed before helped participants understand their mothers' experiences with stigma related to unmarried women discussing SRH-related topics with others.

*I shared that I was doing this study because my mom asked where I was getting all these gift cards. I don't talk to my mom about my personal reproductive health concerns, but she shared her experience of using tampons when they first came out. It came out in her twenties, and when she shared with her friends that she was using tampons, her friends called her a w**** and worn out for using them. – P5*

Thus, with the reflection on experiences about SRH every week, participants were able to engage in and initiate never-had or deeper conversations with people they expected support from on SRH-related issues.

4.4.2. Outcome 2: Making or Considering Making Visits for SRH Care

I expected the ARC-based online community to support unmarried Korean women's discussion of the stigmatized topic of SRH with others. Unexpectedly, I also found that the ARC-based online community affected participants' SRH care-seeking at the clinic.

The making or consideration of making visits for SRH care started with participants' realization of their hesitancy in making visits for SRH care. While completing the Ranking of Problems (A2) activity, they **realized why they were hesitant to seek SRH care: the social prejudice against unmarried women going to OB-GYN visits**.

I realized I did have prejudices against unmarried women going to the OB-GYN. I never thought I had any problems with going to the OB-GYN, but through the activities, especially the

earlier one (Ranking of Problems activity), I realized my prejudices were blocking me from going. Even if I had pressing issues, I treated them as insignificant issues because of my prejudice. – P17

Even participants who had sought SRH care before realized that they were still hesitant to continue seeking SRH care.

I thought I was okay with going to the OB-GYN by now (after having visited the OB-GYN). However, I realized that I still had hesitancy to go to the OB-GYN because of the negative societal perception. – P16

Another contributing factor that led participants to make or consider making visits for SRH care was **learning about other unmarried women's experiences that differed from their own.** Such learning occurred during their participation in A5 and Things I Wish I Knew & Photo Elicitation (A7) activities. With A5, participants were able to realize that some unmarried women go to the OB-GYN despite the similar difficulties they endured due to the stigma associated with SRH. With A7, they learned that many unmarried women who have sought the stigmatized SRH care did not show hesitancy in seeking necessary care.

While doing the Circle Network Diagram activity, I realized that there are a number of people who go to the OB-GYN. While doing the Things I Wish I Knew (& Photo Elicitation) activity, I realized that people who go, go without hesitancy. – P14

Furthermore, participants learned that the unmarried women who go to the OB-GYN sought SRH care for issues that they had not considered to be a serious issue that warranted making an SRH care visit.

In the community (ARC), people were going to the OB-GYN for far less serious problems. I didn't go to the OB-GYN during the study, but I am now more open to going to the OB-GYN for follow-ups. – P16

After the study activities, many participants who had not sought SRH care prior to the participating in the ARC-based online community considered making visits for SRH care.

While participating in it (ARC) and after too, I felt like the OB-GYN became a place that I could go to. I don't know if this is a good example, but I felt like it could be a place I could go to if I had a common cold. – P13

A few participants even went to the OB-GYN and chose to share more information with their clinicians. Participants who had not been able to follow through with recommended care were able to better understand their SRH through further discussions with their clinicians and follow their recommended care.

I was hesitant to go (to the OB-GYN) because I didn't want to talk about my sexual experiences. During this study, I realized that I could share my experiences easily with others when it was anonymous. I started to wonder why I couldn't open up to my gynecologist. ... Previously, I came back from the OB-GYN because I didn't want to do the ultrasound. However, during the study, I made an appointment to go again and do the ultrasound. I found out that I had polycystic ovary syndrome. I asked my gynecologist a lot about the syndrome, and my gynecologist was surprised that I suddenly shared so much with her. I built a better rapport with her during that visit, at least, I think so. – P18

Participants who were still hesitant to make in-person visits for SRH care sought care with clinicians online.

After these two activities (Circle Network Diagram and Things I Wish I Knew & Photo Elicitation activities), I don't think I was ready to go to the OB-GYN in person, but I did seek care online with a gynecologist on a (SRH) issue that I had a problem with. – P14

Although small in numbers, I found value in the ARC-based online community to not only support unmarried women's discussion of the culturally taboo topic of SRH but also further support unmarried women's SRH care seeking.

4.5. In-Group Microaggression Counteraction Findings

I illustrate how my approach fostered empathy and understanding among unmarried women, educated them on the nuances and impacts of in-group microaggressions, and encouraged reflection and action, helping them recognize and address SRH care challenges and support each other as allies. In section 4.5.1, I describe how features I set up in the online community supported the increase of empathy and understanding amongst unmarried women. In sections 4.5.2-4.5.5, I describe how the in-group microaggression education and reflection activities, A6 (Microaggression Perpetrator Personas Critique) and A8 (Microaggression Counteraction Tool Evaluation), increased unmarried women participants' perception of in-group microaggression as a problem (section 4.5.2), by understanding the subtle nuance and harmful impact of microaggressions (section 4.5.3) and reflecting on their own or witnessed microaggression perpetration (section 4.5.4). In section 4.5.5, I describe participants' actions and plans to become better allies to fellow unmarried women. Figure 19 illustrates how the online safe space I created served as an intervention to help participants understand, notice, reflect on, and ultimately act to reduce in-group microaggressions.

4.5.1. Empathy and Understanding of SRH Challenges

Through their participation in the online community I created, participants were able to increase their empathy and understanding towards fellow unmarried women. Participants expressed that three factors supported their increase in empathy and understanding.

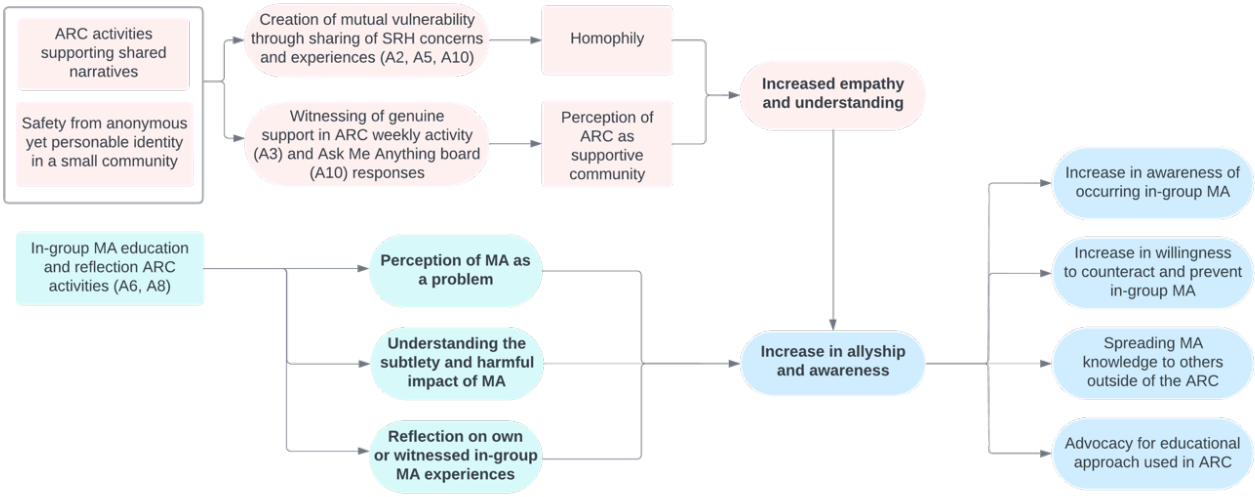

Figure 19. Process of ARC Participation Serving as an In-Group Microaggression Intervention. The pink-colored part of the diagram, or the top two rows of components for the diagram, shows how ARC served to increase the empathy and understanding between unmarried women ARC participants. The green-colored part of the diagram, or the bottom two rows of the diagram, show how the two microaggression education and reflection activities (A6: Microaggression Perpetrator Personas Critique and A8: Microaggression Counteraction Tool Evaluation) supported the learning and reflecting on in-group microaggressions. The blue-colored part of the diagram, or the rightmost side of the diagram, shows that the increased empathy and understanding between unmarried women participants and learning about and reflecting on in-group microaggressions supported the four ways of the increase in ARC participants' allyship and awareness for in-group microaggression counteraction and prevention. MA is an acronym for microaggression, and SRH is an acronym for sexual and reproductive health. A2 is the Ranking of Problems activity; A3 is the Advice Columnist activity; A5 is the Circle Network Diagram activity.

The first was safety from the anonymous yet personable identity in a small community. Many participants stated that they used their current online communities for SRH support passively, refraining from actively sharing their own concerns or experiences. Such reluctance stemmed from the cultural taboo associated with SRH, making it uncomfortable to discuss these topics even anonymously with other women.

Since it's a sensitive issue in the current social atmosphere, even though it's anonymous and we're the same gender, I think it's still somewhat difficult to easily share my story (in the online communities I use for SRH support). It feels uncomfortable. - P16

However, in this study, many participants appreciated that I made their usernames actual Korean names that were personable but disassociated from their identity. They thought that the usernames ensured anonymity and simultaneously helped them feel closer to other participants. That factor contributed to them feeling safer engaging in this study's online community than in other communities.

What I liked was that although the usernames were anonymous, they were set up as real people's names, so it was personable, but no one could guess who they were. This seemed to ensure anonymity better than other (online SRH support) communities and made me feel closer (to other participants). I liked that. - P7

The community's small size also helped women feel safe to open up and share their SRH concerns and experiences. Many participants stated they would not have opened up in larger communities because there were more chances of taunting or dismissal in those communities. Moreover, many participants stated that they could relate to others more than they would in larger communities, which helped foster connectivity between the participants.

*I liked that it (the online community) was small. In small communities, people are less likely to say sh**. They are more likely to be supportive, and I feel like I can relate to others on a more personal level (than large communities), if that makes sense. - P26*

The second factor was the creation of mutual vulnerability through sharing SRH narratives in activities. Many participants thought that other participants' experiences related to SRH were similar to their own and felt relieved that they were not alone. This relief and

reassurance that they were not alone in having SRH-related concerns created a sense of homophily, which made it easier for participants to trust fellow participants and further share their SRH-related concerns and experiences.

What I thought was the most outstanding thing was that when I sometimes read other people's posts, I definitely felt they were a bit more mature, which made them seem more trustworthy. Also, when I read about other people's experiences, I felt there were parts I could relate to, which gave me a sense of reassurance and comfort. I think those aspects were quite good and made me more open to sharing my stories (related to SRH). - P26

A2 (Ranking of Problems), A5 (Circle Network Diagram), and A10 (Ask Me Anything) were activities that participants stated helped them the most in becoming more willing to open up. Reading other participants' responses for A2 helped participants feel reassured that other unmarried women had similar concerns rooted in the social prejudice against unmarried women seeking SRH care.

(When I read other participants' responses for A2: Ranking of Problems), it was reassuring in a way to get to know that other people had similar or the same concerns, especially about being hesitant to seek SRH care because of others: what they say or how society will judge you. – P16

Through A10, participants discovered that people were trying to resolve their SRH problems independently without discussing them with others.

Regarding SRH issues, I realized that everyone has similar concerns. When I read other people's comments on the Ask Me Anything board (A10), I saw that they recommended solutions in a similar vein. Seeing this made me think that everyone has similar thoughts, but they just haven't been talking about it much. - P25

With the realization of their own and others' limited resources for SRH support through A5, many participants became more willing to be vulnerable and share their SRH concerns and experiences.

The circles (concentric circles in A5 that showed whom participants discussed their SRH concerns) that other participants made were so similar to mine. There were so many people who did not or could not talk about these concerns with others. I felt like we all needed to open up more, including myself. It's nothing to be shameful about, right? – P2

The third factor was the participants' perception of this study's online community as supportive, fostered by witnessing empathetic and validating responses from other participants. Many participants' previous experiences in other online communities for SRH support included aggression, taunting, or dismissal of concerns from others, which led to their passive use of the online communities to avoid judgments.

When I became more interested in sex or when I first started worrying about menstrual issues, it was quite difficult. It was hard to easily ask questions in online communities when I didn't have much knowledge (about SRH). I was afraid that if I posted something, I would receive critical and prejudiced comments again. Even though it was anonymous, it still hurt. ... I don't post at all now (on the online communities I use). - P16

However, while participating in this study's online community, many participants found that fellow women could be genuinely supportive and warm towards other women in anonymous online communities. Through the ARC activity responses, especially A3 (Advice Columnist)–writing letters to a hypothetical unmarried woman hesitant to seek care because of the taboo associated with SRH–and A10, participants witnessed empathetic responses to others' SRH concerns that they had not often received in the online communities that they were using. In the

anonymous online communities that they currently seek or have sought SRH support in, they had often received dismissal and invalidation of their concerns by fellow women. Therefore, the empathetic and validating responses in A3 helped participants perceive the online community I created as supportive in which they could be vulnerable.

I remember in the second week, while looking at other people's sincere and empathetic responses (in A3) that validated the character's concerns, it occurred to me for the first time that I could receive this kind of emotional support even though it was an anonymous community. - P10

4.5.2. Recognition of Microaggressions as a Problem

I found that having participants evaluate whether the perpetrator personas in A6 (Microaggression Perpetrator Personas Critique) should be considered harmful helped them realize that well-intended words of support could indeed be damaging and that underlying biases could unintentionally surface. When participants first engaged with activity A6, 24 out of 26 recognized microaggressions as problematic. This activity led to the initial understanding that in-group microaggressions are harmful. Through evaluating the two perpetrator personas in A6, participants became aware that their well-intended words of support could be perceived as microaggressions by fellow unmarried women.

There are cases where people think that because it is a conversation between individuals of the same gender, they won't engage in such aggressive behavior. That's why I thought this issue should be considered among same-sex peers. When it comes to issues related to SRH, it is not only the behavior of men that is problematic. The topic itself is often discussed among women of the same gender, and there can be similar issues that arise in those interactions. So, I think it's a problem that needs to be addressed. - P17

Moreover, by critiquing the two perpetrator personas who unknowingly propagated their own prejudices while giving advice on a friend's SRH concern, they **realized that underlying biases could surface even in what they believed were supportive words**.

I became aware that when I speak, I might unconsciously express my own biases or discriminatory thoughts without even realizing it, like the characters (perpetrator personas in A6). This newly found insight was the most memorable thing for me. - P10

Additionally, **reflecting on current and potential online microaggression prevention and counteraction measures helped change the minds of those who previously believed that microaggressions were not problematic**. Two participants disapproved of labeling the perpetrator personas as harmful because they thought that being cautious not to commit microaggressions may be too burdensome as it may require excessive self-restriction. However, while reflecting on current and potential microaggression counteraction and prevention measures in A8 (Microaggression Counteraction Tool Evaluation), one of these participants thought that maybe it's because measures similar to these are already implemented in the online communities they use that they don't see enough microaggressions and perceive them as a problem.

Honestly, when I first learned about the topic of microaggressions (through activity A6), I thought it was a very trivial issue. I kept thinking that people were being overly sensitive. ... Then, we did an activity where we rated various solutions (A8), and I realized that some of these solutions were already being implemented on platforms I use. For example, Naver (a popular online search engine used in Korea) has a feature that hides content that could be sensitive. I realized that the reason I hadn't thought much about it in my daily life might be thanks to these measures. This made me reflect on whether I might be saying things that could hurt others more than I realized,

and I understood that there are people affected by these issues, which is why such systems are in place. - P14

The majority of the participants who did find microaggressions to be a problem to address were especially appreciative of activity A6, which helped them become aware of microaggressions. **They felt liberated to be able to name the phenomenon that they had been seeing but were unable to define as problematic because there was no known term for it**.

In everyday life, people often say things like that, but I didn't realize what it was, so I didn't think it was a microaggression. I felt uncomfortable and negative, but I didn't know why. After learning about the concept of microaggressions, I had an aha moment, realizing that this was why I felt bad and uncomfortable. - P7

Also, **they felt validated that they were not alone in finding microaggression comments to be uncomfortable and negative**.

I had seen similar subtle derogatory remarks (to the ones provided in the A6 activity perpetrator persona descriptions). By learning about microaggressions, I realized that such comments could indeed be problematic. It helped me understand that it's not strange for the person hearing them or me seeing them to feel upset. - P10

Moreover, **some participants expressed surprise that microaggressions can occur within the same identity group**. They said that they had never thought that women could commit microaggressions against other women.

I did not know that microaggressions related to women's health could occur between women. I thought microaggressions might only be related to race or similar issues. However, I realized for the first time that a comment like one woman telling another woman just to wash when she has vaginitis could be a microaggression. - P3

4.5.3. Understanding of Subtlety and Harmful Impact of Microaggressions

I used two personas with varying levels of subtlety in their microaggressions. One was a microinvalidation, dismissing and negating the person with vaginitis's concerns and experience, and one was a microinsult, implying the person with vaginitis is unhygienic. Although all the activities were short and designed to take only fifteen minutes to complete, participants were able to understand the subtle nuances of microaggressions. They recognized the subtle difference and the harmful impact of the two microaggressions shown in A6.

During the fifth week (A6) activity, I first learned what microaggressions are by looking at the provided examples and texts. I don't remember if it was J or H, but I remember feeling more uncomfortable with one more than the other. I thought both of them were still harmful and subtle, but one was a bit more dismissive and less empathetic than the other. - P13

Furthermore, many participants were able to differentiate between good intent and harmful impact through evaluation of the two personas that had varying levels of subtlety in their microaggressions. Participants recognized that even with good intent, harmful impacts could arise and that they needed to be cognizant of the impact that could arise with well-intended words.

It's clear that someone doesn't necessarily have malicious intent, but I realized that such situations (in-group microaggressions) can still occur. - P17

They also thought that the person providing support should be more aware of the impact and more careful about how they frame their support because SRH is an intimate and difficult topic to share.

Since women's health is a very private and difficult topic to share, it's natural for the listener to feel upset. Therefore, I believe the speaker should be careful. So, I thought that if I was the one speaking, I should definitely be cautious. - P2

4.5.4. Reflection on Microaggression Experiences

I created microaggression perpetrator personas that resembled everyday situations participants might encounter (e.g., commenting on a close friend's SRH concern but unintentionally insinuating that they are dirty and that's what caused their vaginitis). **I found that my approach helped participants reflect on their own experiences without feeling uncomfortable or unpleasant because they realized that microaggressions could occur unintentionally in everyday situations**. Twenty-two participants reflected on their own experiences of perpetrating microaggressions. All of them expressed that they did not feel uncomfortable or unpleasant during this reflection.

Actually, I didn't feel particularly uncomfortable or have any specific thoughts about it (reflecting on my own microaggression perpetration experiences). In fact, I realized that I often used such words in everyday life. This topic was quite shocking to me because I understood that, depending on the person and the situation, it could be perceived negatively. That's why it still remains memorable to me. - P14

Instead, they were able to understand the commonalities between the perpetrator and themselves. They realized that being a microaggression perpetrator could be a common occurrence: words they often used as support or helpful responses to their friend's concerns were unintentional microaggressions.

The activity where we were shown real or similar examples of microaggressions (A6) was really interesting. It made it easier for me to reflect on whether I had ever been a perpetrator to a friend and whether someone else had been a perpetrator. It helped me organize my thoughts a lot better and realize that I had been a perpetrator. Unintentionally, of course. - P25

Participants also reflected on witnessed microaggression experiences in online communities and experiences where they had become targets of microaggressions. **I made the responses for A6 shared, so participants were able to see others' testimonies of microaggression perpetration and target experiences. This made them feel they were not alone in experiencing or perpetrating microaggressions**.

While looking at other people's responses during the fifth-week activity (A6), I realized again that in Korean society, it's still rare for someone to discuss their concerns openly. People often form biases or judgments about the person sharing (their SRH concerns) before responding. This made me reflect on whether I might have been a perpetrator of such microaggressions. I also felt a bit of comfort knowing that others had similar experiences of both perpetrating and being targets of them (microaggressions). - P24

4.5.5. Allyship and Awareness for Countering In-Group Microaggressions

Through education and reflection on in-group microaggressions, many participants further contemplated ways they could be allies and challenge bias within their own affinity groups. First, they expressed a need to be **aware that microaggressions are occurring to counteract in-group microaggressions** that harm fellow unmarried women. They stated that being aware of microaggressions helped them see and identify more microaggressions.

Regarding microaggressions, I started paying more attention to whether someone's words might be offensive when looking for such instances, given what I know now about them. - P20

Second, they **assumed the responsibility of counteracting in-group microaggressions by being more willing to counteract and prevent them**. They became more cautious of their own wordings of support to avoid becoming a microaggression perpetrator again. Furthermore,

they expressed wanting to engage as a more active ally by directly responding to microaggression comments.

I do not usually write posts or comments in the community, but if I see such posts (microaggressions), I thought I should respond with an awareness of the issue. When I reply, I will definitely be more mindful of my tone and consider whether my response could be problematic. - P16

Third, a few participants s**pread microaggression knowledge to others outside of the ARC to increase the awareness of microaggressions outside the study**. Although some participants shared with their male romantic partners, others shared with their friends to raise awareness.

As I was learning about microaggressions, I was so shocked and talked about it with my friends. Have you ever experienced something like that? How can we be careful to avoid it? We had conversations like that. - P19

With their increase in allyship and awareness of counteracting and preventing in-group microaggressions, **many participants advocated for this educational approach offered in the ARC**. All participants appreciated the opportunity to learn about microaggressions.

Interviewer: Do you think it's good that others are learning about microaggressions and that it might have a positive impact on society overall?

P26: Yes, I'm not sure how much it will stick with them, but knowing about it at least is better than acting in complete ignorance. I think it might help bring about positive social change. It's a bit corny, but I do have that kind of hope.

In conclusion, this study demonstrated that the interventions implemented through this study's online community enhanced empathy, understanding, and supportive behavior among

unmarried women concerning SRH-related challenges and in-group microaggressions. These interventions included activities where participants were able to share their SRH experiences and concerns more openly, fostering a sense of solidarity and support. The educational and reflective activities on microaggressions helped participants recognize and address subtle forms of discrimination within their group, promoting a more inclusive and empathetic environment. These findings underscore the importance of structured, supportive online spaces and targeted educational interventions in empowering individuals to challenge stigma and support each other effectively.

4.6. Health Care-Seeking Outcomes Discussion

With this study's ARC-based online community, I discovered that establishing a safe space for reflecting on and sharing SRH experiences can effectively catalyze and advance the pursuit of stigmatized SRH among unmarried women. My discussion outlines the potential benefits of such supportive and protected online communities in supporting these women in discussing and seeking SRH. First, I reflect on how ARC's features for time, location, and privacy contributed to the creation of a secure online environment for participants to openly reflect and share their SRH experiences. Subsequently, I explore how ARC served as a catalyst, enabling the initiation or expansion of SRH conversations with female family members crucial to health-oriented family communication. Lastly, I highlight how ARC served as a medium for resonating and learning from the SRH experiences of other unmarried women.

4.6.1. ARC as a Safe Online Community for Protected Reflection and Sharing of SRH Experiences and Concerns

When unmarried Korean women are trying to pursue SRH, they lack support from people whom they trust to support and help make decisions with them, such as their mothers, their network

of friends, and romantic partners [6, 9, 123]. Often, they are told by these expected supporters that changes in their marital status or time would resolve their medical problems and that they are promiscuous for pursuing necessary SRH care [9, 123] Thus, with the severe lack of support offline, unmarried Korean women seek haven in online spaces, specifically in online forums where they could ask questions anonymously, such as NatePann and Naver Jisikin [9]. However, these online spaces are often not actually safe because unmarried Korean women face judgments rooted in social prejudices from other members that condemn and invalidate their SRH-related concerns and experiences [9].

Given this lack of support, unmarried Korean women are in urgent need of a safe online space to reflect on and share their SRH experiences and concerns with others who are also seeking support. In line with the previous ARC studies conducted with stigmatized groups [124, 125], the ARC-based online community served as a supportive and safe space where unmarried Korean women would reflect on and share SRH experiences and concerns while still having their identity protected (i.e., through the use of pseudonyms in the community) at a time and space convenient for them. Therefore, although SRH was a difficult topic for participants to share with others, even with people very close to them (e.g., mothers and close friends), they were able to deeply think about and share their thoughts on this "shameful and immoral" topic.

I underscore two crucial steps I took to ensure the protection of the participants' identity and for them to feel safe to reflect on and share their concerns and experiences related to the stigmatized SRH. First, I established an uncoupled platform by creating a separate online community platform that was not linkable to any social media accounts or email accounts. Second, I assigned pseudonyms for usernames and passwords randomly, so that any subconscious representations of the participants' identities would not be shown. With these two steps, I was able

to further dissociate participants' identities in the ARC-based online community from their offline and other online identities. The extra measures put in place to ensure participants' identity protection served as a base for them to reflect and share their SRH-related experiences without feeling shameful or burdened to discuss a stigmatized topic. Thus, I saw **ARC as having the potential to serve as a safe space with the protection it provided and the offering of the time and place to pause and reflect on the culturally taboo topic of SRH.**

4.6.2. ARC as a Catalyst for Initiating or Expanding SRH Conversations with Female Family Members

Parents have been a primary source of stigma narratives [6, 9, 123, 126]. Thus, public health efforts have emphasized the importance of health-oriented family communication, especially between mothers and daughters, as mother-daughter SRH communication has been identified as one of the most effective prevention strategies in promoting SRH [123, 126]. Also, many unmarried women from Asian cultures that stigmatize SRH shared a desire to have increased communication about SRH with their families [123, 126]. Yet, SRH conversations between mothers and daughters in Asian cultures are limited or non-existent, even based on recent research [6, 9, 123, 126].

The ARC-based online community supported unmarried women to reflect on their current limitations of whom they share their SRH concerns and experiences through the Circle Network Diagram activity of A5. Participants found it beneficial to have a specific time and space dedicated to reflecting on their relationships and the individuals they felt comfortable confiding in regarding their SRH concerns and experiences. This allowed them to delve deeper into the reasons behind their choices, exploring both the connections they could trust and the barriers that prevented them from sharing with certain individuals.

Through the second prompt of the Open-Ended Questions activity of A4, where they contemplated how they would approach SRH conversations with their hypothetical daughters in the future, participants also considered their current discussions on SRH with their mothers. In doing so, they became aware of areas for improvement in both past and ongoing SRH dialogues with their mothers. The realization of both how limited or non-existent SRH conversations with their family members are and how they wanted the conversations to improve helped participants initiate or expand conversations with their mothers and family members. The initiation and expansion of SRH conversations helped them to understand their mothers' experiences with SRH better and deconstruct the generational passing down of the negative sociocultural beliefs that inhibit discussions and the pursuit of SRH. Thus, I found **potential in ARC-based online communities to improve health-oriented family communication among female family members (e.g., mothers and grandmothers) who have the most impact on unmarried women's pursuit of SRH.**

4.6.3. ARC as a Medium for Resonating with and Learning about Other Unmarried Women's SRH Experiences

People from stigmatized communities have turned to the Internet to cope and compensate for a lack of access to information and the inability to form offline relationships with others who share their stigmatized condition [124, 125, 127]. The Internet has provided a means for them to disclose information regarding their stigmatized conditions more easily without necessarily having to reveal their identities and feel embarrassment [124, 125, 127]. With the online community that I created using the ARC method, I found that this ARC-based online community supported learning about other unmarried women's experiences with SRH that were similar to and yet different from their own. The activities that participants found particularly impactful in facilitating

relatability and learning about shared experiences were the Ranking of Problems (A2), Circle Network Diagram (A5), and the Things I Wish I Knew & Photo Elicitation (A7) activities. Through A2, participants first reflected on if and why they were hesitant to seek care for SRH. With this reflection, they were able to realize that social prejudice and stigma were major reasons for their reluctance in SRH care-seeking. Through both A5 and A7, participants recognized that despite facing similar challenges associated with the stigma surrounding SRH, some unmarried women still sought care at clinics. Moreover, both A5 and A7 revealed that unmarried women often seek care for SRH issues that they hadn't previously considered worthy of clinic visits. This realization not only facilitated a sense of relatability but also broadened participants' perspectives on SRH care needs.

By engaging with others' experiences in A5 and A7, participants not only empathized with fellow unmarried women but also gleaned insights into different coping mechanisms for dealing with SRH-related stigma. This dual understanding served as a catalyst for encouraging further discussions on stigmatized SRH topics and promoting proactive attitudes towards seeking SRH care.

This finding is also supported by Maestre et al. [124]’s study on creating an ARC for individuals with AIDS, which found that participants from a stigmatized population enjoyed activities that allowed them to learn from other people’s experiences and ideas and relate to what they do in their lives. Similarly, online health communities and forums with individuals who do not have a stigmatized condition have been shown to empower patients by learning from each other [128].

In this study, I have found that some participants not only resonated with and related to other participants’ experiences but took it one step further. These participants who had not had an

SRH care appointment prior to participating in the online safe space took the step to go to an SRH care appointment. Thus, I found the **ARC-based online communities supported unmarried women's pursuit of SRH clinical care when they learned that others in a similar situation had taken such action.**

4.7. In-Group Microaggression Counteraction Discussion

In this discussion section, I describe what design choices I made in setting up the online community with activities and how those choices impacted participants. First, I describe why it is so important to create a supportive online space for discussing stigmatized SRH and help participants challenge oppressive cultural norms (section 4.7.1). Second, I explain how I leveraged ARC to address in-group microaggressions. I discuss how the activities I employed in the ARC fostered education and reflection, helping participants recognize and understand subtle forms of discrimination within their community and promoting supportive behavior (section 4.7.2).

4.7.1. Need for Safe Space for Intragroup Support

Stigma surrounding health topics complicates discussions and care-seeking, especially in cultures that value conformity [156, 157]. Stigmatized populations, such as unmarried Korean women, face internal and external pressure to adhere to societal norms, leading to lost opportunities for timely care [6, 117, 158]. Additionally, they may discourage other unmarried women from seeking necessary care [9]. Participants from this study reported witnessing such discouragement and judgment from other women in online communities, leading to a loss of trust and passive participation. They struggled to find similar experiences in existing online communities for SRH support and became second-hand targets of microaggressions in those supposedly safe spaces.

After participating in this study, many women found hope for a safer online space that promotes the sharing of narratives and the cultivation of a non-judgmental community. Because I ensured safety through an anonymous yet personable identity–a crucial element in online safe spaces for women [159, 160, 161] and other people from marginalized communities [162]–and offered both guided and unguided activities to support shared narrative on stigmatized SRH [124], many participants felt that they could be vulnerable with the online community members and discuss their SRH concerns and experiences. The increased sharing of SRH concerns and experience discussions in the ARC led to an increased understanding of similarities among participants (as described in section 4.5.1), revealing that they were not alone in facing SRH care and support hardships. They also discovered that other unmarried women similarly lacked adequate support from existing resources.

This finding aligns with social comparison theory, introduced by Festinger [163] in 1954, which posits that individuals evaluate their own opinions and abilities by comparing themselves to others. This process of social comparison helps people better understand their own circumstances and form self-identity. Comparisons can focus on abilities, opinions, or emotions and can be upward (comparing to someone perceived as better off) or downward (comparing to someone perceived as worse off). Lateral comparisons occur when individuals compare themselves to others they perceive as equal in status, ability, or experience. Lateral comparisons are particularly beneficial in fostering a sense of normalcy and reducing feelings of isolation. By identifying with peers who share similar experiences and challenges, individuals can validate their own feelings and experiences, reducing self-doubt and increasing self-esteem. In online support groups, lateral comparisons help participants feel understood and supported, as they see that others are going through similar struggles.

Barta et al. [164]'s Social Comparison and Social Support in Online Support Groups model builds upon social comparison theory, highlighting that shared identity and experience in online support groups facilitate positive affective consequences and sustain well-being. By connecting with “similar others” or peers with shared experiences, online support groups enable lateral comparisons, which can normalize difficult experiences and challenge social isolation [164]. Participants in this study found reassurance and a sense of community through these lateral comparisons within the online community, helping them feel less alone in their hardships related to SRH care. Such reassurance is one of the microintervention effects outlined by Sue et al. [24], which includes activities aimed at empowering people from marginalized groups and promoting resilience among them. **Thus, to foster a sense of belonging and reassure members of marginalized populations that they are not alone, designers should ensure safety through anonymous yet personable identities. Additionally, they should create both guided and unguided activities that support shared narratives of stigmatized health topics.**

In addition to the benefits of social comparison, this study also emphasized the importance of group identity affirmation. Group identity affirmation refers to recognizing and reinforcing the strengths, positive qualities, and unique characteristics of a particular group [24]. This concept, as outlined by Sue et al. [24], involves acknowledging the group's collective identity and fostering a sense of pride and unity among its members.

For study participants, witnessing genuine support in ARC activities and the responses in the Ask Me Anything board helped them form the perception that women can be helpful, unlike their previous negative experiences in online communities. This affirmation of group identity played a crucial role in changing their views on the supportive potential of their peers. By seeing positive examples of women helping each other, participants began to internalize the idea that their

group possessed strengths and positive qualities that could counteract the negative societal norms they faced.

The small size of this study's online community also played a crucial role in group identity affirmation. Hwang & Foote [165] found that small communities often feature personal and intimate posts, which support and encourage group identity and a sense of belonging. They found that users engage in these small communities to find experiences that resonate with them even if they mostly lurk in the communities. Similarly, participants discovered that the small size of this study's online community positively affected their resonating with other unmarried women participants and finding them supportive, which led to group identity affirmation. **Therefore, to highlight the strengths of people from marginalized communities in supporting each other, designers should create opportunities for members to witness empathetic and validating responses from those within the same identity group in a small-sized online community.**

Group identity affirmation is particularly important in marginalized communities where members often face external negative perceptions and internalized stigma [24, 143]. By highlighting and celebrating the group's positive attributes, members can develop a stronger, more resilient sense of identity [24, 143]. This was evident in this study, where participants' realization that unmarried women can help break sociocultural norms rather than reinforce them led to a stronger and more supportive community. This shift in perception allowed participants to view the ARC as a place where members work together to support each other and challenge the silence imposed by cultural taboos associated with SRH.

The experiences of unmarried Korean women's group identity affirmation resonate with findings from other contexts. Pearce et al. [166, 167] showed that online safe spaces helped unmarried women in Azerbaijan transgress oppressive sociocultural norms, where reproductive

health information is taboo. Azerbaijani women rely on online spaces for frank sexual discussions, contrasting with Western contexts, where reproductive health information is widely discussed [167]. Exposure to others deviating from norms, such as son preference, provided a sense of more choices than offline connections suggested [166].

In sum, while online communities have the potential to empower people from marginalized communities by providing spaces for sharing and support, they often fall short due to low sharing of narratives out of fear of judgment within these spaces. However, this study's online community showed the potential to mitigate these issues by supporting participants in sharing their SRH concerns and experiences. The genuine support witnessed in this study's activities fostered a sense of community and challenged the silence imposed by oppressive sociocultural norms.

4.7.2. Intervention for In-Group Microaggressions

Through the education and reflection activities I created, I hoped to use this study's ARC as an intervention to reduce in-group microaggressions. Two significant potential challenges emerged. **The first challenge was that in-group microaggression targets could simultaneously be allies and/or perpetrators.** It was essential to ensure participants understood they could hold multiple identities. Although I followed the guidance of MacLeod et al. [150] and Cooper [155] on using non-victim personas to recognize problems and identify solutions—emphasizing that being a victim of a particular problem does not inherently grant one the ability to identify its solution—I could not ensure that participants would not feel uncomfortable or distressed when reflecting on past perpetration or witnessing of microaggressions. Despite this concern, this study revealed that none of the participants felt uncomfortable reading examples of microaggression perpetration or reflecting on their own or witnessed in-group microaggressions as it was made clear to them in perpetrator personas in A6 that microaggressions could often occur unintentionally

and in everyday situations they could relate with. Many participants stated that these activities were memorable because they helped them realize their unintentional perpetration and propagation of underlying prejudices in similar everyday situations.

Additionally, many participants were previously unaware of microaggressions but recognized them through these activities, feeling liberated by the ability to name these experiences. Sue et al. [24, 137] emphasize making the "invisible" visible and educating perpetrators as core goals of microaggression interventions. I found that my approach has the potential to achieve these goals. Friere [168] argues that "naming" an oppressive event is the first step toward empowerment and liberation, as it provides a language for marginalized individuals to convey their experiences, assuring them their thoughts and experiences are valid. Naming also forces those with power and privilege to consider their roles in perpetuating oppression [24, 168]. In this study's case, the microaggression target could also be the perpetrator, so reflecting on past experiences of negating others' thoughts or opinions made participants consider their roles in unintentionally oppressing fellow unmarried Korean women.

Reflecting on being a perpetrator and considering the perpetrator's perspective was initially risky, but it provided clues to resolve an important question raised by To et al. [169] on empowering microaggression targets and allies without creating a jarring experience. To et al. [169]'s study provided opportunities for participants to achieve critical sensibility when they faced racist microaggressions, but positioning participants as only victims of racist microaggressions in their prototypes led to concerns about backlash and difficulty processing racist interactions. Based on their findings, I decided to stress the unintentional nature of microaggressions, making participants less defensive about their morality. Also, the examples I used were relatable, involving scenarios with close friends or online interactions. They made it easy for participants to understand

that microaggressions occurred and that they have been both targets and perpetrators of such microaggressions. Using relatable and unintentional examples of microaggressions helped individuals reflect on their own experiences, whether as perpetrators, witnesses, or targets. This approach also facilitated an easier acceptance of the possibility that they may have unintentionally been either a target or a perpetrator. **Therefore, designers should use relatable and unintentional examples of microaggressions when creating perpetrator personas to support education and reflection on in-group microaggressions.**

The second challenge was the possibility of participants not perceiving microaggressions as a problem. Microaggressions are often subtle and implicit, making them difficult for targets, allies, and perpetrators to recognize as harmful [20]. Therefore, it is crucial to understand the nuances of microaggressions–how they can be subtly and implicitly expressed–and to recognize that harm can be inflicted without malicious intent [9, 24, 143]. This understanding is essential in acknowledging that microaggressions are indeed problematic. In this study, I found that participants effectively grasped the nuances and harmful impacts of microaggressions. They focused on the impact rather than the intent, which helped them understand that even well-intended words of support could cause harm.

Goodman [170] further stresses that the ultimate hope is to reach and educate the perpetrator by engaging them in a dialogue about what they have done that has proven offensive, connecting it to their beliefs and values, and having them consider the worldview of marginalized group members (which has been accomplished with A6). Although Sue et al. [24] acknowledge that education is a long-term process, they found vast potential for brief encounters of education, or microinterventions, to "plant seeds of possible change that may blossom in the future (pg. 139) [24]." Moreover, participants advocated for this educational approach and deemed it to be

potentially effective in raising awareness of in-group microaggressions. Thus, although brief, critiquing microaggression perpetrator personas in A6 immersed the participants into quickly grasping the concept of microaggressions and applying the knowledge in a short amount of time [171, 172], which showed the potential to be an effective microintervention.

Although A6 proved effective as a microintervention, A8 facilitated further reflection on counteracting and preventing in-group microaggressions, which was imperative to ensure that participants found microaggressions to be an issue to address. One participant who initially did not perceive in-group microaggressions as a problem changed their perspective during A8, advocating for tailored counteraction measures. As such, the sequential use of A6 and A8 supported participants' education, self-reflection, and reassessment of values and beliefs. To et al. [169, 173] encouraged researchers to explore opportunities for social technologies to educate about racism and prejudice, and this study demonstrates progress toward educating about prejudices by using ARC activities as microinterventions. **Thus, I recommend that designers provide multiple opportunities for reflection on microaggressions using various scenarios and prompts, such as perpetrator personas varying in the subtlety of microaggressions and reflections on current and potential counteraction and prevention measures.**

However, improvements in awareness and allyship cannot be solely attributed to microaggression activities. Increased empathy and understanding from their participation in all the activities in this study also supported participants' willingness to become better allies. Activities like A10 (Ask Me Anything) were crucial for fostering organic connections and support. Activities that were conducted earlier in the study, such as A2 (Ranking of Problems), A3 (Advice Columnist), and A5 (Circle Network Diagram), helped participants perceive other ARC members as reliable sources of emotional support and fostered a sense of similarity and reassurance.

Thus, I found my approach leveraging the ARC method effective in microaggression education and reflection not only for the related activities (A6 and A8), but also for the increased empathy and understanding it fostered through aspects not related to microaggressions (through A2, A3, A5, and A10). **I recommend future studies adopting ARC as a microaggression intervention to include activities like A2, A3, A5, and A10 *before* introducing microaggression education and reflection activities.** Providing a safe environment for stigmatized individuals to connect, learn, and reflect, ARCs hold promise as interventions for in-group microaggressions, empowering participants to truly support rather than harm in-group members.

4.8. Limitations and Future Work

This work must be considered in light of its limitations. The first researcher who conducted the interviews with the participants was from the same stigmatized population. Thus, the participants may have felt a connection with the interviewer and enabled thoughtful responses. However, they may have also felt pressure to be portrayed as strong women who were making changes to take charge of their own health. Future studies should explore how the ARC outcomes differ from having the interviewer not be from the same population as the participants.

Also, because this study was the first attempt to use ARC as an intervention specifically for addressing in-group microaggressions, I aimed primarily to observe increases in awareness and potential allyship among participants who could be targets, allies, and perpetrators simultaneously. This study's primary focus was understanding whether these awareness and allyship changes could be achieved, which was a challenging and complex endeavor. While the study successfully highlighted short-term increases in awareness and allyship, it did not track these changes over an extended period, leaving these shifts' long-term sustainability and impact unexamined. Future

research should focus on long-term tracking of both awareness and allyship changes to better understand their persistence and overall effectiveness.

Furthermore, this study was focused specifically on unmarried Korean women, which may limit the generalizability of the findings to other marginalized populations. Future research should examine the application of similar ARCs in a broader context to determine whether the effects on awareness, allyship, and behavior changes can be achieved across different cultural and demographic groups. Such future studies would help in understanding the broader applicability and effectiveness of ARCs as an intervention for in-group microaggressions in diverse marginalized communities.

4.9. Conclusion

This research highlights the potential of ARC-based online communities as safe havens for unmarried women in cultures where SRH is stigmatized. By fostering a supportive and protected environment, these platforms facilitate the initiation and expansion of SRH conversations, as well as the seeking of SRH care. Participants benefited from a dedicated time and space within these communities to reflect and share concerns and experiences related to SRH. Through guided activities, they were able to delve into their own thoughts and experiences about SRH, while also resonating with and learning from the experiences of other unmarried women. **This newfound clarity on leveraging ARC-based online communities to support SRH pursuits shows significant potential for improving the health outcomes of unmarried women, especially in cultures where SRH care is stigmatized**.

Furthermore, in this 9-week study with 26 unmarried Korean women, I investigated the effectiveness of this study's ARC-based approach to creating a safe and supportive online community. I designed activities within this community to facilitate discussions and support on

the culturally taboo topic of SRH and to counter in-group microaggressions. This study provided two key insights and contributions related to in-group microaggression counteraction and facilitating discussions and support on the culturally taboo topic of SRH.

The first contribution is my design of an online space that fosters safety and shared narratives for mutual support of people from marginalized communities. This study highlights how I created a safe and supportive online environment for discussing stigmatized topics, such as SRH for unmarried Korean women. I emphasize the importance of ensuring safety through small-sized communities and anonymous yet personable identities and offering both guided and unguided activities to foster supportive connections. The online community I designed helped reduce feelings of isolation and promote a stronger, more resilient sense of group identity among participants.

The second contribution is my approach to addressing in-group microaggressions, which requires effective educational interventions with multiple opportunities for reflection and empathy-building. This study presents a structured method for addressing in-group microaggressions by providing educational activities that help participants recognize the subtle nuances and harmful impacts of microaggressions. Through relatable scenarios and reflective exercises using non-victim personas, I encouraged participants to shift their perspective from intent to impact. This shift helped them identify and address microaggressions within their own identity group. I also emphasize the importance of sequential activities that build empathy and understanding before introducing challenging reflections on microaggressions. My approach promotes a more inclusive and supportive community by encouraging self-reflection and affirming actions.

In conclusion, the study demonstrated the transformative potential of ARC-based online safe spaces in fostering reflection, learning, and advocacy within marginalized communities. By offering reflective activities for stigmatized SRH discussions and addressing in-group microaggressions, my approach helps create a more supportive and inclusive environment. These findings also highlight the efficacy of such activities in creating online safe spaces that strengthen connections among people from marginalized communities and promote positive social change in stigmatized healthcare support.

4.10. Chapter Summary and Contributions

Summary

In this section, the focus is on the design of a protected, anonymous online space using the Asynchronous Remote Communities (ARC) method that encouraged deep self-reflection, mutual support, and open discussions among 26 unmarried Korean women over a 9-week period. This safe community setting enabled participants to share and reflect on stigmatized SRH topics and their experiences with in-group microaggressions. The designed environment not only prompted richer online dialogue but also translated into real-world behavioral changes, such as increased care-seeking and broader SRH discussions within participants' personal networks.

Contributions

- I designed an anonymous online community that fostered mutual support and resonance among women confronting stigmatized health topics.
- I demonstrated that well-structured online communities can extend beyond reflection to catalyze behavioral changes, including initiating care-seeking and opening up about SRH issues.
- I contributed a new approach for addressing in-group microaggressions using relatable, non-victim-based scenarios that build empathy among participants.
- These community and design insights were disseminated through:
  - Ryu, H. and Pratt, W. 2024. "Reducing the Stigma of Sexual and Reproductive Health Care Through Supportive and Protected Online Communities." *AMIA 2024 Annual Symposium*.
  - Ryu, H. and Kang, S. 2025. "Exploring Design Tensions in Countering Microaggressions in Online Communities for Stigmatized Health Support." *CHI 2025 Case Study*. https://doi.org/10.1145/3706599.3706702
  - Ryu, H., Kim, J., Kang, S., and Pratt, W. 2025. "Improving Online Communities for Stigmatized Healthcare: Countering In-Group Microaggressions and Fostering Supportive Connection." *CSCW 2025*.

Chapter 5: Enhancing the Asynchronous Remote Communities Method for Research with People Facing Stigma

This chapter is based on a manuscript currently under review: Ryu, H., & Pratt, W. *Enhancing Design Research for People Facing Stigma: Strengthening Participation, Engagement, and Reflection.* Submitted to *ACM Transactions on Computing for Healthcare (Special Issue on Human Centered Computing in Healthcare).*

5.1. Study Purpose

ARC has proven uniquely suited to fostering connection, understanding, and meaningful engagement among people facing stigma who might otherwise face challenges in traditional research environments [113, 124, 150]. Researchers can create online communities where participants engage remotely, in a safe and supportive space, sharing their experiences and perspectives freely, without fear of judgment or social repercussions [149, 150, 151]. This approach is particularly effective for studying sensitive topics, enabling researchers to gather rich, authentic data from groups that might otherwise be reluctant to participate in traditional face-to-face studies [124, 150].

Thus, in Study 3, using the ARC method, I aimed to create a space where unmarried Korean women who often avoid seeking SRH care due to associated stigma [3, 7, 116] could reflect on and share their perspectives on SRH issues, and ultimately provide insights on how to design technologies to support them. My approach focused on helping them foster connections with others

who share similar experiences and deepen their understanding of both their own and others' SRH-related experiences.

However, as I applied this method, I encountered several challenges that necessitated adaptations to ensure the study participants had both meaningful interactions and engagement. While the existing ARC guidelines were helpful, I recognized the potential to go beyond their scope in addressing certain complexities that I encountered. To overcome these challenges, I adapted the ARC method by enhancing strategies for rapport-building, refining the assessment of activity meaningfulness, and incorporating sequential activities that aligned with the participants' comfort and engagement levels.

5.2. Background on ARC

To better understand the context in which these challenges arose, I first provide an overview of the ARC method and its application in previous studies involving people facing stigma. The ARC method is a powerful qualitative research approach, particularly effective for studies involving people facing stigma [113, 124]. It involves participants engaging in a series of activities, both individually and as a group, within an online environment [149, 150, 151]. The flexibility of these activities—ranging from surveys to online adaptations of traditional HCI methods—allows researchers to tailor the approach to the specific needs of their study [149, 150].

One of the key benefits of ARC is its ability to overcome barriers that often make face-to-face studies challenging. This feature is particularly important for people living with stigmatized conditions [113, 124], geographically dispersed communities [183], or individuals with limited availability, such as pregnant people and new mothers [151]. For these groups, ARC offers a convenient and accessible alternative. This method is particularly advantageous when working with people facing stigma, such as individuals living with HIV [124], where concerns about

confidentiality and the sensitivity of the topic can hinder participation in traditional research settings.

Additionally, ARC's design facilitates data triangulation by incorporating multiple activities. This approach enhances the validity of the findings by accounting for various factors that could otherwise confound results [124]. The method also enables researchers to analyze interactions within the online community, such as posts and comments, which provides deeper insights into participant engagement and contextualizes the data generated from these activities [124, 151].

For individuals facing stigma, ARC's online nature offers a sense of privacy, which encourages participation and honest self-disclosure [159, 175]. This aspect of ARC makes it particularly well-suited for research with populations who might be reluctant to disclose sensitive information in a face-to-face setting. By adapting activities over time based on the needs of the target population, ARC not only facilitates meaningful data collection but also creates a supportive environment where participants feel safe to share and reflect on their experiences [124].

ARC studies that do not directly focus on stigma also highlight ARC's adaptability in addressing sensitive or challenging contexts [152, 176, 180, 183]. For example, Jenness et al. [180] and Bhattacharya et al. [176] applied ARC to behavioral activation interventions for teenagers with depression, demonstrating its utility in fostering engagement around mental health, a topic that can carry sensitivity and vulnerability. Similarly, Jean Baptiste et al. [152] used ARC to explore online safety perspectives among adolescents, another context where participants may feel vulnerable or cautious in sharing personal experiences. Yu & McDonald [183] focused on the coordination of caregiving for teenagers with Type 1 diabetes, a condition that brings its own set of challenges in terms of privacy and autonomy. While these studies do not explicitly focus on stigma, they

underscore ARC's potential for engaging participants in discussions on topics where confidentiality, privacy, and sensitivity are key concerns.

Overall, ARC's adaptability, focus on privacy, and ability to engage participants over an extended period make it an exceptional method for researching people facing stigma. These qualities ensure that people's voices are heard and their experiences are understood in a meaningful way.

The effectiveness of the ARC method is further illustrated by three studies that have contributed valuable lessons on its use. MacLeod et al. [150] laid the groundwork for conducting research with distributed populations online, offering advice on building rapport with participants and balancing ethics and practicality in the consent process. Prabhakar et al. [151] provided a framework for balancing the rigorous demands of designing and analyzing ARC activities with the need to ensure these activities remain both accessible and meaningful for participants. Maestre et al. [124] emphasized the importance of communication with stigmatized communities, advising on the use of appropriate language and the need to provide clear warnings about confidentiality risks. Collectively, these studies have summarized 22 important lessons for utilizing the ARC method effectively.

Building on these established benefits, this study identified specific challenges that necessitated further refinement of the ARC methodology when applied to people facing stigma.

5.3. Challenges in Using ARC

In adapting the ARC method for individuals facing stigma, I encountered several challenges. These challenges included fostering trust in short-term engagements, introducing new and challenging concepts, and ensuring that activities remained both meaningful and impactful. Although lessons from previous ARC studies provided valuable guidance, I found four key lessons

needed further refinement to address the unique dynamics of working with people facing stigma. In particular, I identified areas where enhancements or deviations from these lessons were necessary (Table 7) to ensure the method remained a robust tool for gathering meaningful insights, while making participation engaging and valuable.

Table 7. ARC Lessons Requiring Adaptations.

L#	Lessons	Lessons From
1	Building a strong rapport with members of groups used for recruiting before, during, and after the study.	MacLeod et al. [150]
2	Investigating alternative methods of consenting electronically. *Note*: In MacLeod et al. [150]'s study, all participants sent scans of their consent forms via e-mail after discussing it with the study team via Facebook chat.	MacLeod et al. [150]
3	Discouraging activities that build on one another where the sequence is important.	Prabhakar et al. [151]
4	Careful consideration of activity selection. When possible, I must provide meaningful and helpful interventions.	Prabhakar et al. [151]

First, I faced the challenge of establishing a short yet trusting relationship with participants in ARC studies, particularly when long-term rapport with researchers had not been previously developed. Lessons 1 and 2 emphasize the importance of establishing rapport with participants, particularly before the study begins. MacLeod et al. [150] and Maestre et al. [124] highlighted the importance of having researchers who had established long-term relationships with participants before the study initiation. However, considering realistic time constraints, I wondered if participants without prior long-term rapport with researchers could find ARC studies helpful and valuable and contemplated how researchers could establish a short but trusting relationship with participants.

Second, I faced the challenge of introducing and fostering participants' understanding of new and complex concepts, such as in-group microaggressions, especially given their unfamiliarity with these ideas and the limited discussion around microaggressions in SRH care in Korea. In my ARC study, I introduced new and challenging

concepts like in-group microaggressions: subtle, often unintentional, discriminatory remarks or behaviors exchanged between members of the same marginalized group that reinforce harmful stereotypes and stigma [143]. While most research on the challenges unmarried Korean women face in seeking SRH care does not address microaggressions [3, 7, 11, 116, 117], nor is the concept widely discussed in Korea, recent findings reveal that microaggressions significantly hinder SRH care and perpetuate stigma even within those who share the same stigmatized identity [9]. Recognizing that this concept would be unfamiliar to participants, I aimed to provide an extended period for them to learn, grasp, and reflect on microaggressions and their experiences related to SRH care. Additionally, I sought to encourage individual and group ideation on how microaggressions could be better countered, providing an opportunity not only to reflect on the problem but also to explore potential solutions. I believed that implementing sequential activities, deviating from lesson 3, could enhance the usefulness and meaningfulness of the ARC activities by promoting reflective thinking. By allowing participants to progressively build on their understanding and experiences, sequential activities could lead to deeper insights and more meaningful engagement. For example, participants could first encounter new terms or concepts through initial activity prompts (process prompting), which would then encourage them to reflect on their own experiences and those of others (reflective social discourse) [181]. Finally, they could evaluate and propose possible resolutions to the issues discussed (process modeling) [181]. This structured sequence would reinforce the learning and reflection process, potentially making ARC activities more impactful and beneficial for participants.

Third, I found that some lessons required further guidance to be applied to people facing stigma, especially lesson 4. I noticed a lack of guidance on assessing the usefulness or meaningfulness of ARC activities. Lesson 4 emphasizes the careful selection of activities to

ensure they are meaningful and helpful. Prabhakar et al. [151] identified this lesson by reflecting on their failure to encourage participants to seek help. Both Prabhakar et al. [151] and Maestre et al. [124] noted a lack of specific guidance on how to provide meaningful interventions, which I needed to address for this study. Usefulness in ARC studies has often been measured through enjoyability and difficulty ratings, as well as open-ended questions asking why the activities were enjoyable or difficult. However, these measures do not always capture the usefulness or meaningfulness of activities. Even when combined with other data sources, such as activity delay time, completion rates, and participant responses, the full significance of the activity cannot be accurately assessed without also considering changes in conversations and support outside of the ARC. These external interactions are crucial for overcoming stigma and encouraging positive behavior, making them essential factors in evaluating the overall impact of the ARC activities.

5.4. ARC Lesson Adaptations

As discussed in Section 5.3, I encountered challenges when I attempted to leverage the known lessons on using ARC in a study to engage people facing stigma in design research. To address these challenges, I took several steps to enhance participant engagement and gather meaningful data.

First, to enhance rapport, I implemented strategies aimed at fostering stronger personal connections with the participants. While most ARC studies do not incorporate voice calls [124, 150, 151], I found them invaluable for building rapport with participants by making the researcher more approachable and personable. As the contact researcher and an unmarried Korean woman who lived in Korea until early adulthood, I communicated with participants in Korean, empathizing with their concerns and explaining the study's purpose and significance, especially for women like themselves. Although I followed standard ARC procedures by having participants

submit signed consent forms via email [150], I also reached out by phone to discuss study procedures, address potential risks, and respond to any concerns. I compiled their concerns into a frequently asked questions (FAQ) page for this study's ARC, where I directly addressed each issue. This list of questions and answers was also included in the study onboarding email. Additionally, I offered communication options via email or other messaging platforms to accommodate participants' preferences.

Second, to foster deeper reflection and understanding of a new and challenging concept, I implemented activities that build on one another in a specific sequence. I believed that sequential activities would enhance the ARC process by fostering reflective thinking [181]. One of the substantial barriers I identified was in-group microaggressions, where women discourage other women facing the same stigma from seeking SRH care in online communities. To address this issue, I introduced the concept of microaggressions through A6, "Microaggression Perpetrator Persona Critique," where participants were presented with two different perpetrator personas, each exhibiting varying degrees of microaggression behavior. Participants were asked to assess whether they considered these personas to be perpetrators, compare the severity of their actions, and reflect on whether they had ever been perpetrators themselves. This activity facilitated process prompting and reflective social discourse.

Following up on this activity, in the sequential activity A8, "Microaggression Counteraction Tool Evaluation," I further supported participants' process modeling by offering them the opportunity to evaluate and generate potential resolutions for counteracting microaggressions [181]. I provided four different design options to stimulate their thinking and encourage innovative solutions. This structured approach allowed participants to engage deeply with the topic, fostering both reflection and the development of practical strategies for addressing

microaggressions. To ensure the effectiveness of this sequence, I chose to initiate the sequential activity two weeks after the first microaggression activity, allowing participants ample time to complete the initial task and reflect on microaggressions before moving on to the next activity.

Third, I evaluated ARC activities to ensure they were both engaging and impactful, aiming to foster meaningful changes in participants' SRH perceptions and support-seeking behaviors. To ensure the activities were meaningful for the study participants, I carefully designed them with the specific challenges of people facing stigma in mind. In this study, stigma frequently hindered participants from seeking essential healthcare or support [116, 117]. Current ARC studies with people facing stigma aim to explore how the ARC framework can serve as an alternative space for support and connection [113, 124]. However, I also recognized the importance of considering the conversations and support that occur outside of the ARC, as these are essential for overcoming stigma and promoting positive behavior [123, 126]. Therefore, in this study, I not only measured the enjoyability and difficulty of ARC activities but also assessed how these activities influenced participants' perceptions of sexual and reproductive health and their care and support-seeking behaviors both online and offline. I sought to identify the most useful activities by evaluating activities' abilities to balance participant engagement (enjoyability) with meaningful impact (SRH-related perception and behavior change), even if they were challenging (difficulty) or uncomfortable or unpleasant (uncomfortableness).

5.5. Data Analysis

I used four criteria to examine the usefulness of each ARC activity in creating a safe space for unmarried Korean women. The data for the first criterion—how many people had seen and completed the activities—was obtained through the ARC usage log, and the data for the other criteria were obtained through a debrief survey (A9). In the debrief survey, I asked participants to

separately rate how enjoyable and how difficult each weekly activity was with a 5-point scale (1 = “Not at all”, 5 = “Very much”). Additionally, I asked which activities made them feel even a bit unpleasant or uncomfortable and why they made them feel that way to assess uncomfortableness in participating in activities on stigmatized topics. Finally, I evaluated if and how participants perceived the activities to have affected their perceptions or behaviors related to SRH to determine the activities’ usefulness in perception or behavior change about the stigmatized topic. In the debrief survey, I asked participants to select the activities that made them think about aspects of SRH that they had not before from activities A1-A11 and provide an open-ended response on why they chose those activities.

In the interview, I asked them about their overall ARC experience and in detail about their ARC activity enjoyability, difficulty, and uncomfortableness. I further asked them about how the ARC supported or did not support their perception or behavior change regarding SRH care. I audio-recorded the evaluation interviews and used a professional transcription service to have the recordings transcribed verbatim. First, I co-coded three transcripts with the ATLAS.ti software using an inductive approach [182] with the second and third researchers. Second, to derive codes representing dominant concepts in the data, I clustered related codes into overarching categories using an affinity diagramming approach, wherein I arranged coded excerpts into clusters according to similarity. To validate the coding scheme, I iterated on affinity diagramming with the second researcher. With the finalized codebook, I coded the remaining transcripts. Discussions were conducted with all researchers at every stage to further ensure validity.

With the survey and interview data analysis, I categorized the activities using three criteria: engagement, impact, and reflection. The calculation of engagement, impact, and reflection for ARC activities was based on a combination of qualitative and quantitative data collected during

the study. The rating scales started from very low to very high with five levels in total: very low, low, medium, high, and very high.

Engagement was measured using participant survey responses where they rated their enjoyment of each activity on a Likert scale, alongside participation rates. Post-activity feedback from participants, such as survey comments on the overall experience and qualitative descriptions of their experiences, also contributed to assessing engagement.

Impact was evaluated by analyzing survey responses where participants indicated how much the activity influenced their understanding or attitudes related to SRH. Qualitative feedback on perception and behavior change from open-ended survey responses and interviews helped gauge the extent of the impact.

Reflection was assessed through survey responses where participants rated the extent to which the activity prompted them to reflect on their experiences or beliefs. Qualitative data from interviews and open-ended survey responses provided insights into participants' thought processes during and after the activity. Content analysis of the depth of participant responses and follow-up questions asking about new insights or realizations further informed the reflection ratings.

5.6. Findings

In this section, I evaluate the success of this study's ARC with my ARC lesson adaptions. I elucidate the findings on improved rapport building and increased participation and enrollment rates (section 5.6.1), and improved usefulness of ARC activities (section 5.6.2).

5.6.1. Improved Rapport Building and Increased Participation and Enrollment Rates

This study had 31 potential participants, and 87% (27 out of 31) scheduled a pre-consent call with us. Following these calls, 96% (26 out of 27) of those participants enrolled in the study.

In contrast, Prabhakar et al. [151] had a 76% enrollment rate and MacLeod et al. [150] had a 26% enrollment rate. Prabhakar et al. [151] found that they had a higher enrollment rate compared to MacLeod et al. [150]'s study because they simplified the way to consent. However, I found that when working with people facing stigma, it was more effective to follow MacLeod et al. [150]'s method, which involved more in-depth pre-consent engagement.

In the interview, many participants echoed that the researcher's sincerity and niceness that was shown during pre-consent calls made them believe that the researcher was a good person who would advocate for their hardships and that the researcher was on a mission that they were willing to stand behind.

Talking to you before I gave my consent, I felt a real connection. Your kindness and the way you listened made me feel like you were on my side, and that you were committed to standing up for people like me. - P16

In addition to these pre-consent calls, I conducted follow-up phone calls to walk participants through the study procedures, address risks, and answer any concerns or questions they had. These questions typically fell into three categories: (1) clarifications on the study's scope and format (e.g., topics related to SRH and the diary entry format), (2) technical and logistical concerns (e.g., whether an app was needed, or the use of video during interviews), and (3) participation requirements and data confidentiality (e.g., the study duration and how their data would be used).

Furthermore, some participants stated that the FAQ page and the study onboarding email with the commonly asked questions before the study initiation helped them feel reassured that the researcher took their concerns seriously. Thus, they felt that they could trust the study and the research team and felt a strong urge to participate in the study.

Seeing the FAQ page and the detailed onboarding email with answers to common questions really reassured me. It showed me that you took our concerns seriously, which made me trust both you and the study. It gave me the confidence to fully participate, knowing that you cared about making sure we felt supported from the start. - P21

Overall, participants were engaged and eager to collaborate during the entire study. All participants completed every weekly activity, resulting in a 100% completion rate (Table 8), which is uncommon in ARC studies [123, 150, 151]. In comparison, Prabhakar et al. [151] and MacLeod et al. [150] saw an initial surge in participation, followed by a leveling off—Prabhakar et al. [151] sustained over 60% participation for 8 weeks, while MacLeod et al. [150] did not specify completion rates for their 22-week study. Maestre et al. [124] maintained high engagement (96%) during their 8-week study but observed a drop in participation toward the end. Similar to these studies, I encountered some delays as the study progressed [124, 150, 151]. However, many participants emailed apologies for the delays and typically completed the activities within two days of the deadline. This interaction showed that participants did have high initiative to participate in the weekly activities and found value in taking time to complete the activity.

Table 8. Completion, Enjoyability, Difficulty, Unpleasantness or Uncomfortableness of ARC Weekly Activities.

Activity (Activity Number: Title)	Completion	On-Time Completion	Enjoyability		Difficulty		Unpleasantness/ Uncomfortableness
			M	SD	M	SD	
A1: Introductions	100%	81%	**3.88**	0.82	1.50	0.76	0%
A2: Ranking of Problems	100%	81%	**3.85**	0.88	1.85	0.92	3.8%
A3: Advice Columnist	100%	89%	**3.96**	0.87	1.88	0.82	0%
A4: Open-Ended Questions	100%	85%	3.81	0.80	1.85	0.83	0%
A5: Circle Network Diagram	100%	70%	3.69	0.88	2.08	1.09	0%
A6: Personas	100%	62%	3.65	1.06	**2.88**	1.03	**19.2%**
A7: Things I Wish I Knew & Photo Elicitation	100%	62%	**3.88**	0.95	**2.23**	1.07	3.8%
A8: Microaggression Counteraction Tool Testing	100%	96%	**3.85**	1.08	**2.92**	1.09	**11.5%**

5.6.2. Improved Usefulness of ARC Activities

Useful activities were those that effectively balanced participant engagement (enjoyability) with meaningful impact (SRH-related perception and behavior change), even if they were challenging (difficulty) or uncomfortable (uncomfortableness). We used a 5-point scale (1 = "Not at all", 5 = "Very much") to measure how much participants enjoyed each activity and how difficult they found it to complete. In the following sections, we explore this study's findings on the usefulness of these activities. We begin by discussing the enjoyability, difficulty, and uncomfortableness experienced by participants during ARC activities. Next, we examine which activities influenced changes in participants' SRH-related perceptions and the mechanisms behind these changes. Finally, we share the activities that led to SRH-related behavior changes and the factors contributing to these outcomes.

5.6.2.1. Enjoyability, Difficulty, and Uncomfortableness

Overall, participants enjoyed all activities and did not find most activities difficult (Table 8). The activity that was the most enjoyable for participants was Advice Columnist (A3). The activities that were also highly enjoyable for participants were Introductions (A1), Things I Wish I Knew & Photo Elicitation (A7), Ranking of Problems (A2), and Microaggression Counteraction Tool Testing (A8). Conversely, the three most difficult activities were A8, Personas (A6), and A7 in order. Both A7 and A8 were deemed as highly enjoyable activities but were also perceived to be highly difficult by participants.

When asked why the activities were difficult, participants only denoted that the activity required more effort than other activities. However, I found more rationale on why the activities were perceived to be difficult when examining the participants' responses to which activities they found to be even a bit uncomfortable or unpleasant and why they felt that way. The participant

who found A7 to be uncomfortable (P9) responded that she had never shared experiences visiting the gynecologist's office on the web before. A6 and A8 were found to be unpleasant or uncomfortable by two participants for two main reasons. First, two participants who initially did not believe microaggressions were harmful felt slightly uncomfortable with their introduction in A6. However, one participant noted that her uncomfortableness dissipated after considering that current microaggression counteraction measures might have made her unaware of their harm during the second activity (A8).

I was uncomfortable at first, but then I started thinking about how the current efforts to counter microaggressions might have made me less aware of their impact during the second activity. Once that clicked for me, I did not feel uncomfortable anymore. - P14

Second, participants felt uncomfortable and upset upon realizing that effective microaggression counteraction tools were not yet available to protect them from the implicit but long-lasting harm of microaggressions. This led to a mix of hope for better counteraction tools and frustration with the existing online forums or communities they relied on for SRH support.

It was really upsetting to realize there are no strong tools to protect us from the lasting harm of microaggressions. I rely on these online communities, and it is frustrating they do not offer better support. I just hope something better comes along soon. - P10

5.6.2.2. SRH-Related Perception Change

I further found that participants experienced changes in perceptions of SRH issues and support for SRH issues (Figure 20). The activity most participants found to have effects on their perceptions was A6. Participants provided three reasons for why it changed their perceptions.

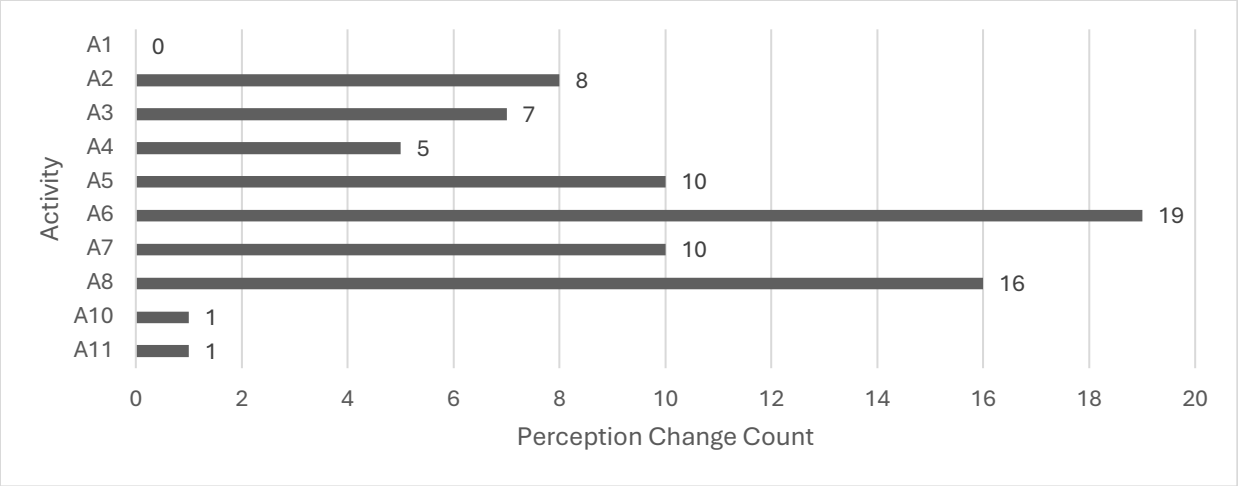

Figure 20. ARC Activities that Led to Perception Change on SRH Care and Support.

First, most participants did not know what microaggressions were before joining the study.

Before joining the study, I did not even know what microaggressions were. It was eye-opening to learn about them and realize how they have impacted my health and care without me even knowing. - P9

Second, some participants thought that microaggressions could only happen between men and women but realized during A6 that fellow women could be microaggression perpetrators.

I always thought microaggressions were something that only happened between men and women, but during the study, it really hit me that even other women could be responsible for them. It was a woah (surprising) moment for me. - P18

Third, most participants appreciated the opportunity to reflect on their words and advice that they had given to other unmarried Korean women and thought that they should put in more effort to consider if their words or advice could be microaggressions.

I was really grateful, not just saying, but really (appreciative), for the chance to reflect on the advice I have given to my friends. It really hit me that I need to be more thoughtful about my words and make sure I am not unintentionally causing harm. - P14

The second popular activity that participants found to affect their perceptions was A8. A8 helped participants consider new ways to counteract microaggressions which many had not done before this activity and encouraged them to collaborate on designing a more supportive future.

I never thought of how microaggressions could be counteracted, so it was a great opportunity to envision how it could be counteracted in so many different ways. It was also great to see and kind of design together (with other unmarried women) a future where we could be better supported. - P25

The third most SRH-related perception-changing activities were A5 and A7. A5 supported participants' recognition of their limitations in SRH care support sources and gave them the opportunity to reflect on why they were limited and find out if others had been limited in their support sources as well.

Working with the circle network diagram (A5) made me realize how limited my support sources for SRH care were. When I looked at others' diagrams, it made me wonder why we were all facing these limitations. It really made me stop and think. - P22

A5 was named by participants to be the most pivotal activity in making them increase their SRH discussions with current and potential support sources.

The concentric circle activity (A5) was the activity that really made a difference for me. It pushed me to start having more conversations about SRH with both the people I already rely on and those I had not thought to reach out to before. - P10

A7 supported participants to gain closure to their past SRH support-seeking struggles. By sending a letter to themselves in the past with a photo that they wanted to send, they were able to console their past selves and validate the struggles that they had gone through in the past.

The photo and letter activity (A7) was really powerful, memorable might be a better word, but nonetheless impactful for me. Writing a letter to my past self and sending a photo felt like a way to finally bring closure to the struggles I went through. It was like I could console my younger self and say, "Your struggles were real, and they mattered." - P5

Also, participants mentioned in the interview that they appreciated having the time to see what others have posted over the past few weeks in the weekly activities and the always-open Ask Me Anything boards.

It meant a lot to me to see what others had shared on the boards (weekly activity and Ask Me Anything boards). Finding similar experiences made me feel connected, and seeing different ones opened my eyes to new perspectives. - P2

I emphasized that there is no further monetary compensation for reviewing and commenting on others' posts and that there will also be no disadvantages from not reviewing or responding to others' posts. More than half the participants voluntarily reviewed and responded to others' posts. Later in the post-study interview, the ones who reviewed and responded told the study team that they enjoyed having the break week to review because they were, at times, too busy to take a break and read and respond to what others had to say. They said that they were able to resonate with other participants more and leave more thoughtful comments to people that they resonated with in hopes that they would not feel alone in going through hardships as they had felt until now.

I really appreciated the break week. Life gets so hectic, and it was nice to finally have time to read and respond to what others had shared. I felt more connected to their experiences and wanted to leave thoughtful comments so they wouldn't feel as alone as I had felt before. - P26

5.6.2.3. SRH-Related Behavior Change

As with previous ARC studies, I employed multiple methods to assess each phenomenon and enhance the validity of this study's findings, specifically regarding participants' challenges in SRH care and support. In A2, A5, and A7, participants shared their struggles in seeking SRH care, citing fears of judgments and the resulting lack of support from particular individuals or groups. My analysis revealed that the primary barriers participants faced in seeking SRH care or discussing SRH concerns were fears of judgments from family members, particularly mothers, as well as from friends and close acquaintances (Figure 21). However, post-study interviews indicated that participants were able to overcome these fears and challenges, ultimately altering their SRH support-seeking behaviors.

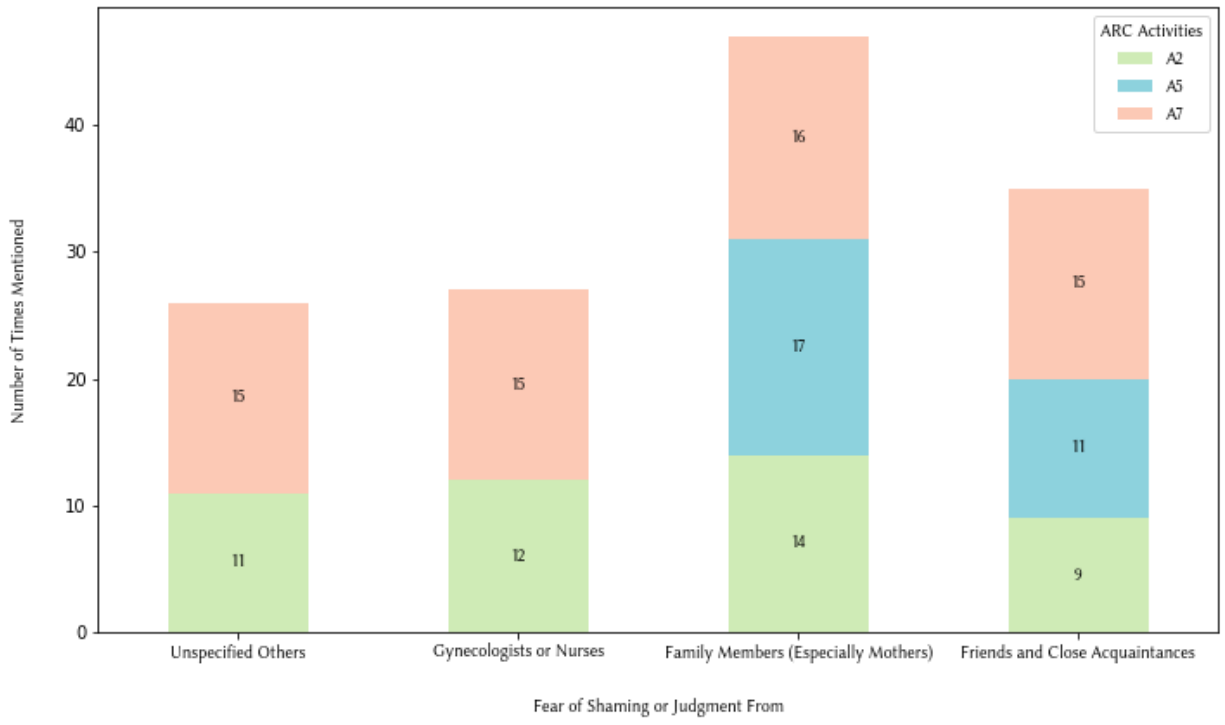

Figure 21. SRH Care and Support Challenges from A2, A5, and A7. This chart shows the number of times participants mentioned fearing judgment from various groups in activities A2, A5, and A7. The groups include "Unspecified Others", "Gynecologists or Nurses", "Family Members (Especially Mothers)",

and “Friends and Close Acquaintances”. Family members, especially mothers, were the most frequently cited sources of fear, followed by friends, acquaintances, healthcare professionals, and unspecified others. The chart highlights key social barriers to seeking SRH care and support.

The ARC supported unmarried women to reflect on their current limitations of whom they share their SRH concerns and experiences through the Circle Network Diagram activity (A5). Participants found it beneficial to have a specific time and space dedicated to reflecting on their relationships and the individuals they felt comfortable confiding in regarding their SRH concerns and experiences. This allowed them to delve deeper into the reasons behind their choices, exploring the connections they could trust and the barriers preventing them from sharing with certain individuals.

The circle activity (A5) really helped me reflect on who I feel comfortable sharing my SRH concerns with. Having that dedicated time and space made me think deeply about the relationships I trust and why I hold back with certain people. It was insightful and interesting to see the barriers I have put up and understand more about my choices. - P1

Through the second prompt of the Open-Ended Questions activity (A4), where they contemplated how they would approach SRH conversations with their hypothetical daughters in the future, participants also considered their current discussions on SRH with their mothers. In doing so, they became aware of areas for improvement in both past and ongoing SRH dialogues with their mothers. The realization of both how limited or non-existent SRH conversations with their family members are and how they wanted the conversations to improve helped participants initiate or expand conversations with their female family members, especially their mothers.

Realizing how little I talked about SRH with my family, especially my mom, really hit me. It pushed me to finally open up to her about things like birth control and menstrual health issues. We have started having those conversations, and it’s surprisingly brought us closer. - P2

Through both A5 and A7, participants recognized that despite facing similar challenges associated with the stigma surrounding SRH, some unmarried women still sought care at clinics. Moreover, both A5 and A7 revealed that unmarried women often seek care for SRH issues that they hadn't previously considered worthy of clinic visits. Upon this realization, many participants considered making visits for SRH care, and some participants actually made and went to the visit during the study.

Reading others' responses for the activities, particularly the circle activity (A5) and the letter activity (A7), made me realize that even with the stigma around SRH, some unmarried women still go to clinics for care. I had not thought about going for certain issues before, but after seeing that, I started thinking it something that I could do too. In fact, I even booked an appointment and went recently. - P14

5.7. Discussion

In this section, I offer guidance on enhancing pre-study rapport with stigmatized participants, expanding the criteria for evaluating activity usefulness, promoting positive behavior within these populations, and reconsidering the use of sequential activities.

5.7.1. Improving Pre-Study Rapport Building with Stigmatized Participants

This study underscores the importance of building rapport with participants facing stigma by addressing their concerns before the study begins. This approach substantially impacts enrollment rates and participant trust, as evidenced by comparing My methods to those of Prabhakar et al. [151] and MacLeod et al. [150]. Prabhakar et al. [151] achieved a higher enrollment rate by simplifying the consent process, while MacLeod et al. [150]'s text-based rapport-building and more complicated consent approach had a lower rate. However, this study's

findings suggest that a more personalized approach that differs from the two approaches is particularly beneficial for people facing stigma.

In contrast to Prabhakar et al. [151]'s simplified consent process and MacLeod et al. [150]'s text-based consent approach, I found that incorporating pre-study consent calls was highly effective. These calls not only clarified study procedures and risks but also provided an opportunity to address participants' specific concerns. This personalized interaction led to higher enrollment rates and increased trust. For instance, many participants expressed that discussing the study in detail made them feel understood and valued, which alleviated their anxieties about participation.

Moreover, I supplemented the pre-study calls with additional resources such as a frequently asked questions page on the ARC and detailed onboarding emails. These resources addressed common concerns and provided further clarification, reinforcing the information shared during the calls. Participants greatly appreciated these follow-up measures, which substantially increased their comfort level and commitment to the study.

In summary, the lesson learned is clear**: incorporating multiple measures to address participants' concerns before the study starts substantially enhances rapport with people facing stigma. This approach not only leads to higher enrollment rates and greater trust but also fosters a supportive environment that encourages participation and ensures the success of the study.**

5.7.2. Expanding the Evaluation Criteria of Activity Usefulness

During the process of determining the usefulness of ARC activities in this study, I found that currently used measurements in ARC debrief surveys have prioritized measuring its usability (ease of use) by assessing the activities' enjoyability and difficulty, which did not reflect usefulness [124, 150, 151]. I found that activities A6 and A8, which had high ratings for both difficulty and

enjoyability, were also the ones that participants ranked highest for providing them with the opportunity to think about SRH issues in a way they had not before—one of this study's goals. Thus, I propose that the **ARC debrief surveys and post-study interviews further include questions to assess each activity's usefulness in serving the purpose of the ARC**. For instance, if the ARC was created to connect the members of a stigmatized community and create a support network for them, the debrief survey and post-study interview should also incorporate questions on the usefulness of each activity in having a sense of belonging or feeling supported by people in similar situations.

Furthermore, I found that when asking people from stigmatized communities to think and share their thoughts about culturally taboo topics, we need to also measure how we could make the experience less uncomfortable or unpleasant for them. This study's findings indicated that participants primarily cited increased effort and time as reasons for the difficulty of activities. However, when I examined the responses for why some of the activities made them feel even a bit uncomfortable or unpleasant, I was able to further uncover why they were difficult for participants. **For ARC researchers who are creating a safe space for people facing stigma, it is crucial to ask participants about what made them feel uncomfortable or unpleasant during ARC activities to minimize the reluctance to discuss taboo topics.**

Lastly, I found that we need to also understand how participating in an ARC leads to reflection on the topic and even perception and behavioral changes. I found that investigating participants' reflection on stigmatized topics and their SRH-related perception and behavioral changes led to a deeper insight into how each activity was useful to the participants.

While the specific grouping of activities may vary based on the study population and objectives, I offer guidance on how an expanded set of criteria for activity usefulness can yield

richer insights for ARC researchers. In this study, with the assessment of the ARC activities' impact, engagement, and reflective qualities, I categorized the activities into three groups: (1) high-impact activities, (2) reflective activities, and (3) engaging activities (Figure 22). Impact refers to how effectively an activity influenced participants' thoughts and actions related to SRH. Engagement refers to how actively and willingly participants were involved in an activity. Reflection refers to the extent to which an activity encouraged participants to think deeply about their SRH-related experiences, beliefs, and behaviors.

Figure 22. ARC Activity Groups. Engagement refers to how actively and willingly participants were involved in an activity. Impact refers to how effectively an activity influenced participants' thoughts and actions related to SRH. Reflection refers to the extent to which an activity encouraged participants to think

deeply about their SRH-related experiences, beliefs, and behaviors. High-impact activities, such as A6, A7, and A8, were challenging but led to substantial changes in perception and deep reflection, even if they caused slight uncomfortableness to a few participants. Reflective activities, like A4 and A5, maintained high engagement, promoted positive changes in perception and behavior, and encouraged deep reflection on relationships and SRH care decisions. Engaging activities, such as A3, were highly enjoyable and effectively engaged participants, though they did not lead to the same depth of reflection or substantial changes in perception or behavior as other activities.

High-impact activities, such as A6, A7, and A8, were challenging but led to substantial changes in perception and deep reflection, even if they caused slight uncomfortableness to a few participants. For example, A6 required participants to confront and reflect on microaggressions, leading to profound changes in how they perceived these behaviors and their impact on SRH. A7 involved deep reflection on past SRH experiences, offering participants closure and validation despite the emotional intensity. A8 addressed microaggressions directly, challenging participants to think critically and substantially shifting their understanding of these issues.

Reflective activities, like A4 and A5, maintained high engagement, promoted positive changes in perception and behavior, and encouraged deep reflection on relationships and SRH care decisions. A4, for instance, prompted participants to reflect on their SRH conversations with family members, leading to improved communication and insights into generational beliefs. A5 involved mapping out SRH support networks, leading participants to important realizations about their limitations in seeking support and motivating them to strengthen these networks.

Lastly, engaging activities, such as A3, were highly enjoyable and effectively engaged participants, though they did not lead to the same depth of reflection or substantial changes in perception or behavior as other activities. A3 facilitated open dialogue and participation, but its

impact on SRH-related perceptions was moderate, classifying it as an engaging rather than a reflective activity.

Researchers can leverage these categories—high-impact, reflective, and engaging activities—to tailor their ARC studies more effectively to the needs of their target populations. However, high-impact activities should be introduced with caution due to the potential uncomfortableness they may cause. These activities can be strategically incorporated to drive deep reflection and transformative perception shifts, but researchers should ensure that participants are adequately prepared and supported throughout the process. Reflective activities can be used to maintain high engagement while promoting positive changes in attitudes and behaviors, particularly in contexts where participants may need to process complex emotions or cultural taboos. Engaging activities, while perhaps less transformative, can serve as important tools to foster initial participation and build trust, gradually preparing participants for more challenging tasks.

By thoughtfully integrating these types of activities, researchers can create a balanced and effective ARC study that not only engages participants but also facilitates meaningful outcomes. This approach allows researchers to align their study design with specific goals—whether it's fostering reflection, encouraging behavior change, or simply engaging participants—ultimately leading to more impactful and meaningful research with people facing stigma.

This study reveals the necessity of expanding the evaluation criteria for ARC activities to go beyond usability, addressing both the uncomfortableness participants may experience and the impact these activities have on their reflections and behaviors. With the broadened evaluation criteria, I was able to better understand how each activity contributes to achieving the study's goals, particularly in the context of people facing stigma. These findings

highlight the importance of not only creating safe and engaging spaces but also ensuring that the activities are truly meaningful and effective in fostering reflection and behavioral change. This approach offers a valuable framework for future ARC studies, guiding researchers in designing activities that not only facilitate participation but also drive substantial and positive outcomes for the communities involved.

5.7.3. Encouraging Positive Behavior for People Facing Stigma Through Awareness of Peer Actions

Creating opportunities for people to be aware of what others similar to them typically do is crucial for encouraging behavior change in people facing stigma. This principle is rooted in the concept of descriptive norms, which refer to behaviors perceived as common or typical among peers [179]. When individuals understand that others like them engage in certain behaviors that they thought were uncommon (e.g., "Many unmarried women seek care despite fear of facing stigma." or "Many people like me vote."), they are more likely to adopt these behaviors themselves [166, 177, 179]. **This study highlights the importance of leveraging these descriptive norms to encourage positive behavior change in people facing stigma.**

I found that when participants discovered that other unmarried women in similar situations sought care or shared their situations with others, they became more willing to discuss their own SRH concerns or seek care. This awareness of descriptive norms substantially influenced their behavior.

Circle Network Diagram (A5) was particularly effective in changing participants' perceptions. This activity helped participants recognize their limitations in SRH care support sources and reflect on why they were limited. By learning that others had similar experiences, participants felt encouraged to increase their SRH discussions with current and potential support

sources. **Given its effectiveness, incorporating the Circle Network Diagram activity into future ARC studies could be beneficial for fostering awareness and encouraging positive behavior change**.

Participants also appreciated having time to see what others had posted in the weekly activities and the always open Ask Me Anything and Diary boards. Despite no monetary compensation for reviewing and commenting on others' posts, more than half the participants willingly engaged in this activity. During post-study interviews, participants mentioned that they enjoyed the break week to review others' posts. This allowed them to resonate more deeply with other participants, leave thoughtful comments, feel less alone in their hardships, and learn from others' approaches to resolving similar issues. **Including a break week in future ARC studies could give participants the necessary time to reflect on others' hardships and different ways of resolving issues, allowing them to engage more meaningfully with the community**.

Creating opportunities for participants to bond over current hardships, share narratives of overcoming judgments and stigma, and show support for other women facing SRH-related stigma was crucial in building trust and supporting positive behavior change. These findings align with broader research on descriptive norms, reinforcing the importance of making individuals aware of the typical behaviors of others similar to them to encourage behavior change.

The key lesson here is that awareness of the typical actions of peers can drive substantial behavior change, especially in people facing stigma. By integrating these principles into future asynchronous remote community studies, we can foster an environment where participants feel supported and motivated to adopt positive behaviors. Highlighting the actions of peers not only encourages individuals to conform to positive behaviors but also helps build a supportive community that promotes overall well-being.

5.7.4. Reconsidering the Use of Sequential Activities

ARC guidelines, particularly lesson 3 (Table 7), advise against the use of sequential activities, based on the assumption that participants complete multiple tasks simultaneously. However, this study presents a different perspective. I observed that even when participants delayed starting their activities, they completed each task within two days of the deadline and before beginning the next one. Participants shared that the activities prompted them to reflect on topics they had not considered before and generated excitement for the subsequent week's task. This engaging and anticipatory experience contributed to the consistent and timely completion of each activity.

Given the positive experience of reflection and the timely completion of activities, I explored the potential value of sequential activities in addressing the microaggressions faced by unmarried Korean women. The microaggression framework has been applied to understanding its perpetuation in discouraging SRH care in only one study [9] to my knowledge. Many unmarried Korean women are often both unintentional perpetrators and unaware targets of microaggressions that discourage timely SRH care [9]. Sue et al. [24, 137] emphasized the importance of making the "invisible" visible and educating perpetrators as core interventions against microaggressions, and I found A6 effective in achieving these goals.

Naming an oppressive event, situation, or process is the first step toward empowerment and liberation, as it diminishes the power such experiences hold over people facing stigma [168]. By providing participants with the language to convey their experiences, naming helps them feel validated and assured that their thoughts and experiences are legitimate [24, 137, 168]. In A6, I aimed to support unmarried women in naming microaggressions. Many participants reported that A6 changed their perceptions of SRH issues by making them aware of microaggressions they had

previously witnessed but could not articulate. This recognition contributed to feelings of liberation and empowerment.

Furthermore, awareness of microaggressions prompted participants to reflect on their roles in perpetuating oppression [24, 137]. This study revealed that individuals who are targets of microaggressions can also be perpetrators. Reflecting on past experiences of negating or invalidating others' thoughts or opinions, as prompted by A6, helped participants understand their roles in unintentionally oppressing fellow unmarried Korean women. This reflection, facilitated by the sequential nature of activities like A6, supported their education, self-awareness, and reassessment of values.

In addition, Sue et al. [24] noted that inaction against microaggressions often stems from not knowing how to respond. A8 allowed participants to envision using tools to counteract microaggressions, helping them explore different perspectives and strategies. Participants found this exploration valuable, as it supported their education, self-reflection, and reassessment of values. Using A6 and A8 sequentially reinforced these aspects, enabling participants to better understand their beliefs and behaviors and to envision positive change.

Based on this study's findings, I **recommend reconsidering the use of sequential activities in ARC studies. While MacLeod et al. [150]'s lesson on discouraging sequential activities is valuable, this study demonstrates that, under specific conditions—such as high participant engagement and sufficient reflection time—sequential activities can be highly beneficial.** Sequential activities can be particularly valuable when participants are highly engaged in weekly tasks and consistently complete each on time, ensuring a structured progression that fosters deeper reflection and sustained engagement. Starting with problem identification and self-reflection, followed by evaluating potential solutions, proved to be an effective sequence.

Additionally, spacing activities at least two weeks apart allows time for both activity completion and meaningful reflection.

To my knowledge, Garg [178] is the only other ARC study advocating for the use of sequential activities. In their study with parent-child dyads, similar conditions were applied, such as requiring the completion of one task before moving on to the next and allowing a two-week gap to accommodate any delays. Both this study's findings and Garg [178]'s suggest that sequential activities can encourage deeper engagement and understanding when participants are provided the time and structure for reflection. Although sequential activities are generally discouraged in ARC studies, my work, along with Garg [178]'s, indicates that they can be particularly effective for fostering comprehensive understanding and deep reflection when dealing with complex topics, whether related to stigma or other challenging concepts.

5.8. Limitations and Future Work

Unlike previous ARC studies, this study did not require participants to have a social media account. However, all participants needed access to technology to complete activities involving image uploads or photography. To broaden the scope of this research, future studies should explore ways to include participants in remote or low-resource areas where access to technology is limited.

Additionally, while this study found that the ARC encouraged positive behaviors among people facing stigma—such as seeking stigmatized care or engaging in discussions on stigmatized health topics—I was unable to track the long-term effects of ARC participation. I recommend that future studies incorporate long-term effect measurements to better understand the lasting impact of ARC participation on behavior and perception changes.

5.9. Conclusion

This study highlights the substantial potential of my adaptations to the ARC method in cultivating meaningful interactions and engagement among people facing stigma, particularly when addressing sensitive topics like SRH among unmarried Korean women. By refining the ARC approach through enhanced pre-study rapport-building, expanding the criteria for evaluating activity usefulness, and thoughtfully incorporating sequential activities, I was able to create more meaningful experiences for the study participants. These adaptations also contributed to a high enrollment rate (96%) and 100% participation in the study activities across the 9-week study, which in turn led to richer and more comprehensive insights.

This study's findings challenge the traditional ARC guidelines that discourage sequential activities, showing that when conditions are right—such as with high participant engagement and sufficient reflection time—these activities can deepen reflection and lead to more profound changes in perception and behavior. This heightened level of participant reflection and engagement not only benefited them personally but also strengthened the research outcomes by providing deeper, more nuanced insights into their experiences and perspectives. The approach that I used is particularly crucial when working with populations burdened by stigma, as these structured interactions can facilitate open discussion and self-reflection.

Moreover, by broadening the evaluation criteria for ARC activities beyond usability to encompass their impact on participants' perceptions and behaviors, I demonstrated that ARC can be more than just a research tool; it can also drive personal and communal growth. This more holistic evaluation enhances the quality of the research, as it captures deeper insights into participant experiences and the broader impact of the study.

In conclusion, this study offers valuable insights for future ARC research, particularly with stigmatized groups. By adapting the ARC method to focus on creating meaningful interactions and engagement, researchers can build environments that not only encourage honest participation but also lead to lasting positive change. These findings underscore the potential of ARC to empower marginalized voices, enhance research quality, and foster substantial personal and communal growth, paving the way for more impactful research in this field.

5.10. Chapter Summary and Contributions

Summary

This section highlights the methodological innovations I introduced to the ARC approach in order to better support meaningful interactions and participant engagement, particularly with stigmatized populations. Recognizing the limitations of traditional ARC guidelines such as discouraging sequential activities, I refined the method through three key strategies: enhancing rapport before the study began, broadening the criteria for evaluating activity usefulness, and designing a sequence of activities that built upon one another.

These adaptations contributed to a 96% enrollment rate and 100% participation across the nine-week study, leading to deeper reflection and richer insights from participants. Contrary to existing guidance, I found that thoughtfully sequenced activities, when paired with strong rapport and sufficient reflection time, could promote sustained engagement and behavioral change. By moving beyond usability as the sole evaluation criterion and considering emotional and perceptual impact, I demonstrated ARC's broader potential in not only collecting data but also catalyzing growth and empowerment within marginalized communities.

Contributions

- I demonstrated that the ARC method can be adapted to support sensitive and stigmatized topics through targeted methodological refinements that emphasize meaningful interaction and deep participant engagement.
- My adaptations—specifically enhanced rapport-building, broadened activity evaluation, and structured sequential activities—resulted in high enrollment and full participation, thereby ensuring high-quality data and richer insights.
- I broadened the ARC evaluation framework to capture both behavioral and perceptual changes, revealing ARC's potential as not only a research tool but also a mechanism for empowerment and social change.
- These methodological contributions are detailed in: Ryu, H. and Pratt, W. [Under Review]. "Enhancing Design Research for People Facing Stigma: Strengthening Participation, Engagement, and Reflection." *ACM Health Special Issue*.

Chapter 6: Culturally Sensitive Counterspeech with Generative Artificial Intelligence

This chapter is based on a manuscript currently under review: Ryu, H., Kang, S., & Pratt, W. *Mitigating Stigma and Fostering Support: Improving AI-Generated Counterspeech for Microaggressions.* Submitted to *AMIA 2025 Annual Symposium.*

6.1. Study Purpose

Counterspeech offers a promising approach to mitigate the harms of these microaggressions [68, 189]. Rather than censoring or removing problematic remarks, counterspeech directly engages with them, challenging harmful narratives and fostering awareness [190]. By responding with empathy, education, and alternative perspectives, counterspeech can disrupt stigma and encourage more supportive conversations [191, 192]. However, crafting effective counterspeech has proven to be challenging, particularly in contexts where stigma is deeply embedded in cultural norms [68, 189].

Generative artificial intelligence (AI) presents a potential solution by enabling scalable, contextually adaptive counterspeech interventions [68, 189]. AI-driven approaches can help overcome the limitations of manual moderation, which often requires extensive labor and cultural expertise, by generating responses that challenge stigma in real time. Prior research has explored AI-generated counterspeech in domains such as hate speech mitigation [193] and online harassment reduction [194], demonstrating its potential to intervene in harmful discourse. However, applying generative AI to counterspeech for deeply ingrained, culturally specific microaggressions—such as those related to SRH stigma—remains an underexplored area. The

complexity of these interactions requires AI models to move beyond generic responses and incorporate cultural sensitivity, nuance, and validation of the microaggression target's experiences.

To explore how generative AI navigates these complexities, this study examines AI-generated counterspeech in response to microaggressions occurring in online spaces. Using AI-generated counterspeech, we investigate how AI tools incorporate recommended strategies for counteracting microaggressions and identify ways that they might perpetuate harm or reinforce stigma. By describing AI's current counterspeech generation process and evaluating both the strengths and limitations of AI-generated counterspeech, this study offers insight into how generative AI could foster more inclusive and supportive conversations about stigmatized healthcare topics, not only for unmarried Korean women but also for others navigating stigmatized healthcare.

6.2. Methods

This section describes the data used for counterspeech generation, the process each generative AI model claims to follow in creating counterspeech, and the approach we took to analyze the resulting counterspeech. This study received Institutional Review Board approval from the University of Washington.

6.2.1. Data

We collected microaggression samples by scraping online forums where unmarried Korean women discuss concerns related to SRH. From this dataset, we randomly selected 50 microaggression samples to use as input for counterspeech generation. The samples had microaggressions that were either directed at individuals who shared their concerns, fears, or unpleasant experiences or were embedded within discussions among fellow users.

We selected microaggression samples that captured a diverse range of types and severities. We aimed to include examples with varying emotional tones, contexts (e.g., clinical vs. social), and speaker relationships ((e.g., between peers, between older and younger women, or between anonymous community members with differing views) to examine how well the models adapted their responses to nuanced content.

Since both ChatGPT-4 and Copilot GPT-4 exhibited limitations in understanding the nuances of these microaggressions and generating appropriate counterspeech in Korean, the first author translated the 50 microaggression samples into English. The second author then reviewed the translations in detail to ensure that cultural nuances and the specific nature of the microaggressions were accurately preserved. Both authors are native Korean speakers who completed their primary and undergraduate education in Korea and later pursued master's degrees at an American university, receiving intensive English training in Korea.

We selected ChatGPT-4 and Copilot GPT-4 for counterspeech generation comparison due to their widespread use, relevance to public deployment, and availability during the time of the study. These models also represented different backend infrastructures (OpenAI vs. Microsoft), allowing us to explore variance in counterspeech generation across platforms.

For each microaggression sample, we prompted both AI models to generate counterspeech using the prompt: "Create a counterspeech for this microaggression that an unmarried Korean woman encountered or was subjected to in an online community." Each microaggression sample was input one at a time to both models. Both AI models generated a counterspeech example for each of the 50 microaggression samples, resulting in a dataset of 100 AI-generated counterspeech samples.

The input process was stateless: the authors used a newly created account for ChatGPT to prevent contamination from prior interactions, and no prior account existed for Copilot. This ensured that each interaction was isolated and not influenced by earlier queries.

6.2.2. Generative AI's Claimed Approach to Creating Counterspeech

We asked both ChatGPT-4 and Copilot GPT-4 to explain their process of generating microaggression counterspeech using the prompt "How do you create counterspeech for microaggressions on stigmatized health topics that occur in online communities?" This prompt was issued before counterspeech generation to examine how the models framed their interpretive approach. By examining the responses that both AI models provided, we synthesized the counterspeech generation process of both models. Both ChatGPT-4 and Copilot GPT-4 generate microaggression counterspeech by identifying the underlying harmful belief, validating the emotions of those affected, and providing factual corrections to challenge misconceptions. ChatGPT-4 emphasizes fostering constructive dialogue through reflective questions and alternative viewpoints, aiming to promote solidarity by offering support and relevant resources. In contrast, Copilot GPT-4 focuses more on factual corrections and encouraging positive behavioral change by proposing ways to handle similar situations in the future. While both models claim to maintain a respectful and engaging tone to avoid confrontation, ChatGPT-4 leans toward education and encouragement, whereas Copilot GPT-4 prioritizes steering conversations toward mutual understanding and inclusivity.

6.2.3. Analysis

To evaluate the AI-generated counterspeech, we applied both deductive and inductive coding approaches. First, we synthesized strategies suitable for online counterspeech by drawing from the Dangerous Speech Project [192]'s guidelines for recommended and problematic

counterspeech strategies and Sue et al.'s microintervention strategies [24] (Table 9). We then used the codes in Table 9 to deductively analyze the dataset, assessing how well the AI-generated counterspeech aligned with these established frameworks.

Simultaneously, we employed an inductive approach to identify potential harms and areas for improvement within the AI-generated counterspeech. The first and second authors independently coded the dataset using ATLAS.ti, systematically reviewing each transcript to derive codes representing dominant concepts in the data. After this initial coding, the first author clustered related codes into overarching categories using affinity diagramming, arranging coded excerpts based on similarity. To validate the coding scheme, this process was iteratively refined through discussions with the second and third authors. At each stage, all authors engaged in discussions to ensure coding consistency and maintain analytical rigor.

We determined the number of samples based on thematic saturation. After co-coding 40 samples (20 at a time), we observed no new themes emerging. An additional 10 samples were analyzed to confirm saturation, bringing the total to 50.

Table 9. Codes for Recommended and Problematic Strategies for Counterspeech Derived from Dangerous Speech Project [192]'s Guidelines and Microintervention Strategies [24].

Strategy Type	***Strategy***	***Definition***
Recommended	Empathy	Use a friendly, empathetic, or peaceful tone in responses to microaggressions.
	Disarm the Microaggression	Express disagreement with the microaggression.
	Make the "Invisible" Visible	Challenge the stereotype and make the meta-communication explicit.
	Educate the Offender	Differentiate between intent and impact. Promote empathy. Appeal to the perpetrator's values and principles.
	Shaming and Labeling	Label microaggression posts/comments as hateful, racist, bigoted, misogynistic, etc.

	Affiliation	Affiliate with the microaggression target or the group the target is in to establish a connection (e.g. I am also a conservative, but…; What you said was hurtful to me as an Asian…).
	Warning of Consequences	Warn the possible consequences of perpetuating microaggressions on a public platform.
Problematic	Hostile or Aggressive Tone, Insults	Respond to hateful speech with a hostile, aggressive tone, and insults. This includes but is not limited to the use of profanity, slurs, name-calling, and aspersions.
	Fact-Checking	React to microaggression by correcting falsehoods or misperceptions contained in the speech.
	Silencing	Limit the speech of women, minority groups, and dissenters.
	Harassment	Use demeaning or intimidating words such as warnings of offline consequences that are threatening.

6.3. Results

In this section, we first discuss how AI-generated counterspeech aligns with recommended counterspeech strategies. Second, we elucidate the limitations and potential harms of AI-generated counterspeech.

6.3.1. How AI-Generated Counterspeech Aligns with Recommended Strategies

The most frequently observed and recommended strategy in AI-generated counterspeech was **Empathy**, with 63 instances (Table 10). By adopting a calm, non-confrontational tone, these responses aimed to encourage constructive dialogue while validating the experiences of microaggression targets.

Your choices and circumstances are valid, and you deserve to receive care that respects your autonomy and addresses your needs effectively. – ChatGPT-4

Table 10. Recommended Counterspeech Strategy Usage in AI-Generated Counterspeech.

Recommended Counterspeech Strategies	Total	ChatGPT-4	Copilot GPT-4
Empathy	63	29	34
Disarm the Microaggression	47	18	29
Make the "Invisible" Visible	55	30	25
Educate the Offender by promoting empathy	36	20	16
Educate the Offender by appealing to the offender's values and principles	20	13	7
Educate the Offender by differentiating between intent and impact	10	5	5
Shaming and Labeling	1	1	0
Affiliation	0	0	0
Warning of Consequences	0	0	0

Another frequently used strategy was **Disarm the Microaggression** with 47 instances. These responses that expressed disagreement with the microaggressions played a crucial role in countering problematic narratives without escalating hostility. However, while disagreement was expressed, AI-generated responses often softened their tone excessively, potentially limiting their ability to explicitly challenge biases.

While healthcare professionals are indeed trained to handle a wide variety of situations with professionalism, the perception of judgment can be a real barrier for some. – ChatGPT-4

Going beyond disagreeing with the microaggressions, they also frequently used the strategy **Make the "Invisible" Visible** with 55 instances. These responses explicitly countered stereotypes embedded in microaggressions, such as the assumption that unmarried women seeking SRH care are acting inappropriately. By making these biases explicit, AI-generated counterspeech aimed to challenge discriminatory assumptions that shape social interactions.

Fertility concerns are significant and sensitive for anyone, regardless of their marital status. – ChatGPT-4

Beyond disarming microaggressions and highlighting implicit biases, AI-generated counterspeech frequently employed education-based strategies to encourage offenders to reconsider their views. **Educate the Offender by promoting empathy** (36 instances) and **Educate the Offender by appealing to the offender's values and principles** (20 instances) were commonly used approaches that framed reproductive healthcare as a universal issue rather than one tied to moral or social judgments.

ChatGPT-4 emphasized the importance of fostering understanding, stating that "*Encouraging empathy rather than dismissing concerns can help create a more supportive environment."* Similarly, Copilot GPT-4 reinforced the need for respect and validation, noting that "*It's important to respect each individual's experience and not dismiss their pain. Seeking medical advice can be crucial for those who need it, and it's always best to support each other with empathy and understanding."*

Both models also followed the **Educate the Offender by differentiating between intent and impact strategy**, appearing 5 times each in ChatGPT-4 and Copilot GPT-4. This approach clarified that even unintentional statements can have harmful effects.

Dismissing concerns about pain not only overlooks the immediate needs of the patient but can also deter them from seeking future care. – ChatGPT-4

Overall, AI-generated counterspeech aligns with established microintervention strategies by prioritizing empathy, stereotype-challenging, and indirect education. By maintaining a calm and non-confrontational tone, AI-generated responses contribute to validating the microaggression target's experiences, reducing defensiveness, and encouraging more inclusive conversations.

6.3.2. Limitations and Potential Harms in AI-Generated Counterspeech

Our analysis revealed that AI-generated counterspeech, while well-intentioned, often fails to provide meaningful support and may reinforce the stigma it seeks to counter. While AI-generated counterspeech largely avoided explicit hostility or harassment, they frequently relied on problematic approaches such as fact-checking and silencing[11]. Beyond the usage of problematic counterspeech strategies, our inductive analysis uncovered more insidious harms, including discussing stigma as outdated, failure to challenge relevant stereotypes, placing the sole burden on the microaggression target, and generating overly generic and superficial empathy (Table 11). Each of these harms reduces the effectiveness of AI-generated counterspeech by either misrepresenting the problem, failing to engage with the underlying discriminatory narratives, or shifting responsibility onto the microaggression target rather than the perpetrator or larger system.

Table 11. Harms of AI-Generated Counterspeech.

Harms	Total	ChatGPT-4	Copilot GPT-4
Discussing stigma as outdated	9	2	7
Failing to challenge relevant stereotypes	8	5	3
Placing the sole burden on the microaggression target	8	4	4
Generating overly generic and superficial empathy	84	44	40

One of the most concerning harms was the **tendency of AI-generated counterspeech to misrepresent stigma as an outdated belief rather than an ongoing systemic issue**. By misrepresenting stigma as outdated, AI-generated counterspeech risks dismissing rather than supporting those facing discrimination. Copilot GPT-4, in particular, was responsible for most instances of discussing stigma as outdated (7 out of 9 cases), often framing microaggressions as remnants of an old-fashioned worldview that is naturally fading away rather than acknowledging

the active and deeply ingrained cultural biases that continue to shape experiences today. For instance, in response to a post where a woman's mother expressed anger at her visiting an OB-GYN, believing that time would naturally cure her symptoms, the AI-generated counterspeech erroneously framed the mother's reaction as an outdated viewpoint that was no longer widely held and neglected to show empathy for the woman See example below:

Microaggression*: I had severe vaginitis and it got really bad, so I told my mom, and she was initially furious that an unmarried woman wanted to go to the OB-GYN. She got furious for the second time saying that vaginitis gets cured when you get married.*

Counterspeech*: It's really concerning that such* ***outdated*** *views about healthcare still exist. Visiting an OB-GYN is essential for maintaining health, regardless of marital status. Vaginitis is a medical condition that requires proper treatment, and it doesn't just go away with marriage. –* Copilot GPT-4

While the AI-generated counterspeech correctly asserts that medical treatment is necessary, it fails to validate the user's distress by ignoring the broader cultural pressures that discourage unmarried women from seeking medical care. By characterizing the mother's response as "outdated," AI suggests that the stigma is already in decline, which may not align with the lived experiences of the user or other women facing similar barriers.

Furthermore, AI sometimes generated judgments of the microaggression target's fears of seeking SRH care by saying that their fear was "outdated". Such responses failed to validate the microaggression target's concerns, reinforcing the stigma it sought to counter.

Your medical decisions should be based on your health needs and personal comfort, not ***outdated*** *notions or judgments*. – Copilot GPT-4

Beyond misrepresenting stigma as outdated, AI-generated counterspeech also applied the problematic strategy of fact-checking [192] in a rigid and culturally insensitive manner, further failing to acknowledge the social and structural barriers that prevent unmarried women from seeking healthcare. Instead of validating users' concerns, these forms of counterspeech repeatedly emphasized how sharing facts that SRH conditions require medical treatment could help the targets, disregarding the reality of cultural stigma. See example below:

Marriage doesn't cure medical conditions like vaginitis; proper medical treatment does. Maybe sharing factual information about how common such conditions are and how they are treated might help change her (perpetrator: microaggression target's mother) perspective. – ChatGPT-4

Another key limitation of AI-generated counterspeech was its **inability to accurately identify and challenge the underlying stereotypes that fuel microaggressions**. Instead of addressing the core discriminatory assumptions behind a microaggression, the AI often redirected the conversation toward general healthcare principles or professionalism, overlooking the underlying cultural or gendered biases.

For example, when a user shared that a gynecologist dismissed her pain during an examination by stating, "Women have to go through childbirth pain anyway. Just do it.", the AI-generated counterspeech responded by emphasizing the importance of pain management but failed to challenge the assumption that all women are expected to give birth.

Pain management and comfort during medical procedures are important aspects of healthcare. It's essential that medical professionals acknowledge pain and explore all possible means to minimize discomfort. – ChatGPT-4

While this counterspeech addresses the importance of recognizing pain, it completely ignores the core discriminatory stereotype embedded in the microaggression: the belief that women's bodies are inherently tied to childbearing, and that suffering through pain is part of their biological role. By failing to challenge this stereotype, the AI-generated counterspeech allows the deeper harm of the microaggression to go unaddressed.

Similarly, when responding to a doctor's inappropriate comment about vaginal width and self-pleasure, the AI focused on the need for professional and non-judgmental healthcare but failed to challenge the underlying stigmatized beliefs about female sexuality and purity. By avoiding a direct challenge to these harmful cultural beliefs, the AI-generated counterspeech reinforces the very narratives it should be dismantling.

Microaggression*: My doctor said to me with a look of confusion and judgment, "You're too wide for an unmarried woman. Do you use self-pleasure tools?" I feel weird about the comment.*

Counterspeech*: Medical examinations should be conducted with professionalism and without personal judgments. Questions about personal life should be relevant and asked with sensitivity, always prioritizing the patient's comfort and privacy.* – ChatGPT-4

The third particularly problematic pattern was the **AI's recurrent tendency to shift the responsibility for resolving discrimination onto the microaggression target**, rather than addressing the systemic or interpersonal biases that perpetuate these harmful experiences. Instead of challenging the underlying structures that enable microaggressions, AI-generated counterspeech frequently placed the burden on the target to adapt, find alternative solutions, or manage the situation independently.

One example of this pattern involved the problematic counterspeech strategy of silencing [192], where AI subtly dismissed concerns rather than validating them. Instead of affirming the microaggression target's discomfort at the OB-GYN, the AI-generated counterspeech implied that the solution was simply to seek a different provider, effectively downplaying the larger issue of systemic stigma.

If you're not comfortable with the way you're being treated, it might be worthwhile to look for another healthcare provider who respects your autonomy and treats you with the dignity you deserve. – ChatGPT-4

Beyond silencing, AI-generated counterspeech also misdirected responsibility by downplaying the possibility of bias and reinforcing the notion that concerns about discrimination stemmed from personal anxiety rather than legitimate experiences. For example, when a user expressed fear of being judged by her gynecologist, the AI downplayed the possibility of bias and instead reassured her that doctors are professional and non-judgmental. This implicitly suggests that the user's concerns stem from personal anxiety rather than legitimate experiences of bias, which dismisses the broader issue of medical discrimination.

While doctors strive to be professional and non-judgmental, it's understandable to feel anxious about how you might be perceived. – ChatGPT-4

In another case, when a user described her partner's discomfort with her seeking gynecological care, the AI-generated counterspeech placed the responsibility on her to find a doctor that would make both her and her partner comfortable, rather than challenging the notion that a woman's healthcare decisions should be contingent on her partner's approval. By framing solutions in this way, AI-generated counterspeech reinforces rather than dismantles the societal structures that place the burden of change on marginalized individuals.

It's important to find a doctor who listens to you and provides the care you need without making you or your boyfriend feel uncomfortable. – Copilot GPT-4

Last but not least, the *most frequent* harm—occurring 84 times across 100 instances of counterspeech—was the **AI's overuse of generic and superficial empathy**. While an empathetic tone is crucial for supportive conversations, the AI often failed to personalize its counterspeech, making its encouragement feel hollow and dismissive rather than affirming and empowering. For instance, when responding to a microaggression implying that unmarried women should delay OB-GYN visits until after marriage, the AI called for a supportive healthcare environment without directly validating the user's specific experience.

Microaggression*: When you go there (the OB-GYN) after you're married, you'll be less embarrassed.*

Counterspeech*: Let's strive to create a supportive environment where anyone can seek medical advice without feeling judged or embarrassed.* – ChatGPT-4

Similarly, AI-generated counterspeech often made broad calls for collective action without providing concrete steps or strategies, limiting their effectiveness. These calls frequently included overly generic expressions of empathy, such as *Let's keep pushing for better, more compassionate communities together* (ChatGPT-4). Such statements that started with "Let's strive to/keep pushing for/support each other in [collective action]." appeared in nearly all AI-generated counterspeech—84 times out of 100—contributing to their superficial tone. Although Copilot GPT-4 called for more collective action without detailed suggestions than ChatGPT-4 did, both systems need improvement. By failing to offer specific guidance on how to navigate or respond to these microaggressions, AI-generated counterspeech lacks the depth needed to be a truly effective intervention.

The limitations of AI-generated counterspeech extend far beyond occasional missteps—they reveal deep structural issues in how AI systems engage with sensitive and culturally nuanced topics.

6.4. Discussion: Step-by-Step Process for Improving AI-Generated Counterspeech

The limitations and harms identified in AI-generated counterspeech highlight the need for substantial improvements in how these systems respond to microaggressions. While AI has the potential to facilitate constructive discussions and provide support, its current approaches often fail to challenge harmful narratives effectively, inadvertently reinforcing stigma rather than dismantling it. To better understand and enhance AI-generated counterspeech, we identify the current process generative AI takes, highlight the areas that need improvement, and identify a new process for AI-generated counterspeech that is more inclusive and culturally sensitive (Figure 23). The sections below detail our proposed process.

6.4.1. Step 1: Identify Both Explicit and Implicit Biases in Microaggressions

Instead of addressing the explicit and implicit biases evidenced in the microaggressions, AI often missed the deeper social and cultural biases embedded in the microaggressions. This oversight weakens the impact of counterspeech by allowing harmful assumptions to persist unchallenged. To address this problem, AI **must be trained to detect both explicit and implicit biases, enabling it to dismantle discriminatory narratives effectively.** Studies on bias in language models [195] reinforce that, without targeted mitigation strategies, AI can unintentionally perpetuate societal prejudices.

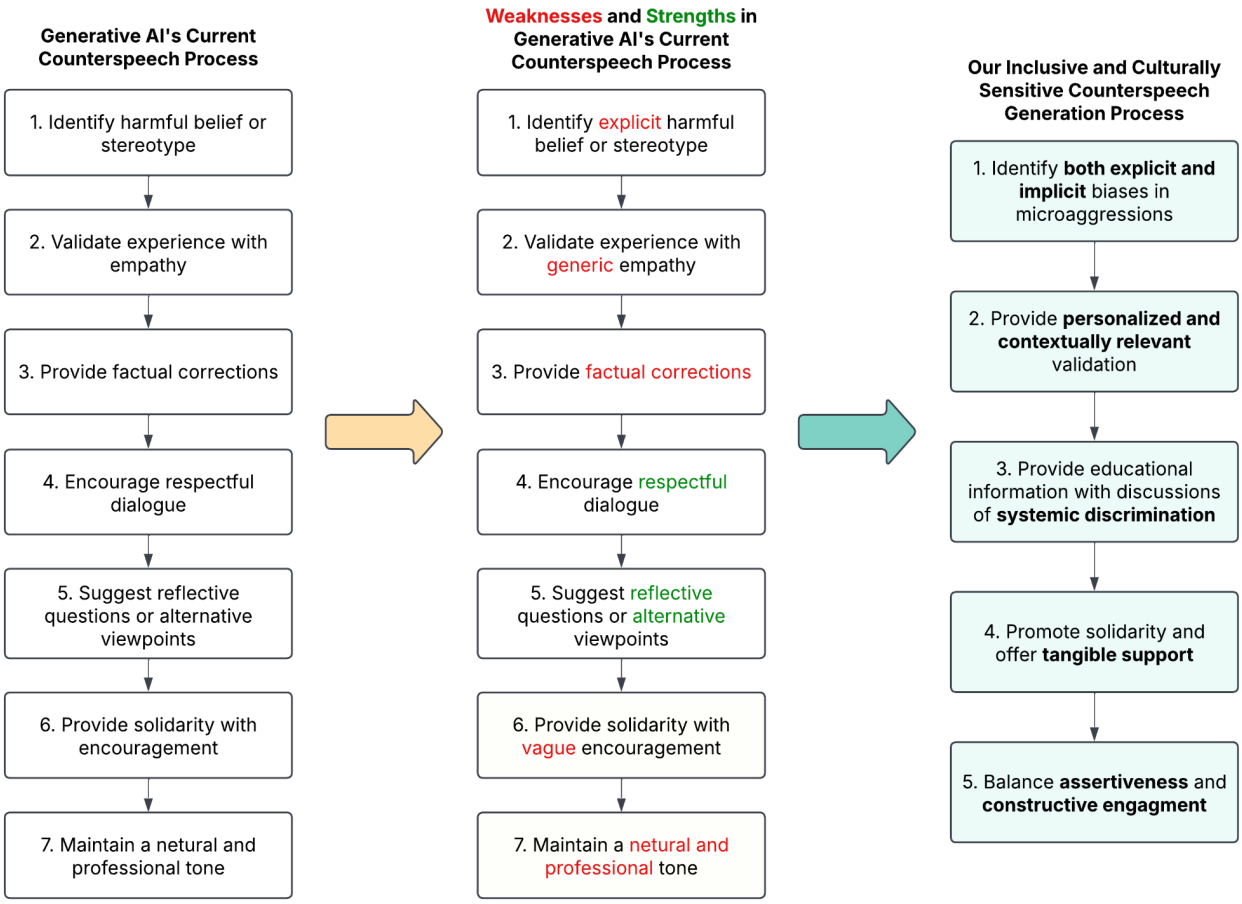

Figure 23. Current vs. Recommended Counterspeech Generation Process for Generative AI. The diagram compares the current AI-generated counterspeech process (left) with its identified strengths and weaknesses (middle) and our proposed inclusive and culturally sensitive counterspeech generation process (right).

6.4.2. Step 2: Provide Personalized and Contextually Relevant Validation

Much of the AI-generated counterspeech minimized the emotional distress caused by microaggressions, making targets feel dismissed rather than supported. This lack of personalization undermines the credibility of AI as a tool for fostering inclusive conversations. Thus, AI should **offer more personalized and contextually relevant validation, ensuring that affected individuals feel acknowledged and supported**. Affective computing research supports

our approach in that AI must be context-sensitive and adaptive in its emotional responses [196]. Similarly, Buechel and Hahn [197] argue that AI trained on real-world examples of microaggressions should generate more empathetic and affirming messages.

6.4.3. Step 3: Provide Educational Information with Discussions of Systemic Discrimination

The AI-generated counterspeech frequently relied on fact-checking as a primary educational strategy, often ignoring the social and structural barriers that sustain stigma. Although factual corrections can be useful, when applied in a way that overlooks cultural and structural barriers, it reinforces the misconception that stigma is not an issue. Many instances of AI-generated counterspeech emphasized that healthcare is accessible regardless of marital status without acknowledging the societal pressures that create real barriers. This approach inadvertently placed the burden on microaggression targets to justify their concerns rather than addressing the systemic discrimination they face. Instead, AI-generated counterspeech should **employ a narrative-based educational approach that contextualizes information within broader discussions of systemic discrimination**. Similarly, research on misinformation correction [198] suggests that fact-based corrections alone are often unconvincing, particularly when they fail to acknowledge the root causes of misinformation.

6.4.4. Step 4: Promote Solidarity and Offering Tangible Support

One of the most critical shortcomings identified in our analysis was AI's failure to provide concrete support beyond generic encouragement. Many instances of AI-generated counterspeech included vague affirmations but lacked actionable recommendations, such as directing users to support networks or advocacy resources. This omission weakens AI's ability to foster real-world change, as it does not provide affected individuals with practical tools for seeking help. Thus, we

recommend that AI-generated counterspeech **integrate links to peer support groups, advocacy organizations, and community resources to offer more tangible assistance**. Research on digital interventions [199] highlights the potential for AI to connect individuals with real-world resources, making interventions more effective. Additionally, studies on online activism [200] suggest that providing links to collective action efforts can enhance the impact of counterspeech. By integrating tangible assistance, AI-generated counterspeech can foster solidarity and empower users to take meaningful action against discrimination.

6.4.5. Step 5: Balance Assertiveness and Constructive Engagement

AI-generated counterspeech often prioritized neutrality and non-confrontational language, making responses less effective in challenging harmful stereotypes. Instead of addressing discriminatory assumptions, AI-generated counterspeech frequently redirected conversations toward neutral explanations or general healthcare principles. This pattern was evident in the failure to challenge relevant stereotypes and the overuse of generic empathy, which resulted in noncommittal, unsympathetic, and ineffective counterspeech. We recommend that AI-generated counterspeech **strike a balance between engagement and assertiveness**. AI-generated counterspeech should actively challenge microaggressions and harmful stereotypes while maintaining a tone that encourages constructive discourse, rather than escalating conflict or alienating the perpetrator. Specific alternative options include:

- **Using direct but respectful language:** Instead of vague encouragement (e.g., “Let’s support each other in making informed choices.”), AI-generated counterspeech should be more explicit (e.g., “Unmarried women often face stigma when seeking healthcare, but their access to care is just as valid and necessary as anyone else's.”).

- **Challenging harmful stereotypes without personal attacks:** Rather than just stating facts, AI should frame counterspeech in a way that highlights why certain beliefs are problematic, without resorting to hostility.
- **Encouraging self-reflection with thought-provoking questions:** Instead of just correcting misinformation, AI could prompt users to reconsider their stance by asking questions that expose contradictions in their reasoning.

Supporting our approach, research on counterspeech efficacy [201] suggests that direct and assertive responses are often more effective than overly deferential ones. Additionally, studies on resistance strategies in marginalized communities [202] highlight that direct, unapologetic counterspeech can empower targets of microaggressions.

6.6. Limitations and Future Work

In this study, we did not have direct participation of people facing stigma because the harms that the AI-generated counterspeech could cause had not been identified prior to this study. Since this research aimed to identify gaps and challenges in existing models before developing improvements, direct participant involvement was deemed harmful to participants at this stage. Future research should explore how co-design methodologies can refine AI-generated counterspeech, ensuring that they reflect the lived experiences and nuanced perspectives of those affected by microaggressions. Also, this study was conducted with microaggressions experienced by unmarried Korean women, thus future studies should replicate this study with microaggressions experienced by other populations of people facing stigma in seeking healthcare to further generalize the study findings.

6.7. Conclusion

This study identifies critical shortcomings in AI-generated counterspeech and introduces a structured framework to enhance its effectiveness, particularly in addressing microaggressions that hinder access to stigmatized health care. Current AI-generated counterspeech often inadvertently dismisses stigma by framing it as outdated rather than recognizing its ongoing harm. It also fails to challenge relevant stereotypes, places the burden of addressing microaggressions onto those who experience them instead of holding perpetrators accountable, and produces overly generic and superficial expressions of empathy that lack meaningful engagement. To address these harms, our newly proposed counterspeech generation process emphasizes identifying both explicit and implicit biases, offering personalized validation, embedding educational content within systemic discussions, providing tangible support, and balancing assertiveness with engagement. With thoughtful improvements and careful implementation, AI can become a powerful tool for countering harmful narratives and fostering inclusive conversations, creating digital spaces where those affected by microaggressions feel heard, valued, and empowered.

6.8. Chapter Summary and Contributions

Summary

This study explores how generative artificial intelligence (AI) can be used to produce culturally sensitive counterspeech that addresses microaggressions related to unmarried Korean women's access to sexual and reproductive health (SRH) care. Counterspeech, which challenges harmful speech with empathy, education, and alternative perspectives, has shown promise in other domains but remains underexplored in culturally stigmatized healthcare contexts.

To examine the strengths and limitations of current generative AI systems, I collected 50 microaggression samples from online forums and used ChatGPT-4 and Copilot GPT-4 to generate 100 counterspeech responses. These responses were analyzed using deductive coding based on microintervention strategies and the Dangerous Speech Project's guidelines of recommended and discouraged counterspeech strategies, alongside inductive coding to identify unintended harms. While the AI-generated counterspeech often aligned with strategies such as empathy and stereotype-challenging, the analysis revealed significant issues—such as superficial validation, misrepresentation of stigma as outdated, failure to challenge stereotypes, and a tendency to place the burden on microaggression targets.

To address these limitations, I proposed a five-step framework for inclusive counterspeech generation. This framework emphasizes identifying both explicit and implicit biases, offering personalized validation, embedding educational content within systemic critiques, providing tangible support, and balancing assertiveness with constructive dialogue.

Contributions

- I identified the limitations and unintended harms of AI-generated counterspeech in culturally stigmatized contexts, offering critical insight into its risks and potential.
- I proposed a culturally responsive framework for improving counterspeech generation, emphasizing the importance of addressing cultural nuance, validating targets' experiences, and embedding systemic awareness into AI responses.
- I demonstrated how generative AI systems can be refined using this framework to better support individuals navigating stigmatized healthcare concerns, offering concrete design implications for developing empathetic and socially aware AI interventions.
- These findings are under review in: Ryu, H., Kang, S., and Pratt, W. "Mitigating Stigma and Fostering Support: Improving AI-Generated Counterspeech for Microaggressions," *AMIA 2025 Annual Symposium*.

Chapter 7: Conclusion

This dissertation explores how microaggressions—often subtle, sometimes unintentional, yet deeply harmful—discourage unmarried Korean women from seeking sexual and reproductive health care. Through four interconnected studies, I examined how these harmful messages are communicated and reinforced in both online and offline spaces and developed ways to reveal, counteract, and reimagine those interactions through inclusive and culturally grounded technologies. I began by analyzing social media discourse to expose how microaggressions shape care-seeking behavior. Then, I co-designed interventions with unmarried Korean women that challenged stigma while respecting their cultural values and preserving their agency. I further created a safe and reflective online space using adapted remote methods, which enabled open discussions, mutual support, and personal growth. Finally, I critically evaluated generative artificial intelligence systems, offering a new process to make AI-generated counterspeech more culturally sensitive and affirming.

Together, these studies offer a new perspective on how stigma operates at the intersection of culture, gender, and healthcare, and how design can be leveraged to not only prevent harm but also foster care and dignity. My contributions span theory, method, and design. I was the first to examine microaggressions as a key barrier to sexual and reproductive health care for unmarried Korean women and developed the emotional proximity connections and microaggression framework to explain why microaggressions from emotionally close individuals can be especially damaging. I introduced culturally sensitive, agency-preserving design strategies that reflect the lived experiences of targets. I refined the Asynchronous Remote Communities method to support deeper engagement and reflection and demonstrated its potential as both a research tool and a space

for healing. I also proposed a framework for improving AI-generated counterspeech, grounded in microintervention theory and informed by the cultural complexities of stigma.

This work is also rooted in my own lived experience. As an unmarried Korean woman, I have encountered many of the same silences and judgments that participants described. These personal experiences shaped my research questions and strengthened my commitment to protecting participants, honoring their stories, and building spaces where their voices are heard and respected. The communities I collaborated with throughout this work reminded me that thoughtful support, when grounded in empathy and mutual respect, can be transformative, and that small interventions can lead to meaningful change.

Today, as federal policies increasingly threaten health equity, marginalize reproductive and gender-related research, and limit support for vulnerable populations, this work stands as both a response and a call. Future research must expand culturally sensitive design to other stigmatized communities and develop systems that do not just minimize bias but uplift and empower. We must continue building bridges between digital tools and real-world care, and ensure that those most affected are not only consulted but co-creators of the technologies that shape their lives.

To researchers doing work that is being defunded or dismissed, I want to say this: your work matters, perhaps now more than ever. The urgency of your research is not diminished by lack of funding or recognition. In fact, it is precisely in these moments of challenge that your contributions become even more vital. Research that centers equity, challenges oppression, and amplifies marginalized voices may not always receive institutional validation, but it has the power to change lives and shift systems. Your persistence helps lay the groundwork for a future we all deserve: a future where care is more inclusive, just, and compassionate.

Amid this difficult landscape, I remain hopeful. Design guided by empathy and the wisdom of those with lived experience can make a difference in protecting care, dignity, and choice for all, even when current systems fall short. For those navigating silence, shame, or judgment, I hope this research affirms that your voice matters, your health matters, and that there is space for you in both scholarship and care.

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Appendix A

Study 2 Co-Design Session 1 Questions

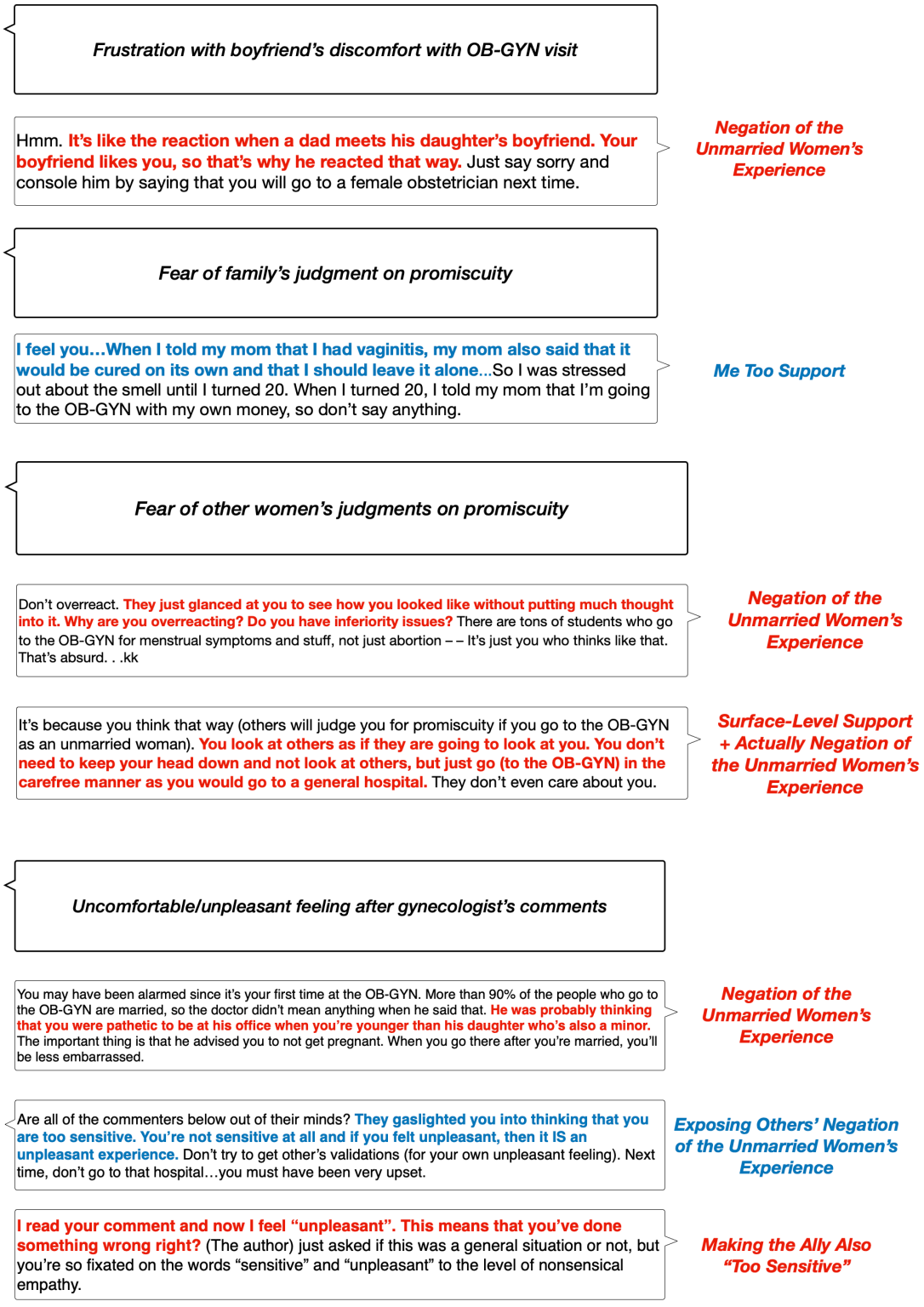
1. While you were living in Korea, was there a moment when you or someone you know considered seeking gynecological care? If so, could you describe the experience?
2. While you were living in Korea, did you or someone you know face any barriers whilst seeking gynecological care? If there were any, could you explain what those barriers were?
3. If you or someone you know experienced a similar situation in the US, did it make a difference that you were in the US? How was it the same or easier or more difficult?
4. Do you think that your gynecological care-seeking experiences in Korea have affected your seeking of gynecological care in the US? If so, could you explain how it affected your seeking of gynecological care in the US? If not, could you explain how it did not have any effect on your seeking of gynecological care in the US?
5. Have you learned about the concept of microaggressions? If so, what does it mean to you?
6. Have you or someone you know ever felt unheard or not respected whilst seeking gynecological care either in Korea or the States or both? If so, could you describe the experience?
7. What kind of social media do you use, and how do you use them? Social media includes online forums such as NatePann, Naver Cafe, HiDoc, and networking services such as Facebook or Twitter.
8. Have you or someone you know used any social media to discuss gynecological care? If so, what kind of social media do you or someone you know use, and how do you or someone you know use them?

9. Have you or someone you know ever felt unheard or not respected on social media whilst seeking gynecological care? If so, could you describe the experience?

Show examples of online microaggressions (see images on the next page)

10. If you had a magic wand that makes anything possible, how would you help the people causing harm understand that they are harming the unmarried Korean women?
11. Would you want to flag or remove their messages? If so, with the same magic wand, how would you flag or remove their messages? If not, could you explain why you think that people should not flag or remove their messages?
12. Would you want to remove the people causing harm from the online community if that was a possibility? If so, with the same magic wand, how would you remove the people causing harm? If not, could you explain why you think that the people causing harm should not be removed from the online community?
13. Would you use the same method for the online harm causers if they are not aware of the harm they are causing?
14. With the same magic wand, how would you support unmarried women who are seeking gynecological care online?

**Examples of Online Microaggressions Shown During Study 2 Co-Design Session 1*



Appendix B

Study 2 Co-Designs Session 2 Questions

1. [*Show the tab with only the forum sample*] Please take a moment to review the content and structure of the online forum post-comment sample. Feel free to share your design thoughts out loud, and please keep in mind that design ideas do not have to be complete. The random, immediate, or raw thoughts are also amazing ideas, so please feel free to share your thoughts as they come into your mind. The first question is how you would design to counteract online microaggressions against unmarried Korean women?
2. [*Go to the tab where both the forum sample and set of design components are shown*] Here are a set of design components based on the analysis of the interviews from the first session. With them, we are going to make a forum that feels safe and supportive to you. Please feel free to edit them, make new additions, or not use them. If you would like to reframe their usage purpose, please do so as you see fit. Also, if you do not want to use any of these features, feel free to not use any of them as well. Let's go through them one by one.
    a. Walk participants through each design component—from post writing to reply rephrase suggestions—then ask which components they'd like to use or skip, why they feel that way, and how they'd prefer to use them (as-is, modified, enhanced, or repurposed).
3. [*After completing the session on designing a safe and supportive space from microaggressions for themselves*] How would the online microaggression counteract design be different or same if you were in the shoes of receiving the online microaggressions?

Appendix C

Study 3 Post-Study Interview Questions

Part 1: Gynecological Care Seeking Experience and Knowledge of Microaggressions

1. Have you or someone you know considered seeking gynecological care? If so, could you describe the experience?
2. Did you or someone you know face any barriers whilst seeking gynecological care? If there were any, could you explain what those barriers were?
3. Have you or someone you know ever felt unheard or not respected whilst seeking gynecological care either in Korea or the States or both? If so, could you describe the experience?
4. Have you or someone you know used any social media (including online forums) to discuss gynecological care? If so, what kind of social media do you or someone you know use, and how do you or someone you know use them?
5. Have you or someone you know ever felt unheard or not respected on social media whilst seeking gynecological care? If so, could you describe the experience?
6. Have you heard about the concept of microaggressions? If so, what does it mean to you?

Part 2: Asynchronous Remote Communities (ARC) Overall Usage Experience and Weekly Activities Feedback

1. How was using the ARC?

    1-1. What did you particularly like about it?

    1-2. What did you particularly dislike about it?

2. Have you ever had the experience of using the Diary or Ask Me Anything discussion boards that were always available? If you have any experience, how did you use it? If you haven't used it, can you tell us why you haven't used it?

3. Were there any activities that made you think differently or deeper about a topic? If so, what were the activities and how did they make you think differently or deeper about a topic?

4. Were there any activities that made you feel uncomfortable? What were the activities and why did they make you feel uncomfortable?

5. Were there any activities that you did not want to participate in? What were the activities and why did they make you feel uncomfortable?

6. Did you frequently interact with others? If so, in what ways did you interact with others?

7. How could we improve the ARC for better communication between unmarried Korean women users and discussion of gynecological care?

8. Would you use the ARC again in the future? If so, why would you use the ARC again in the future?

9. Did using the ARC affect your seeking of gynecological care or seeking of support for gynecological care in real life? If so, how did it affect your seeking of gynecological care or seeking of support for gynecological care in real life?

10. Who would you recommend the ARC to and why? If you already recommended it to someone while using, who did you recommend it to and why?