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ORIGINAL PAPER

Microaggressions, Interrupted: The Experience and Effects of Gender Microaggressions for Women in STEM

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Abstract

Women continue to remain underrepresented in STEM, and this gender disparity is particularly pronounced in leadership positions. Through in-depth, qualitative interviews of 39 women leaders in STEM, we identify common gender microaggressions they experience, and explore how these microaggressions affect their leadership experience and outcomes in the workplace. Our findings highlight five types of gender microaggressions women most often encounter, and how and when these microaggressions occur. We explore the negative impact that microaggressions can have on women's work identities and how they can trigger a cycle of rumination and self-doubt that may ultimately result in women choosing to leave STEM. Importantly, we surface the interventional and empowering role that allies play in triggering a redemptive sensemaking process that can support women leaders to build resilience and counter the negative effects of microaggressions.

Keywords STEM · Gender microaggression · Identity · Allyship · Leadership · Gender

Introduction

Women leave Science, Technology, Engineering, and Math (STEM) fields at significantly higher rates than men (Glass et al., 2013), creating the "leaky pipeline" (Liu et al., 2019). Though the percentage of women who earn a bachelor's degree in STEM fields has increased, and in some cases, is reaching parity with or surpassing the percentage of men earning the same degrees, (i.e., 42.5% in mathematics and statistics; 59.9% in biology) women comprise less than a quarter of those employed in STEM occupations (Catalyst, 2019). This gender gap is even more pronounced at the senior leadership level in STEM, where women hold approximately 16% of corporate board memberships (Catalyst, 2019). The persistence of this gap is troubling given the colossal impact that STEM fields have on our lives, which include shaping the technology that informs our interpersonal interactions or medical discoveries that influence mortality outcomes (Harbert, 2021; Wallis et al., 2021). The absence of diverse perspectives in such decision-making spaces can lead to less effective governance and ethical lapses in judgment, resulting in products and services that are blind to the needs of women, sometimes with fatal consequences (Brady et al., 2021; Chang, 2018; Perrault, 2015). Persisting gender inequality is not only unethical, "it hinders the advancement of individuals, teams, organizations, and society as a whole" (Phipps & Prieto, 2021, p. 247).

Decades of research highlights the challenges faced by women leaders ascending the STEM leadership pathway, known to be inhospitable to women (Cech & Blair-Loy, 2010; Hunt, 2012; Koenig et al., 2011). For example, stereotype threat (Heilman, 2001), perceptions of role incongruity between traditionally female roles and leader stereotypes (Eagly & Karau, 2002), overt discrimination, and deeply entrenched systemic barriers (Hall et al., 2018; Lewellyn & Muller-Kahle, 2020) create a labyrinth for women leaders (Eagly & Carli, 2007). These challenges can threaten women's motivation to lead, and the sensemaking processes through which they understand themselves as leaders, their relationships, and other experiences in the workplace (Maitlis & Christianson, 2014; Kark et al., 2021). For example, research illuminates how women in STEM can develop gendered professional identities and working styles (Fletcher, 2001; Zheng et al., 2021). While research exploring women in STEM has grown (Bowles, 2012; Kossek et al., 2021), the

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persisting gender leadership gap highlights that much work remains to be done (Diehl & Dzubinski, 2016).

In modern organizations, most forms of overt gender discrimination (i.e., blatant mistreatment or overtly sexist jokes) have become less socially acceptable and have been replaced with subtle and often unintentional slights, known as microaggressions that denigrate women (Capodilupo et al., 2010; Cardador, 2017; Cortina et al., 2013; Yang & Carroll, 2018). To illustrate, Tracy Chou, an experienced software engineer, shared a microaggression that occurred at a conference, where a male programmer corrected her about a Quora feature that, as one of the early engineers working at Quora, she was intimately familiar with, making her the subject matter expert (Levintova, 2015). Other examples included being told "You're too pretty to code" or being asked if she was "the admin". Though not blatant, these microaggressions were an invalidation of her competence and a threat to her professional identity as a software engineer. Research suggests that such microaggressions occur regularly for women in STEM and can have accumulating and deleterious effects on their health and psychological outcomes (Holder et al., 2015; Lewis et al., 2016).

While research on gender microaggressions has grown, buttressed by decades of research on workplace gender discrimination (Basford et al., 2014; Cortina et al., 2001; Holder et al., 2015), such studies remain siloed across the education, counseling, and management literatures (Fainshmidt et al., 2021). A deeper exploration of how microaggressions manifest and impact women's identities and outcomes in STEM professions—and what can ameliorate their negative effects—presents a way to marry the literatures to better understand women's experience—and exit—from the STEM leadership pipeline. Thus, in this qualitative study, we draw on the microaggression, identity, and sensemaking literatures to explore the *types* of gender microaggressions women leaders in STEM encounter, and *how* they experience, make sense of, and cope with them. In doing so, our study makes several theoretical and practical contributions.

First, we advance the microaggression literature through an in-depth qualitative study, in which we identify common gender microaggressions in STEM that threaten women's professional identity and leadership progression by disrupting their sense of positive identity, coherence, and stability (Ashforth & Schinoff, 2016). This qualitative approach provides added nuance and empirical complexity to a widely-experienced yet relatively understudied phenomenon (Lui & Quezada, 2019), highlighting manifestations of gender microaggressions and surfacing the destructive consequences of these microaggressions to build theory about how these consequences can be mitigated.

Second, we contribute to the identity and sensemaking literature by exploring how women retrospectively make sense of workplace gender microaggressions. Identity threats can trigger negative internal processes that can hinder women's leadership ascent, resulting in the loss of key talent in organizations (Meister et al., 2017). We further this by highlighting how microaggressions can threaten women's work identity, which is highly relevant in STEM fields where perceptions of technical competence plays a huge role in who gets developed and promoted (Bowles, 2012). Importantly, we uncover new understandings about *how* external buffers—and, in particular, allies—can trigger redemptive sensemaking, which can mitigate the harmful effects of microaggressions, helping women transition from a negative to a positive state.

Finally, we provide practical recommendations that can bolster workplace diversity, equity, and inclusion (DEI) efforts in STEM. Using the microaggression framework, we capture and taxonomize a range of manifestations of gender discrimination, to integrate and further previous work on gender discrimination. We illuminate how microaggressions can affect professional identity, prompting a vicious downward spiral of self-doubt created and reinforced by false self-narratives of how women view themselves and their contributions, ultimately making qualified women question their leadership ability. Our findings demonstrate the importance of allies who can help break this cycle, promoting DEI training that addresses problematic behavior at its source rather than trying to 'fix the woman'.

Theoretical Background

Gender and Identity

An individual's self-identity is most simply described as how they answer the question "who am I?" (Ashforth et al., 2008; Ramarajan, 2014). Individuals have multiple identities, which together influence important intra—and interpersonal processes (Ashforth et al., 2008; Markus & Wurf, 1987). These identities evolve in response to how they make sense of their life experiences through constructing and telling stories or narratives (Maitlis, 2020; Pals, 2006), and how they respond to the contextual cues and feedback in their environment (Alvesson, 2010). For example, social role identities such as that of a 'leader' or 'engineer' can be claimed by the individual but can also be validated—or denied—by others through social interactions (Ashforth & Schinoff, 2016; Cech, 2015).

People are motivated to have their identities socially verified by others (Festinger, 1954; Higgins et al., 1986), particularly at work where they want to be seen in a positive light (Dutton et al., 2010). This social self-verification provides self-coherence and a positive sense-of-self, which are fundamental identity motives (Swann et al., 2003; Vignoles et al., 2006). When self-verifying information is withheld, or

an individual perceives that others view the individual inaccurately, it can have affective, cognitive, and behavioral outcomes (e.g., Barreto & Ellemers, 2003; Meister et al., 2017; Guadagno & Cialdini, 2007; Leary & Kowalski, 1990). Ultimately, it can trigger a process whereby individuals appraise their experience (Meister et al., 2014) and conduct identity work to repair and protect against damages to the self, and renegotiate how they are seen (Alvesson et al., 2008; Lutgen-Sandvik, 2008).

This process is likely to be heightened in STEM fields where women are constantly reminded of their lack-of-fit (Eaton et al., 2020). People attend to identity-related information from others when it relates to an identity they deem important (Shapiro & Williams, 2012; Stets & Burke, 2000). Thus, because others' perceptions and evaluations play an instrumental role in career progression and financial rewards, women tend to monitor their colleagues' perceptions and attempt to maintain positive impressions (Bitterly & Schweitzer, 2019; Wayne & Kacmar, 1991). Identity threats (e.g., experiences that can cause potential harm to the values, meanings, or enactment of an identity: Petriglieri, 2011) can be especially salient for women operating in domains with which they highly identify, and this is certainly true in STEM where women are typically highly identified with their professional identities (Schmader, 2002; Shapiro et al., 2013).

A wealth of research shows that women in STEM regularly deal with identity threats (Eaton et al., 2020; Moss-Racusin et al., 2012). One form of threat is stereotype threat defined as the threat women experience based on negative stereotypes that exist about their group. Stereotype threat can lead women to experience ego-depletion, self-doubt, self-blame, which can negatively affect their career progression in STEM and also spillover to harm other areas in their lives (Block et al., 2019; Inzlicht et al., 2011; Kinias & Sim, 2016). The research on stereotype threat reveals that threatening signals can manifest through subtle organizational cues, (i.e., company mission statements) (Hall et al., 2018), sex-typed positions (i.e., male-typed jobs) (Bergeron et al., 2006), and imbalanced representation of women versus men (Murphy & Dweck, 2010). If situational cues can elicit palpable identity threats, we contend that interpersonal interactions that subtly denigrate women can be experienced as identity threats as well. We thus draw on the microaggression literature to explore how these interactions harm a woman's leader identity.

The Experience of Microaggression as an Identity Threat

Gender microaggressions are defined as brief (hence 'micro') and regularly experienced verbal, behavioral, or environmental indignities that—often unintentionally—communicate hostile, derogatory, or negative slights toward women (Nadal, 2008, p. 23; Sue et al., 2008). Though subtle, microaggressions derogate the target, signaling exclusion and lack of belonging (Wilkins-Yel et al., 2019). A growing body of work shows that gender microaggressions occur in the workplace (Capodilupo et al., 2010; Gartner et al., 2020; Yang & Carroll, 2018). Understanding how workplace microaggressions are experienced by women is critical not only for extending theory by highlighting the different types of remedial identity work microaggressions can trigger but also for bolstering diversity training efforts in organizations.

The current work builds on previous work exploring gender discrimination in organizations (Miner-Rubino & Cortina, 2004; Settles et al., 2006). To fully understand workplace gender microaggressions and their impact, we examine the extant literature on sex-based discrimination and explain how gender microaggression builds on this research. Gender microaggressions share commonality with sex-based harassment in that both derogate an individual based on her gender (Berdahl, 2007; Cortina & Berdahl, 2008). However, unlike microaggressions, sex-based harassment is heavily predicated on the motivation to protect one's social status: to protect male dominance in the workplace. The microaggression framework, however, de-emphasizes the aggressor's intent, focusing more on the experience and perspective of the target (Capodilupo et al., 2010). This distinction is important both from a theoretical and practical perspective because it provides a broader and more inclusive way to capture, catalog, and theorize about manifestations of gender discrimination from the target's perspective. In fact, the emphasis on motive can make it difficult to include cases where the motives are multiple, obscure, or unknowable (Blee, 2005), creating murky grounds for addressing such behavior. Further, modern day discrimination manifests in subtle ways, often with aggressors unaware of their microaggressions (Capodilupo et al., 2010; Nadal, 2010). Also, assuming intent makes intervention work difficult: most people view themselves as egalitarian and being told that one is committing discriminating behavior, even unintentionally, will no doubt violate this self-perception and threaten one's self-esteem (Wiesenfeld et al., 1999), making it difficult for practitioners to have these dialogues during DEI training.

Another way the microaggression framework differs from existing work on gender discrimination such as modern sexism or incivility (Cortina, 2008; Swim et al., 1995) is that microaggressions focus more on interpersonal behaviors compared to sexism which focuses more on general attitudes about gender dynamics. Importantly, microaggressions, unlike incivility, can be taxonomized into three types, varying in their levels of subtlety: microassault, microinsult, and microinvalidation (Nadal, 2010). This classification is what differentiates incivility and microaggressions: the microaggression framework offers nuance into how manifestations of gender bias can go undetected and unaddressed

due to varying level of subtlety. Microassaults represent the most blatant comments or behaviors that explicitly demean women, such as calling a woman a "bitch" (Nadal, 2008). The second type, microinsults are *subtler* comments or behaviors that unintentionally denigrate women. For instance, when a manager only calls on male employees in a meeting, the subtle message conveyed is that men's input is more important than women's (Sue & Sue, 2016). The subtlest type of microaggression is microinvalidation, comments or behaviors that negate women's experience dealing with gender discrimination. Examples include gaslighting behaviors such as telling women that sexism is a 'thing of the past', invalidating their lived experience dealing with discrimination. Thus, this framework provides a suitable way to capture modern manifestations of discrimination at varying levels of subtlety (i.e., microinsult and microinvalidation vs. microassault), helping to explain how and why modern forms of workplace sexism persists.

Experiencing gender microaggressions in STEM domains can threaten a woman's identity because microaggressions subtly challenge her legitimacy as a leader (i.e., "others don't see me as a leader"). This can be particularly exacerbated in male-typed STEM domains where women are constantly reminded of their lack-of-fit (Hall et al., 2015; Settles et al., 2006). Further, women are burdened by the difficulty in decoding microaggressions (i.e., "That was subtle but it bothers me"), which unlike traditional sexism are subtle and ambiguous, requiring additional cognitive effort as targets decipher the intent and meaning behind the aggressor's behavior (Capodilupo et al., 2010; Cortina et al., 2018). The subtle devaluation of a woman's identity conveyed through such interactions can preclude a woman from forming a coherent, stable, and positive identity, while also generating reactions, such as anger, depression, and loss from the failure to self-verify (Burke & Stets, 1999; Hoare, 1991). Indeed, Hall et al. (2015) showed that identity-threatening exchanges affected burnout among female engineers. However, this quantitative study did not provide details on how these interactions manifested.

What we do know is that women who constantly experience these identity threats must engage in identity work to cope with them (Alvesson et al., 2008). This may include saving face, re-establishing violated norms, managing one's emotions, and fending off or confronting the threat, all of which can detract from her leader aspirations (Block et al., 2019; Meister et al., 2017). However, more empirical work is needed to examine how identity threats manifest through workplace gender microaggressions and how women interpret and process these interactions, which can contribute to women opting out of leadership roles in STEM or leaving the field altogether.

In this work, we also explore how external buffers impact how women experience microaggressions, answering recent calls for more examination and explanation for why current diversity efforts are failing to close the gender gap (Täuber, 2020). The existing intervention literature, such as self-affirmation, role-modeling, and mindset priming (Emerson & Murphy, 2015; Hall et al., 2018; Kinias & Sim, 2016; Shapiro et al., 2013) help individuals cope with negative events at work. We enhance this literature by looking at situational factors that exist beyond the target that could help close the persistent gender gap. Thus, we explored external buffers that address the threat-inducing cues or persons.

In sum, the literature suggests that gender microaggressions can have destabilizing effects by preventing women from forming coherent and positive professional identities—resulting in declines in well-being and increased turnover. Given that people make sense of and develop their identities by constructing narratives and stories about their experiences (Ibarra & Barbulescu, 2010; LaPointe, 2010), we explore the narratives of women leaders working in STEM, focusing on how they make sense of their experiences of microaggressions. We also explore the presence of external buffers that impact how women process and narrate suffering. Our primary motivation was to gain a deeper understanding of what types of microaggressions women encounter and how they navigate workplace microaggressions to extend the literature on the barriers faced by women in STEM (Bergeron et al., 2006; von Hippel et al., 2011), and to identify and offer solutions. With this aim, we pose the following research questions: (1) What types of gender microaggressions do women leaders commonly encounter in STEM? (2) What are the effects of these microaggressions? (2) Who/what buffers the potentially negative effects of gender microaggressions and how?

Methods

We explored these overarching research questions using an inductive qualitative approach (Corbin & Strauss, 2007). We conducted semi-structured interviews, which allow for open-ended questioning and the option for further probing that provides researchers with a descriptive set of rich experiences from which to identify important contextual nuances to answer our research questions (Lamont & Swidler, 2014).

Sampling and Data Collection

Exploring our specific research context (women leaders in STEM) involved purposeful sampling—choosing participants in a context where the phenomena of interest is evident (Patton, 2014). We recruited participants through online professional groups on Facebook, LinkedIn, as well as referrals. To qualify to participate, participants had to (1) self-identify as a woman and (2) have at least five years of work

experience in a STEM field in North America. To explore the experiences of women leaders, we recruited women with at least five years of work experience since they would have gone through a few promotion cycles and be more likely to have leadership responsibilities. Our sample consisted of women leaders from Canada and the U.S. Preliminary analyses did not reveal notable differences in the types of microaggressions encountered or how they were experienced between participants from the two countries, so we collapsed both samples. We interviewed 39 women leaders in various STEM fields, including: biology, chemistry, environmental science, physics, and technology. The racial composition was: 70% White, 13% Asian, 8% Black, 3% Latina, and 6% multi-ethnic. Their average age was 39.1 years, and average work experience was 14.6 years (See online Appendix 1). The women fell into three leadership levels: (1) Director/SVP and above, (2) Senior Managers, and (3) Team Leads.

Interviews were conducted over Zoom and ranged from 35 to 72 min. Interviews were audio-recorded and subsequently transcribed verbatim. We began each interview by asking participants to talk about their career trajectory, and throughout their career narrative we asked about challenges they faced. By telling narratives (and the specific stories within them) individuals process experiences, memories, and make sense of and express their own identity (Ibarra & Barbulescu, 2010; LaPointe, 2010). To manage the tension between asking interview questions that meaningfully surface a topic versus prompting demand-effects, we refrained from directly asking about gender microaggressions, relying on the participant to share incidents they deemed salient. Stories of gender microaggressions naturally emerged and when they did, we followed up with probing questions exploring the context, the effects of experiencing these microaggressions, and who/what buffered these situations. During the earlier interviews, the interview protocol was slightly amended to include more specific follow-up questions based on the emerging themes related to microaggressions (See online Appendix 2). 36 out of the 39 women interviewed mentioned at least one notable experience with gender microaggression in the workplace.

Analysis

To build theory related to women's experiences of gender microaggressions, we used a constant comparative method recommended by Strauss and Corbin (2007) and Gioia et al. (2013), iterating between data collection, coding, and consulting existing theory (Glaser & Strauss, 2009). During data collection, detailed memos were kept by the first author to record general insights and patterns that emerged (Charmaz, 2006). These initial memos helped sensitize us to the general themes prior to the full data analysis phase. Once the data collection was finalized, we followed a three-stage process of coding the data to build theory (Pratt, 2009).

Stage 1: Developing First-Order Concepts

In the first step, we started with open coding, and identified concepts with the intent of "break[ing] open the data to consider all possible meanings" (Corbin & Strauss, 2007, p. 59). We used an open approach to coding, allowing for the emergence of novel themes. The insights and themes generated from the initial coding also informed our interview protocol, which was subsequently adjusted. During the early phase of analysis, we used an open coding method and relied on in vivo codes to categorize the incidents or narratives. For example, we coded for the different types of gender microaggressions (i.e., devaluation of female competence), the existence of and types of buffers that helped these women process these interactions, and the effect of these interventions.

After 30 interviews, we reached theoretical saturation at which point the codes, categories, and themes generated from additional interviews did not yield new insights (Glaser & Strauss, 2009). However, we conducted nine additional interviews to confirm saturation.

Stage 2: Identifying Second-Order Themes

We consolidated the individual codes to understand how our first-order codes mapped onto broader, theoretical categories. This process allowed us to connect the different concepts that emerged during open coding through the process of comparing and contrasting. To facilitate this process, we noted general themes emerging from the data related to the microaggressions and buffers encountered by the participants. For example, Fig. 1 shows that the core types of microaggressions focus on devaluation, denial of one's reality, and pathologizing. Throughout this analysis, we referred to existing literature on gender stereotypes to identify and tie potential explanations to the themes that emerged (Bear et al., 2017; Meister et al., 2017). This was an iterative process that involved going back to the initial codes that were generated during stage one and making appropriate adjustments.

Stage 3: Aggregating Theoretical Dimensions

During this stage, we iterated between data and theory more frequently, while continuing to consult the identity, microaggression, and sensemaking literatures to confirm the emerging patterns that arose (Alvesson et al., 2008). As we became confident with the theoretical categories, we examined underlying dimensions that would help further connect these categories. We show the emergent structure of our data in Fig. 1 for the types of microaggressions

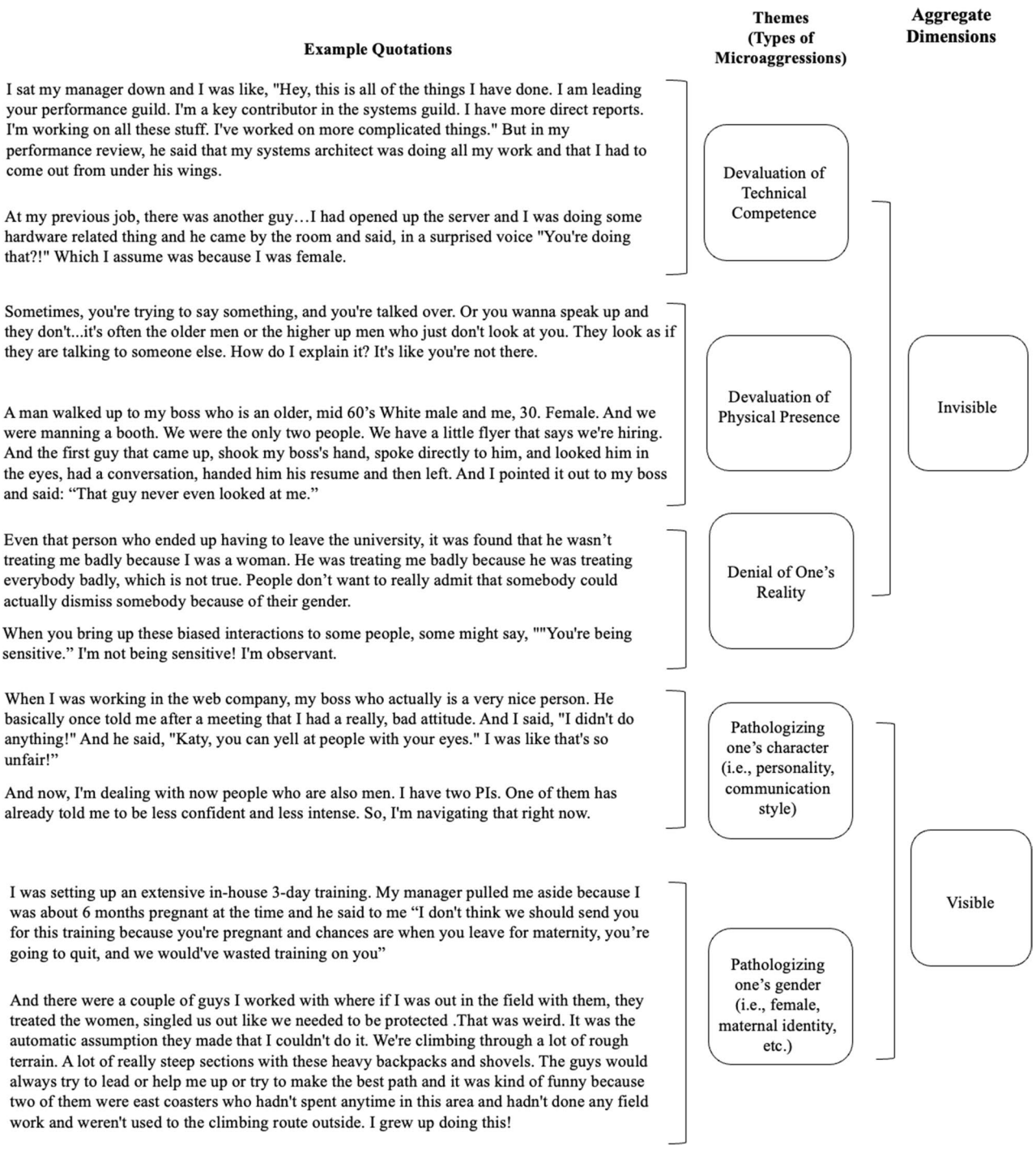

Fig. 1 Types of gender microaggressions in STEM

experienced by women and Fig. 2 for the buffers that mitigated the experience of microaggressions (Meister et al., 2017), showing the main categories, the higher dimensions they map onto, and example quotations. Finally, to view the overall analysis from a theoretical perspective using the data and the emerging themes, we developed a theoretical model delineating how external buffers moderate the relationship between microaggressions and a woman's work identity (Gioia et al., 2013). See Fig. 3.

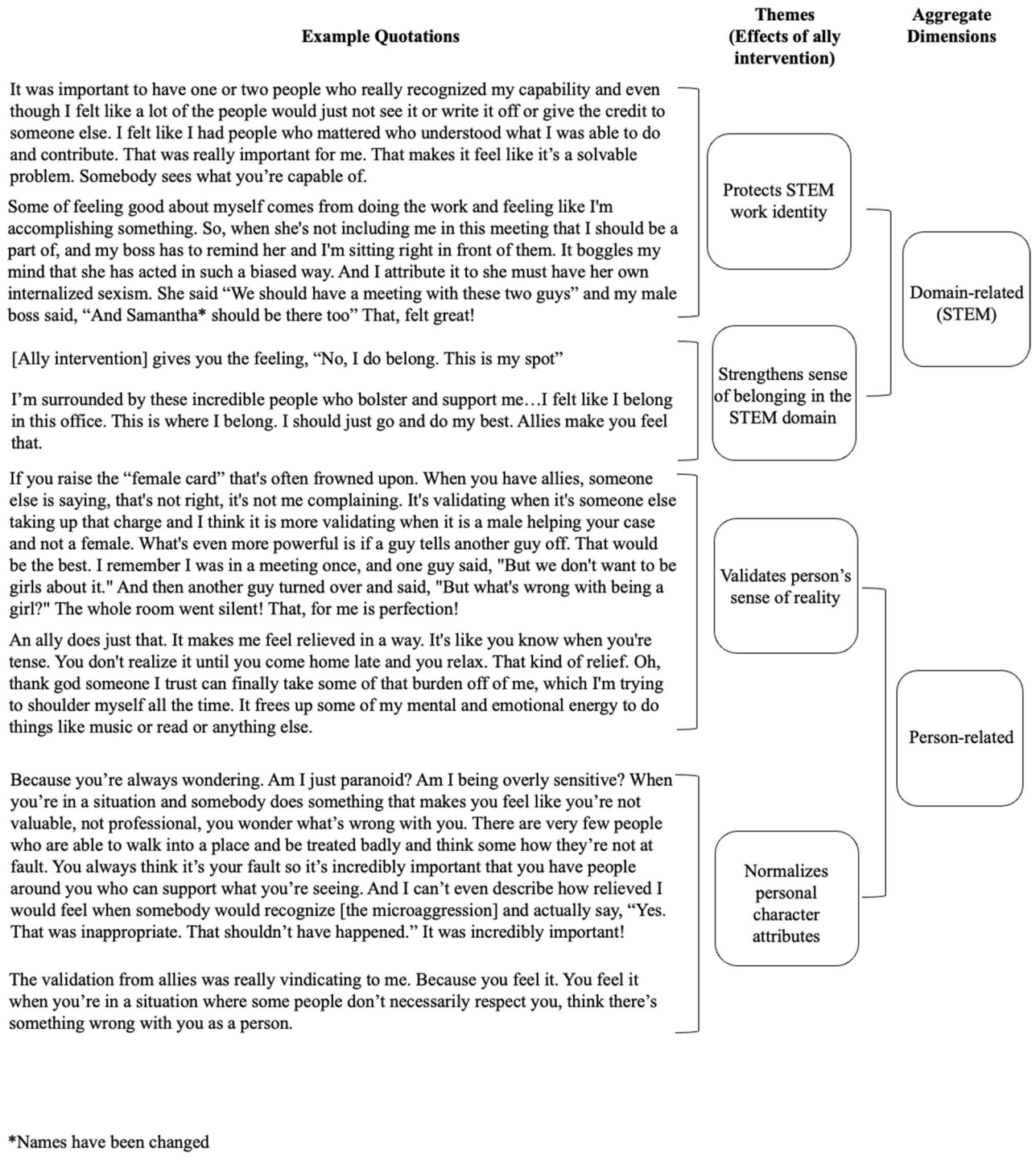

Fig. 2 Effects of ally intervention

Findings

Below we describe the experience and types of gender microaggressions women encounter in the STEM workplace. Building our theoretical model, we also present the identity work strategies women use, and the buffers that influence their sensemaking process.

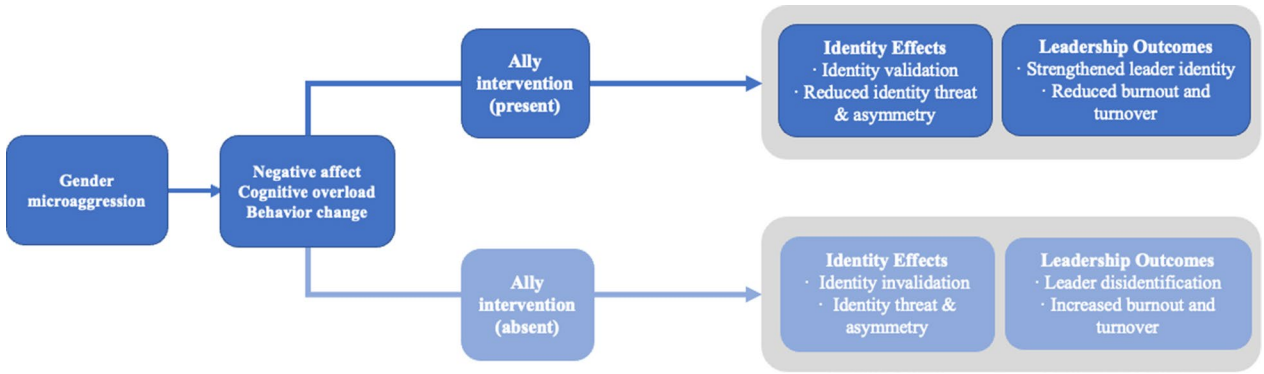

Fig. 3 Model showing the effects of ally intervention on women's experience of gender microaggressions

Types of Microaggressions

Most of the participants mentioned regularly experiencing a range of microaggressions during their careers. We identified 224 discrete incidents of gender microaggressions across the 39 interviews. These incidents boiled down to five types (see Fig. 1), which we outline below.

Devaluation of Technical Competence

Devaluation of one's competence emerged as a salient microaggression that manifested as microinsults, subtly conveying the message that women were technically incapable. Examples included singling out and questioning women's expertise in front of a group, selectively reassigning women's tasks or projects to male colleagues, or deferring to a woman's male colleague who was not involved with the task or project. Given that the organization is an evaluative context, such exchanges may be seen as a normative part of the job (Roberson & Kulik, 2007). However, rather than being interpreted as constructive feedback, these exchanges signaled devaluation for the following reasons: in all situations, the woman was (1) the original owner of the task who had, for example, written the code for an application; (2) the subject matter expert (i.e., the only person who knew a certain programming language); or (3) the person leading the project. Hence, the women expected to be treated as the subject matter expert but were startled when they received these forms of pushback from both male *and* female colleagues. To illustrate, one engineer working at a large academic institution described an incident in which management removed her from a project during a reorganization effort despite the fact that she was the only engineer who knew how to maintain the specific servers.

> It wasn't explicitly said, but management didn't believe even after the senior architect and everybody said, "She is really doing all this work." They still didn't believe them. They had a power outage. They could not bring up 7 out of 8 of their systems because I was the one that dealt with them. Companies don't appreciate if they can't access all of their data. They lost multi-million-dollar contracts all because they couldn't fathom that I could actually contribute to the business. That is very much karma for them!

Participants regularly experienced devaluation of competence throughout their careers. Most of these microaggressions manifested as subtle encounters such as "Oh, you're the new engineer? Is that even possible? That's not what I expected. Good for you!" Though these interactions were salient enough for the women to remember, most noted the ambiguity behind these microinsults, which are characterized as subtly demeaning actions enacted by aggressors who are probably not conscious of their actions. The aggressors in these cases were likely not aware of the sexism in their behaviors and did not recognize the subtle but demeaning message behind their actions. As one technology consultant shared: "I get a lot of 'Why are *you* doing this?!' And I don't think they necessarily mean it in a bad way. Their intention might be that they are surprised. But it comes off terribly!".

Devaluation of Physical Presence

Another form of devaluation emerged as ignoring woman's physical presence during everyday workplace interactions. Similar to devaluation of technical competence, most manifested as microinsults. Women described constantly being interrupted or completely ignored in formal spaces (i.e., meetings, recruitment fairs, conferences) and informal spaces (i.e., lunch conversations) by both men and women as if the woman did not exist. Though the interrupting behavior mirrored previous research (Blair-Loy et al., 2017), we uncovered a range of ways in which women are interrupted or ignored in STEM while capturing the impact of these actions. One system engineer working in a large academic

center shared this experience in which she was ignored by her new female director:

> I had emailed [the director] before she got there, "Welcome. I'm looking forward meeting you." She didn't email back, which is not the problem here. She was talking to my two male colleagues in one of their offices. And I walked in and said, "Hi! I emailed you." And she said, "Oh, hi." But then the entire rest of the conversation she would talk to these other guys. And the conversation was a 'Hello, getting to know you' conversation. And she was showing no interest in getting to know me.

Though not perceived as intentionally malicious, behaviors that ignored a woman's physical presence were interpreted negatively by the target as evidenced by this mechanical engineer who described a situation in which she was asked to perform a last-minute request for the senior vice president of her company and was ignored by her male colleagues during the first half of a one-hour meeting.

> I go into the office, and it's him and the 2 VPS and me. I had dropped everything that I had done in the afternoon to pull this together for them. They spent the first 20 minutes of the meeting, all talking about some super old bottle of rye whisky. And I literally just sat there, as a 30-year-old engineer, just waiting my turn to present my work. I was just like "Well, this is really effing rude!" You haven't included me in a conversation! You haven't even tried to adapt the conversation to something that would include me! And I wouldn't necessarily say that was explicit in that case, but it's a bit exclusionary, right?!

Though devaluation of one's competence or physical presence was not interpreted as intentional, participants shared that these microinsults conveyed messages of devaluation and exclusion and that their presence or time did not matter. Moreover, devaluations of technical competence made women feel that their technical skills and abilities went unrecognized, while devaluation of their physical presence in daily interactions made them feel unseen and unheard, making them feel invisible.

Denial of One's Reality

The women also reported experiencing different forms of microinvalidation, the subtlest type of microaggressions that diminish women's experience of gender bias. Typically, a woman would describe a microaggression to a colleague only to have the microaggressions attributed to something other than gender bias. As one User Experience (UX) designer shared: "There's always a way to describe, there's always a way to dismiss it, to accept or to say that it's not because of gender or sexism. People will always find some reason to excuse somebody's behavior." Another woman shared that when she escalated to senior management a new hire's interrupting behavior toward women, including her, she was told that his behavior was not a problem. She was told: "It's okay! He's just like me when I was his age," adding that instead of noting this as a potential issue and validating her experience, senior management "joke[d] about it." Microinvalidations that downplayed women's experience dealing with gender bias made invisible the hardships they encountered, and were used as a way maintain the current order (Simpson & Lewis, 2005). This theme of dismissal and invisibility can be illustrated by this consultant working at a large tech company who presented a senior leader with compelling data showing gender bias in the talent pipeline:

> He was intimidated that I was bringing this [issue] up. He said, "I feel like you're going to kill me." I was being cordial; I was presenting pretty compelling data about the sexism in our organization in a very controlled way. It's such an interesting way to both acknowledge the power imbalance but pretend it was the other way around, and then discredit our findings. It felt like we were having this awkward "jokey" chat instead of talking about gender in our organization and how we can address that. So, it was discouraging. Instead of acknowledging the data and just taking it in and moving forward together, he used defensiveness to dismiss it, upholding the order as it stood.

Pathologizing Woman's Personal Character

Another type of microaggression that emerged from the data, primarily as microinsults, was the pathologizing of a woman's character or demeanor. Pathologizing, a concept from counseling psychology, denotes that the values, communication styles, and ways of being of the majority group are ideal, and that anything that strays from the status quo is seen as abnormal (Sue et al., 2007). In our study, pathologizing centered on behaviors and comments that faulted the woman's personality and/or communication style, conveying that her way of behaving was wrong and needed fixing and were almost exclusively enacted by men. Examples included being called 'aggressive' or being asked to be 'softer' in one's communication and tone. This type of feedback was unanimously shared by the participants, and was aptly illustrated by one scientist working at a large pharmaceutical company:

> The feedback has always been, "You need to practice a poker face" because I'm very expressive and whatever I'm thinking it comes off on my face and it's not "good." So, I have to practice my poker face. I have to not get worked up. But I know for a fact that in our

department, there are men who scream, shout, and cuss and are not told to stand down.

This finding differed from what was found in previous research where women were seen as emotionally weak or sensitive to handle tough conversations (Kanter, 2008); our study results instead revealed that women were seen as being too aggressive or difficult, highlighting the backlash agentic women face (Koenig et al., 2011; Williams & Tiedens, 2016). Importantly, the women who shared these microinsults unanimously noted the difficulty in parsing out feedback that was meant to be constructive versus feedback that was biased, which made it difficult to challenge these microinsults. In recalling an experience in which she received unexpected feedback about her character, one chemist working at a large research institution noted:

> I'm a pretty direct person, but what's really challenging, it's hard to parse out what is constructive feedback and what is gender bias feedback. I was told in multiple performance reviews, "You need to be softer. Work on your soft skills." That was word-for-word in my performance reviews. I had a male colleague who was managed by the same person who was super intense and kind of a jerk in meetings with others and never got coached that way. You need to be different but no one else does because they're men.

Further, the women noted that while assertive behaviors were encouraged for the men, the same mannerisms were discouraged for the women. Despite the fact that these women viewed their mannerisms, such as their communication styles similar to that of their male colleagues and even emulated the men's behavior, they were constantly told that they were being too 'aggressive' or 'difficult' by their colleagues. We noted that these microinsults singling out women's behaviors made women highly visible. These messages that pathologized a woman's demeanor were communicated through formal and informal channels, such that they were not isolated to formal performance reviews but happened in casual conversations at work (i.e., after a meeting, during lunch, etc.).

Pathologizing Woman's Gender

The final type of microaggression that also heightened women's visibility emerged primarily as microinsults that highlighted and denigrated specific aspects tied to the woman's gender identity. This echoed previous research but in a subtly different way. In previous research, pathologizing a woman's gender emerged as preoccupation with her marital status (Kanter, 2008), whereas in our study, the focus was on problematizing women's plans to start a family. Typical examples included unsolicited comments highlighting and pathologizing a woman's maternal identity. For example, most of the women shared that at some point in their career, they received unsolicited comments from colleagues and supervisors regarding their choice to start a family (i.e., "Oh, you have a kid? You're not going to care about your career now!"). One geologist shared this incident in which a supervisor gave her unsolicited feedback:

> What surprised me was how open my mentors and my committee members were about talking about [my] starting a family. He basically told me that having a family and having a successful academic career were going to be incompatible for me particularly if I didn't want to move. I'm like "Why are you saying this? Maybe you think you're being helpful, but you're really not!"

Other comments included highlighting gender by singling women out in a group of men (i.e., "Hey guys, and one gal") or treating the women differently because of their gender (i.e., having an open office door policy for the women but not for the men). These behaviors highlighted unwanted aspects of one' gender, making women feel highly visible in an unwanted way. Though not interpreted as intentional by the targets, these microaggressions were nonetheless viewed as exclusionary and isolating. Next, we examine the effects of regularly experiencing gender microaggressions.

How Women Experience Microaggressions

Most participants who had experienced microaggressions described experiencing negative emotions, such as anger, sadness, and indignation following the microaggression. These were conveyed through statements such as "I was upset with management" or expressed through contextual cues such as tone of voice (i.e., higher volume), facial expressions (i.e., furrowed brows), and body gestures (i.e., raising both hands and shaking one's head).

Many also reported expending significant cognitive energy in the form of rumination, such that they would replay the incident to decipher the intent and meaning behind the microaggression as they contemplated how best to respond to the aggressor. This was not a straightforward process since most microaggressions manifested subtly making it almost impossible to determine the intent, which necessitated the target to ruminate over the incident as evidenced by this technology consultant:

> I might have an inkling about [the microaggression] and generally disregard my feelings as being emotional. I try to be as logical and objective as I can be. If I get this feeling, I'll just say, "It's just a feeling. You don't have any concrete evidence toward that." I'll

> disregard it. But when something happens repeatedly, that's when I'm like 'hmm'.

Other cognitive effects included identity threat and internal identity asymmetry (Meister et al., 2014). Every participant demonstrated strong identification with the STEM field and their identity as a competent professional. Yet, experiencing microaggressions that devalued their competence challenged this positive self-view and enhanced the disparity between how the women viewed themselves and how they felt others perceived them. This experience necessitated cognitive work as illustrated by one software engineer working for a large technology firm.

> A huge portion of my energy went toward, how does this person see me? What do I have to do in relation to them to stay on their good side? How do I keep my credentials as a technical person in this group when nobody really looks at me and sees that?

To combat feelings of misidentification, women practiced hypervigilance—mentally benchmarking how they were being treated compared to their male colleagues and tracking what their male colleagues were doing. The women were vigilant, using social comparison to gain self-knowledge and evaluate themselves relative to others. Usually, social comparison can be problematic for women given that compared to women, men earn more, are promoted faster, and are given more challenging work (Agars, 2004; Heilman, 2001), which may be harmful to a woman's identity (Schwingharnmer et al., 2006). However, in our sample, engaging in social comparison with male colleagues was seen as an agentic tool by women to mentally benchmark their projects to that of the men. In fact, most comparison efforts by women were done to maintain their technical work identity by striving to work on similar projects as their male peers.

Expending considerable cognitive energy to deal with the effects of microaggressions was linked to ego-depletion, a process through which exerting self-control on one task (i.e., self-monitoring, benchmarking, etc.) drains self-control strength and impairs performance on other tasks (Inzlicht et al., 2006). Ego-depletion can lead to lower performance, jeopardizing leadership outcomes for these women (Lanaj et al., 2019). In fact, constantly engaging in cognitive exercises was associated with self-doubt related to one's leadership aspirations—one's future possible self as a leader as evidenced in this statement shared by a senior director working in technology whose constant exposure to subtle microaggressions had a deleterious effect on her core leader confidence and her leader aspirations: "I can feel even now a shakiness in my system and my ability to have an impact on my role is starting to get hamstringed. Do I even want to stay?" Thus, despite achieving a senior leadership position, she revealed the uncertainty and doubt she felt toward her agency as a leader and whether she wanted to continue to remain in STEM.

These cognitive processes relating to one's desire to be seen as competent and professional were often associated with behavioral changes, including overcompensation, in which women tried to outperform their male colleagues and prove their technical competence to a skeptical audience. For example, one technology consultant said, "These comments spurred me to be much better and to work harder at my job just to show how professional I am." Other forms of behavioral changes included emulating the behaviors of male colleagues and asking for more technical assignments. Both the cognitive and behavioral responses were linked to burn out (i.e., hospitalization for one woman) as a result of over working; disidentification with the work domain, (i.e., disengaging with one's team by not participating in meetings and looking for exit opportunities to leave the current team/workplace); and eventual turnover (i.e., leaving the organization or department), all of which can illuminate why competent and experienced women leaders leave STEM fields (Meister et al., 2017; Woodcock et al., 2012).

Buffers of Microaggressions

We first identified and distilled the various buffers that altered the negative experience of microaggression into categories (i.e., colleague intervention, affinity groups, organizational policies, etc.). Colleagues who proactively intervened on behalf of the target emerged as the most frequently mentioned buffer, playing an important role in women's narrated experiences of microaggressions. Thus, we chose to deepen our understanding of the role and influence of these interveners whom the women most often referred to as their "allies." To the women in our study, these colleagues included both men (members of the dominant group) and women (members of the target group but often senior leaders with more 'experience' in navigating the situation) that engaged in allyship behavior—providing proactive, direct, and unsolicited support, which validated their experiences and/or abilities. The majority of the allies, however, were men and included colleagues and managers with whom the woman had a close working relationship, as well as senior leaders who had power and visibility within the organizations. This finding is not surprising given that men are overrepresented in STEM, especially at the leadership level (Catalyst, 2019). Further, these allies differed from supportive colleagues in a critical way: allies would intervene unprompted by the target, whereas supportive colleagues offered words of condolences only when prompted by the target. This act of public defiance to go against the status quo by challenging a biased review or vouching for a woman's competence mirrors oppositional courage, highlighting common behaviors of allyship (Thoroughgood et al., 2021).

It is important to note that allies as described by the participants differed slightly from allies as broadly defined in the scholarly psychology literature. This literature generally refers to allies as members of the socially dominant, privileged group (i.e., White male) who support actions to reduce disparities experienced by the underrepresented or marginalized group (in this case, women) (Craig et al., 2020). Despite this difference, the women in our study included women interveners in their own narratives of allyship, likely because in the practitioner world, the term allyship is often extended to anyone who engages in behaviors to support those who are underrepresented (e.g., Melaku et al., 2020). Thus, for this study we chose to include women in the category of perceived allies in this work. We discuss the implications further in the discussion.

Allies as Prompts for Redemptive Sensemaking

We discovered that allies helped mitigate the effects of microaggressions by altering the sensemaking process (see Fig. 3). That is, allies influenced how women reflected on and provided meaning to the negative experience of microaggressions, interrupting their destructive outcomes. To explain and theorize about how this materialized, we drew on the narrative sensemaking literature, which explores how individuals' identities evolve as they make sense of life experiences—particularly adversity, difficult events, or even trauma in their lives (Maitlis, 2020; Pals, 2006). Those who are able to process hardships to discover meaning during a difficult turning point achieve more positive psychological outcomes than those who fail to engage in this type of sensemaking (King & Hicks, 2007; Maitlis & Christianson, 2014). Relatedly, a concept that surfaced throughout the women' narratives of ally intervention, is that of 'redemption,' defined as the transition from demonstrably bad or emotionally negative events, to a demonstrably good positive outcome, emotionally positive state, or attribution about the self (McAdams & McLean, 2013). That is, the positive or 'good' effectively 'redeems' or overcomes the negative or the 'bad'. To explore this, we coded for sequences of redemption throughout the women's narratives. An example is the story a woman software engineer who described a performance review during which she experienced a microaggression that questioned her technical ability (the negative event), which was followed by a senior leader publicly stepping into challenge the outcome of that review and attesting to her technical ability, resulting in her feeling good about her technical competence (positive event). This example depicts how women experienced microaggressions, which were characterized by an initial negative state that was then "redeemed" or reclaimed by the ally-initiated good that followed it.

Allies played a key role in the redemptive sensemaking process; receiving their support was instrumental in mitigating the negative effects of microaggressions. Allies not only helped the women move from a negative to a positive state, but also supported them to reflect-on and draw key learnings from these situations (McAdams & McLean, 2013). During the analysis of ally-supported redemption, we found their buffering effects fell into two aggregate dimensions: domain-related and person-related (see Fig. 2). Domain-related buffers bolstered a woman's identity tied to the STEM work domain by legitimizing her technical competence and sense of belonging in STEM, whereas person-related buffers protected a woman's identity tied to the *person* by validating her experiences dealing with microaggressions and normalizing personal characteristics such as her mannerisms, personality, etc.

Domain-Related Effects

The most frequently mentioned type of ally support was someone in the organization acknowledging one's technical competence. These allies had proximity to the individual's work and could speak to her technical ability and skills. Examples included a senior leader acknowledging one's skills and encouraging a woman to pursue technical opportunities within the organization; a business partner requesting the technical expertise of a woman after most of her work was reassigned to her male colleagues; and a leader openly challenging the outcome of a biased performance review and acknowledging the woman's technical skills. In all examples, these allies acted without prompting from the target not long after witnessing or hearing about the microaggression.

Receiving ally support helped restore the women's confidence about their technical competence, helping them transition to a positive state. In recalling how receiving external support from a senior leader ally dispelled her self-doubts about her technical ability and consequently her qualifications for a promotion, one software engineer shared this realization:

> And let's not forget the person who marched into the director's office. Management said he was doing my work, and that I was too far under his wing, and he was like "No. I'm going to go and vouch for her and speak up for her." That is incredibly meaningful to me because if it weren't for that, I might even have this false narrative that I wasn't worthy of being promoted. That he was doing my work. I might even believe that.

Through the ally's intervention in which he publicly vouched for the woman's technical competence, this engineer avoided internalizing an unwanted identity and a false narrative about her technical ability that were projected onto her by others. The theme of refusing to internalize

the microaggression and the ensuing learned resilience evidenced in this quotation was echoed by others. Receiving feedback from an ally was pivotal in interrupting the internalization process through which aspects about one's competence were called into question. Through ally support, women described a bolstered sense of belonging (i.e., "This is where I belong") and a desire to continue pursuing a career in STEM in environments where those types of support systems were available ("I'm not going to let men push me out of this field!"). Ally intervention seemed pivotal in preserving the woman's STEM-related, work and leader identity, leaving it intact and whole. Further, it seemed that when this type of support was received, women were less likely to disassociate from the STEM domain, and were thus less likely to leave the STEM field, a finding that supports existing research showing that women who experience repeated threats to their identity are more likely to disassociate with that domain and leave (Beasley & Fischer, 2012).

Person-Related Effects

Another form of ally support was having someone in the organization acknowledge the microaggression experienced by the woman and attribute it to gender bias, validating the woman's lived reality and legitimizing her thoughts and feelings dealing with gender microaggressions. Several women recalled situations in which an ally would volunteer his/her observations and support without prompting from the target. One Physics professor recalled receiving ally intervention after experiencing several microaggressions in staff meetings in which she was constantly interrupted.

> One of my male colleagues [noticed it]. He actually mentioned it to me when I had never told him about it. He [also] mentioned that he noticed the interrupting behaviors during meetings. It definitely makes me feel better that someone is noticing especially that it was a male who noticed it and brought it up.

The realization that the problem is external rather than internal and the ensuing feeling of gratitude was amply illustrated by one scientist who shared this thought: "[It's] validating! Because otherwise we're gaslit. Am I crazy or is this person crazy? If I didn't have anyone to check against, it would become this feedback loop of insanity if I didn't have this support system." This scientist mentions how ally support dispelled her feelings of paranoia and self-doubt. Similarly, having one's experience acknowledged by an ally legitimized the microaggression incident as problematic, allowing the target to '[condemn] the condemner' (Ashforth et al., 2007, p. 159). Receiving ally support also normalized the woman's personal characteristics, such as her communication style, her personality, etc., interrupting the internalization process through which negative attributes ascribed to the person are accepted as true by the woman. This builds on the work that demonstrates that if a woman can cultivate a positive self-view as linked to both her gender identity and her leader identity, it can foster increased well-being and the motivation to lead (Karelaia & Guillén, 2014). This ally facilitated redemptive sensemaking demonstrates a way to achieve this positive identity in the face of constant threats, helping women to reduce the threat and affirm their identities, thereby achieving a more positive state after experiencing harmful microaggressions.

Overall, these findings correspond with extant research that shows that when narrators derive redemptive meanings from adverse events, they tend to experience higher levels of psychological well-being and positive adaptation (McAdams & McLean, 2013). Receiving external support helped these women create a self-narrative that emphasized growth, resilience, and positive personal transformation, all of which are pivotal in maintaining one's happiness and confidence (King & Hicks, 2007).

In sum, our findings demonstrate the significant role that ally intervention can have in positively influencing the narrative process for women experiencing gender microaggressions. As shown in Fig. 3, by acknowledging a woman's competence or validating her experience dealing with microaggressions, allies can play an important role in reducing the negative effects of microaggressions, protecting women's work-related identity, and improving their likelihood of remaining in STEM to pursue leadership opportunities.

Discussion

The current study identified the types of microaggressions that women leaders in STEM commonly experience, how they made sense of the microaggressions, and how allies influenced their sensemaking process. We chose women in STEM industries because despite the significant progress being made when it comes to the advancement of women in STEM, women still leave these industries at higher rates than men (Catalyst, 2019). This is concerning because the absence of diverse voices in the decision-making process in STEM industries will no doubt have negative social, financial, and ethical ramifications given the pivotal role STEM fields play in shaping society (Brady et al., 2021; Lewellyn & Muller-Kahle, 2020). Thus, to delve into reasons for the gender disparity, we examine the more 'invisible' barriers in the form of gender microaggressions that can shape the experience and leadership progression of women in STEM.

Drawing on the gender, microaggression, and identity literatures, we shed light on the harmful effects of workplace microaggressions, which can hinder women's leadership progression. In doing so, we answer calls to investigate external factors that affect the career progressions of

women in STEM (Cardador, 2017; Meister et al., 2017). We explored five types of gender microaggressions, including devaluation of one's competence and physical presence, denial of one's lived reality, and pathologizing and devaluing behaviors. We then explored the effects of these microaggressions and theorized how they threaten women's leader identities. These experiences can ignite highly negative reactions, sparking rumination, hypervigilance, and overcompensation, which can facilitate depletion and burnout, leading highly qualified women to question their leadership ability and identity. Our findings not only mirror previous research on the downstream effects women in STEM domains experience (Block et al., 2019; Inzlicht et al., 2011), but also link the specific interpersonal dynamics that can lead to these negative effects. Though none of the women we interviewed had left STEM, the microaggressions they experienced can help shed a light on why qualified women opt out of leadership opportunities in STEM in search for less toxic work settings. Finally, we revealed the vital role of allies in attenuating the negative effects—by triggering and supporting a redemptive sensemaking process. Below we highlight how these discoveries contribute to and advance both theory and practice.

Theoretical Implications

This study contributes to the body of literature on organizational DEI efforts by highlighting the anatomy and effects of gender microaggressions in contributing to the gender leadership gap in STEM and the supportive role that allies can play. Though practical understanding has progressed with respect to workplace microaggressions, theory and scholarship still lag due primarily to the relatively siloed nature of the management literature (Fainshmidt et al., 2021). We address this gap in several ways. First, we draw together the various work done on gender discrimination in STEM by integrating the microaggression and identity literature. We uncover five types of gender microaggressions, tying them to psychological and work outcomes to demonstrate how experiencing microaggressions can negatively affect a woman's professional leader identity and hinder her leadership progression. Adding to the literature that examines the experiences of women in STEM domains (Miles et al., 2020; Wilkins-Yel et al., 2019; Yang & Carroll, 2018), we specifically demonstrate how microaggressions can chip away at a woman's confidence about her technical abilities or raise doubts about her character. In a field defined by technical prowess (Eaton et al., 2020), losing confidence in one's technical competence can discourage even experienced female STEM professionals from staying the course.

We also enhance existing scholarship on microaggression intervention by uncovering the buffering effects of colleagues who intervened against the microaggressions, thereby shedding light on how such interventions can help sustain women leaders in STEM fields (Cortland & Kinias, 2019; Dennehy & Dasgupta, 2017). These individuals who were both men and women used their power and position to actively intervene unprompted by the target. We connect these intervening behaviors, such as acknowledging a woman's competence and legitimizing her experience dealing with gender microaggressions, to redemptive sensemaking, a process through which a woman transitions from a negative to a positive state. Further, by decoupling the association between the devaluing messages conveyed by the microaggressions and a woman's work and leader identity, the intervention bolsters the woman's STEM-related self-concept, sustaining her to remain in the field and pursue leadership opportunities. Thus, we enhance the literature on microaggression interventions and allyship (Craig et al., 2020; Sue et al., 2019) with empirical data to demonstrate the efficacy of ally intervention and its role in helping sustain women in STEM fields.

We note that in our study, allies as described by the participants included women, members of the target group. The definition of allies has varied in the psychology literature: some define allies as members of the dominant, privileged group acting on behalf of a disadvantaged group (Radke et al., 2020; Sue et al., 2019). Per this definition, women and other stigmatized groups who are not part of the dominant, privileged group can still act to support the target group but are generally not considered allies or capable of providing allyship (Craig et al., 2020). Others use a broader definition of allies as socially aware people who proactively try to do something about injustice that exists around them (Collins et al., 2021; LaMantia et al., 2015). Allies in our study were more in line with the latter definition particularly given that both men and women who intervened helped the target achieve redemptive sensemaking. Our findings suggest that allies can also include target group members who are willing and able to advocate and speak up on behalf of others in their group.

This study contributes to the identity and sensemaking literature that explores how people experience, make sense of, and cope with adverse events—such as those that challenge or threaten identities—in the workplace (Maitlis & Christianson, 2014; Vough et al., 2020). Within this field, research exploring post-traumatic growth and positive adaptation highlights the powerful positive change that can occur in individuals in response to adverse life events, trauma, or life crises (Linley & Joseph, 2004; Maitlis, 2020). While this work is growing, there are still few studies that explore post-traumatic growth in the context of 'ordinary work' and the processes through which this occurs (Maitlis, 2020). Our study contributes to this work by exploring positive growth in the face of negative experiences—microaggressions—in

the context of common and 'ordinary' work of women in STEM.

In doing so, we surface a relatively common identity-threatening work experience that at first blush seems 'minor'—due to its often, subtle nature—yet can accumulate to have detrimental consequences for women's leader identities, well-being, and careers. Previous studies have explored the critical role of cognitive appraisal when faced with a threat, and acknowledge the importance of social support in the process (Meister et al., 2014). However, "more work is needed…to understand more clearly how individuals convert a threat response into an opportunity for identity gain and growth, as well as how they can be helped to do so more efficiently" (Petriglieri, 2011, p. 656). Answering these calls across the sensemaking and identity literature, we surface how allies can trigger redemptive sensemaking whereby women can reconstruct these negative experiences to prevent damage to their self-identities and experience and narrate positive growth in its wake so that they can persist and pursue leadership opportunities in STEM.

Limitations and Future Work

Our study has limitations upon which we might build several avenues for future work. Our sample was limited to those who have *remained* in STEM and thus represents women who may have survivorship bias. Relatedly, our sample consisted of women with a range of leadership experience (i.e., Team Lead to SVP), which may have obscured differences in the types of microaggressions experienced at different leadership levels. However, interviewing a range of women with different levels of experience allowed us to investigate the lived experience of a variety of women leaders navigating gender microaggressions in STEM, increasing our study's generalizability. Though these women chose to stay in STEM, their experiences reveal constant struggles dealing with gender microaggressions that have and continue to affect their core confidence and leadership aspirations. Naturally, we wonder what differentiates the women who chose to stay versus the women who chose to leave STEM completely. There may be important individual differences, such as whether one experiences the threat as a threat to one's self or a threat to one's group (Shapiro, 2011). The fact that ally intervention naturally emerged as a salient buffer among the majority of the women in our study speaks to its power to significantly sustain women leaders operating in STEM. Nonetheless, we hope that future studies can explore the narratives of women who left STEM to understand their experiences and determine if ally intervention has the same redemptive qualities. Relatedly, our study sets the groundwork for understanding the experience and sensemaking process for women of color who must navigate both gender and racial microaggressions.

Second, with our intent to understand and build theory about women's experiences, we chose a qualitative approach. A next step could be to craft a quantitative study based on our conceptual model (Fig. 3), and the categories of intervention we have noted that play a role in the process (Fig. 2). This could provide a larger sample of women in STEM to increase the generalizability of our findings.

Third, our study raises questions about the definition of allies and allyship. Allies in our study emerged as both men and women, suggesting that targets can also be allies to their target group. Future studies could quantitatively examine the impact of different types of allies (i.e., majority group versus target group), types of allyship behaviors (i.e., allyship that validates one's technical competence vs. allyship that validates one's lived experience navigating gendered interactions), contextual factors that enable/constrain ally behavior and outcomes, and their impact on psychological processes, including turnover intention, organizational paranoia, etc. (Thoroughgood et al., 2020, 2021).

Practical Implications

This work helps address the ongoing challenge faced by women and other minorities who do not represent the typical leader 'prototype'. Our study findings offer diversity practitioners a way to enhance workplace diversity training dealing with gender bias in two important ways. First, we make visible the invisible by providing concrete, real-life examples of different types of microaggressions, which normally go unnoticed and unchecked due to their subtle and ambiguous nature. We remove the ambiguity, allowing diversity practitioners to train employees to address problematic interactions, relieving the burden from the target. We thereby aim to fix the aggressor, and not the target.

Second, by highlighting the powerful, ameliorating effects that ally intervention can have in restoring a woman's work identity, practitioners can encourage bystanders to become allies who intervene. The research shows that though bystanders - particularly out-group members- witness frequent examples of microaggressions directed at an outgroup member, they rarely intervene (Crosby et al., 2008; Dickter & Newton, 2013). By reviewing examples of microaggressions, encouraging colleagues to speak up, and illuminating the relief, gratitude, and resilience that allyship can spark within the target, practitioners can encourage proactivity among individuals to combat microaggressions, and help stem the tide of gender microaggressions to create an inclusive work environment for women in STEM.

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Declarations

Conflicts of interest The authors declared have no conflict of interest.

Research Involving Human Participants and Animals Research involved human participants.

Informed Consent Informed Consent was obtained from all.

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