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Psychological Safety: Creating a Transformative Culture in a Faculty Group Peer-Mentoring Intervention

Lance D. Laird[1], Kimberly Bloom-Feshbach[2,3], Tay McNamara[3],
Brian Gibbs[4], & Linda Pololi[3]
[1]Boston University
[2]Weill Cornell Medicine
[3]Brandeis University
[4]University of Massachusetts

We investigated psychological safety (PS) in a randomized controlled study of a group peer mentoring intervention. Forty mid-career academic medicine research faculty participated in the year-long C-Change Mentoring & Leadership Institute, completing a survey after the first session and post-intervention. Qualitative data included ethnographic observations, interviews, and participant writings. A codebook thematic analysis used PS as one sensitizing concept. PS mean scores increased from 5.6 at baseline to 6.1 (range 1-7) post-intervention ($t=3.03$, $p=.005$, mean difference=0.48, 95% CI=0.33, 0.81). In qualitative analysis, PS resulted from intervention structure, storytelling/listening curriculum, and skilled facilitation, fostering norms that enabled sharing, repaired trust, and nurtured belonging. PS enabled faculty to be authentic, vulnerable, and responsive, and to develop social bonds within a peer community.

Keywords: psychological safety, peer mentoring, culture of academic medicine, faculty development interventions

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Introduction

Academic medicine has long been characterized by a non-relational culture linked to competition, hierarchy, low vitality, burnout, and attrition (Appelbaum et al., 2022; Aubin & King, 2018; Paguio & Yu, 2020; Pololi et al., 2009, 2015, 2023; Pololi & Jones, 2010). Psychological safety, defined as the "shared belief by members of a team that the team is safe for interpersonal risk taking," has been identified as a key ingredient to a positive and ethical organizational culture (Edmondson, 1999; Ferrère et al., 2022). A lack of psychological safety results from competition, fear of admitting errors, experiences of discrimination and bias, which have been linked to moral distress, particularly for faculty who are women or underrepresented in medicine (Edmunds et al., 2016; Pololi et al., 2020; Rodriguez et al., 2014). Status hierarchies in medicine and education, professional expectations of autonomy, the fear of embarrassment or exposure of vulnerabilities inhibit adult learning, the processing of errors, asking for help (Edmondson et al., 2016), and ultimately, career satisfaction and professional success. Conversely, research shows that psychological safety in professional medical culture leads to innovation, high team performance, patient safety, and personal wellbeing (Appelbaum et al., 2022; Edmondson, 1999; Edmondson et al., 2016; Purdy et al., 2023; Yulita et al., 2022).

Despite compelling evidence of how psychological safety positively impacts learning and professional development, few researchers have investigated how to enhance psychological safety among academic medical school faculty. Mentoring is one of the key areas of intervention for professional development and retention of faculty in the culture of academic medicine. A systematic review of mentoring interventions for URM (underrepresented in medicine) faculty found that most programs focused on traditional dyadic mentoring, while relatively few introduced peer or group mentoring programs (Bonifacino et al., 2021). A national survey of academic health centers found that "inadequate mentoring was most strongly associated with less institutional support, lower self-efficacy in career advancement," and lower levels of relational trust (Pololi et al., 2015). The perception of psychological safety is one of the fundamental components of effective mentoring (Moore & Wang, 2017).

To investigate this relationship and to advance the science of mentoring, we studied psychological safety as a hypothesized mechanism of action in a randomized controlled trial-tested effective peer mentoring program for academic medical school faculty, known as the C-Change Mentoring

Table 1
Characteristics of medical school research faculty (n-40) participating in the Institute

Characteristic	N	%
Race and ethnicity: URM	20	50
Race and Ethnicity by gender	10	50
Non-URM male	10	25
Non-URM female	10	25
URM male	10	25
URM female	10	25
Degree		
PhD	18	45
MD	17	43
Both MD &PhD	5	13
Rank		
Assistant professor	17	43
Associate professor	13	58
NIH research award		
K award recipients	19	48
RO1 award recipients	15	38
Recipients of both K and RO1 awards	5	13
	Mean	**SD**
Years in academic medicine in 2019	8.9	2.6
Number of Participants	29.2	18.2

Note. Non-underrepresented in medicine (Non-URM) and underrepresented in medicine (URM): Individuals from racial and ethnic groups that are adequately represented and have low representation, respectively, in the healthrelated sciences and STEM fields on a national basis, as designated by the National Institutes of Health and the National Science Foundation.

& Leadership Institute (Pololi et al., 2023). We sought to understand how psychological safety emerged in the C-Change Institute, as well as what it enabled for the group process and for individuals. The theory of change with which the Institute operates is by aligning personal values with career goals, relationship formation, and developing self-reflection and listening skills, faculty will increase their sense of vitality, purpose, and direction. The C-Change Institute, therefore, creates an alternative space, time, and experience conducive to whole-person, authentic engagement (Pololi et al., under review). In this report, we analyze the experience of psychological safety in the Institute and explore how psychological safety was achieved, sustained, and repaired.

Methods

We performed a mixed method analysis of psychological safety as it operated in the C-Change Institute, a year-long faculty development program for academic medical research faculty from across the US. All participants gave written informed consent for the collection of survey, observational, narrative, and interview data. Brandeis University Human Subjects Protection IRB approved this study: IRB #19127R-E.

C-Change Mentoring & Leadership Institute

Faculty participants from multiple institutions participated in the year-long facilitated group peer mentoring course: the C-Change Mentoring & Leadership Institute. The intensive sessions convened quarterly for two- or three-days in a residential retreat-like rural setting. In 2021, two initial sessions occurred via Zoom because of the constraints of the pandemic. Participants developed skills essential for leadership and career advancement in academic medicine: forming relationships, developing listening skills, critically examining teamwork and leadership models, practicing mindfulness, and nurturing vitality. Career planning exercises, demonstrated by facilitators and completed in collaboration with

peers in pairs, small and large groups, included reflecting on core values and strengths, creating long- and short-term goals, and committing to learning contracts to achieve milestones.

Quantitative Methods

Recruitment

We recruited early mid-career research faculty from all disciplines at academic medical schools across the US. To obtain the sampling frame, we used NIH RePORTER to identify awardees of qualifying grants from 2013 to 2019. Altogether, 5,202 received email invitations to apply. Interested faculty completed applications and consented to participate in one of two annual C-Change Institutes. Inclusion criteria were: 3 to 14 years at an academic medical school, rank of associate professor or two or more years as assistant professor, and receipt of a single NIH R01 grant or equivalent and/or K-award. Eligible participants were stratified by three binary characteristics: non-underrepresented versus underrepresented in medicine, male versus female, and MD (or MD, PhD) versus PhD degree. We placed additional focus on recruitment of underrepresented racial and ethnic groups as defined by NIH (2019) (Black/African American, Hispanic/Latinx, Native American, Alaska Native, and Pacific Islander).

We maintained a 50:50 balance in each cohort of faculty participants with regards to race and ethnicity, gender, and degree. Respondents were randomly assigned to an initial treatment group, a waitlist control group (one year later), and a waiting list in randomized order to replace any losses. Of 99 eligible faculty recruited, 40 were randomly allocated to either the first or second cohorts (Pololi et al., 2023). The demographics of the 40 faculty participants are shown in Table 1.

Survey

A brief survey, including a validated psychological safety scale drawn from Edmondson (1999) and a group inclusion scale, was collected two weeks after the first session of the C-Change Institute and again one year later at the completion of the Institute. Participants were instructed to consider the Institute cohort as the "team" referenced in the survey. This survey was used in conjunction with a longer survey that included a wide range of domains (e.g., vitality, self-efficacy, cross-cultural domains) and demographic data. The psychological safety scale was calculated as the mean of 7 items, each with a range of 1 ("very strongly disagree") to 7 ("very strongly agree"), alpha coefficient = 0.86. The alpha coefficient calculated in this study was 0.86, comparable to the alpha coefficient from Edmondson's original study. No data was available for the waitlist group in the year prior to their entry into the C-Change Institute, because the phrasing of the psychological safety scale required an existing group for reference. Items are included in Appendix I.

Analysis

Paired samples t-tests were used to compare psychological safety at time 1 (two weeks after the first Institute session) and post Institute one year later. A general linear model (GLM) was used to predict psychological safety at time 1 and post Institute. Predictors used in GLM model included the stratifying variables of non-underrepresented in medicine vs. underrepresented in medicine (URM, i.e., of Black or African-American, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander and/or of Hispanic or Latino ethnicity), male vs. female, and MD or MD, PhD vs PhD. Data for both the paired samples t-test and GLM model used 100 imputed datasets, imputed using chained equations. We also investigated interaction effects between time and URM status, gender, and degree. All quantitative data were analyzed in Stata 18. Imputations were computed using the Stata plug-in ICE (Royston, 2009).

Qualitative Methods

We analyzed the social interactions of faculty in the program (ethnographic field notes) and their perceptions of the impact of the C-Change Institute (field notes, writings, and interviews) within the context of a randomized controlled trial (Creswell, 2018; O'Brien et al., 2014; Patton, 2015; Pololi et al., 2023). Throughout the study, we used the Standards for Reporting Qualitative Research (SRQR) guidelines.

Data Collection

Qualitative data included ethnographic field notes, participant writings, and interviews. Two qualitative researchers (LDL, White male anthropologist, and KBF, White female academic physician) conducted non-participant ethnographic observation during each session, taking detailed field notes on curriculum content, participation dynamics, and informal conversations. Written data comprised an initial application, anonymous mid-year evaluation, and final day narratives, as well as "meaningful learning" narratives from each day of the C-Change Institute. Researchers recorded hour-long interviews over Zoom with each participant following the completion of the Institute. Domains of inquiry included experiences and evaluations of the C-Change Institute, development of the group over time, and individual changes. We transcribed, de-identified, and securely stored all the data with password protection.

Data Analysis

We coded qualitative data in Atlas.ti 23.2.1 (ATLAS.ti Scientific Software Development GmbH,

2023). We employed a "codebook thematic analysis" (Braun et al., 2019) using abductive coding methods (Thompson, 2022), which aims not at inter-rater reliability or consensus but at a coherent, narrative interpretation of the meaning and process of the phenomenon under study. Deductive codes included curriculum components, outcome measures, and observational foci. Sensitizing concepts drawn from the research proposal, e.g., "psychological safety," were used to capture relevant domains of experience (Bowen, 2006). Each observer reviewed the other's field notes, noting patterns of meaning and action (latent or implicit themes) and topics of discussion or direct interpretive statements (semantic or explicit themes) for inductive codes to add to the initial codebook, with definitions and examples. Emerging codes were added iteratively, and the qualitative coders met regularly to discuss and refine existing codes. To check analytical bias and elicit diverse perspectives given overlapping identities in our qualitative team, an additional qualitative researcher (GPL, African American female anthropologist) independently coded a sample of interview transcripts from the first cohort. Coders also discussed interpretations (member checking) with facilitators present in the sessions (LHP, MBV). Coding by GPL and member checking were congruent with the qualitative researchers' coding and analysis.

For qualitative coding purposes, we defined the sensitizing concept "Safe environment" as fostering a sense of non-coercion, freedom to participate, nonjudgmental positive regard, respect for privacy, and confidentiality. We also tracked signs of safety, including being the first to participate, the offering and welcoming of challenges in a supportive manner, sharing of space, requests for feedback, and self-disclosures. Likewise, we tracked signs of threat: being the last to participate or not participate, demonstrating resistance to directives, competition, conflict, and silencing. Analytical memos on each of these codes resulted in the following description of psychological safety: its creation, maintenance, and repair.

Results

Quantitative Results

Thirty-five of the 40 participants provided quantitative psychological safety survey data. Additional characteristics of participants are shown in Table 1.

Participant scores on the psychological safety scale were high. Participants had mean psychological safety scores of 5.6 (unimputed n=35, SD=.74) at baseline and 6.1 (unimputed n=34, SD=.95) at Institute completion (range 1-7). Not all subgroup increases were statistically significant when evaluated using unimputed GLM models (See Appendix II)

In paired samples t-tests, overall, the mean psychological safety score increased significantly from baseline to Institute completion (t=3.03, p=0.005, mean difference=0.48, 95% CI=0.33, 0.81). Further, the mean scores for URM and non-URM faculty, female and male faculty, MD, and PhD faculty each increased over this time period.

In the GLM models, female faculty reported lower psychological safety than male counterparts at time 1 (unstandardized coefficient, b=0.77, p=0.002). This effect was abated by Institute completion (b=-0.21, p=0.50). There was no significant difference between MD and PhD faculty at time 1 (b=0.28, p=0.24), but at Institute completion, MD or MD, PhD faculty reported higher psychological safety than PhD faculty (b=0.85, p=0.01). There was no significant difference between the responses of URM and non-URM faculty at either time 1 or at Institute completion, indicating that psychological safety was similar by race and ethnicity at both time points.

Qualitative Results

Creating a Safe Environment

In the ethnographic (FN), participant writing (PW), and interview (IN) data, all participants who completed the program characterized the Institute as a safe environment in which they felt free to speak authentically and without fear (IN). The few specific counterexamples are detailed below in Rupture and Repair and Psychological Safety as a Continuous Project. Repeated participant descriptors of the environment (FN, PW, IN) included openness, vulnerability, confidentiality, nonjudgement, respect, being heard, feeling supported, freedom to share personal struggles, freedom from fear, trust, love, and dedication to each other's wellbeing. In our analysis, we found that the structure, composition and setting of the group, facilitation skills, and curricular elements combined to form a networked, interpersonal, relational environment.

Selecting Participants. The intentional formation of a diverse cohort that met consistently through four multi-day sessions over the course of a year was a key factor that several participants cited as important to their sense of safety. Several of them hypothesized that the self-selected group brought an openness to share, listen, and change since they volunteered to participate in a "culture change" career development program (IN). Various individuals whose gender, racial, or sexual identities are marginalized by dominant ideologies mentioned the unique experience of not being the sole "under-represented minority in medicine" (URM) in the room and underscored how the diverse representation itself created safety. Specific facilitated sessions were dedicated to exploring identities, diversity, experiences of power and powerlessness. One Black woman remarked, "To be in a room to hear everybody's

experiences, and there are similar struggles, and I think just to hear that from others was very cathartic." Similar comments emerged from those identifying as LGBTQIA+ or as immigrants to the U.S.

Setting a Space Apart. The C-Change Institute created a context and space in which participants could learn and work in an intentionally structured slower paced setting. Faculty particularly appreciated being away from the stress of work, family responsibilities, and technology. Many found the setting conducive to reflection, describing it as a calm retreat, a haven, and a luxury to enable focused attention to their own values and goals. Two participants expressed gratitude for being free of institutional "constraints" they otherwise experience in their academic medical centers.

From the vantage point of a separate physical space, facilitators challenged participants to look critically at the culture of their institutions and to contrast this with the micro-culture of the C-Change Institute itself. Participants themselves openly acknowledged negative aspects of culture in academic medicine, especially unsafe hierarchical relationships and lack of effective mentoring, and contrasted this culture to the safety and connection they experienced at the C-Change Institute.

Setting Ground Rules. An additional structural, curricular element was the facilitators' introduction and repetition of ground rules and expectations for the group. Facilitators repeatedly emphasized confidentiality when leading activities. They reiterated that participation was "an invitation" rather than a requirement. The agency to participate was key; participants were not called upon and could take part at will. One participant, who eventually shared a great deal of personal struggles, appreciated the permission to consider "whether I want to" share, and another, much more reserved participant, was relieved that there was no pressure. Two others specifically appreciated the agency to participate or remain quiet on their own terms. Citing the ground rules, one participant remarked, "You can always ask…with kind eyes, exploring questions, understanding questions, because you're really just there to understand. You're not there to give a solution."

Practicing Ground Rules. Participants almost immediately referred to the ground rules in early exercises. Several noted that the environment of the C-Change Institute was "safe" from the start because of the ground rules. One man noticed another generalizing his own experience; he gently challenged his peer not to speak for others: "What's your I-statement?" In a different, intense moment on day two of session one, when a facilitator was challenging the group about whether "perseverance" could be a "value" rather than a characteristic, one woman reminded herself, "I'm trying to use I-statements" to explain her childhood experience of "you couldn't quit." Others drew attention to statements directly referencing the ground rules, including: "extend welcome and receive welcome"; "choose for yourself"; "no fixing" and "turning to wonder." When small groups presented a structured group brainstorm activity on how to prepare for the first meeting of a team, they all cited ground rules, check-ins, shared food, and storytelling—elements of the Institute—as important to build trust and psychological safety.

Structured Social Interaction. During C-Change Institute sessions, faculty were assigned to work in specified dyads and triads. When the group assembled, sharing "check-ins" each morning and "meaningful learnings" each afternoon, one woman, echoing others, said she appreciated the intentional assignment of small groups that allowed her to build early connections with each member of the group. Two participants described this method as "forcing…deeper" levels of trust. Several expressed gratitude for the willingness of some participants to share personal struggles in the first session and how it bolstered their own comfort in sharing candidly. In the second session of the second cohort, one male clinician remarked on the openness and honesty he experienced: "I feel I know more about you all than my colleagues that I have had for five years!"

Facilitation & Curriculum

The author of the curriculum (LHP) recruited a second experienced facilitator to co-lead sessions, and the two met biweekly for a year before the program. One facilitator was a White European female academic medicine physician researcher with expertise in medical education, the culture of academic medicine, and the experiences of marginalized groups. The other facilitator (MBV) was a male Latinx PhD with leadership expertise as a diversity, equity, and inclusion officer in higher education and non-academic organizations and expertise in intergroup dialogue. They co-facilitated each of four sessions, meeting before and after sessions to plan and debrief. In the sessions, they took turns leading different exercises and participating in small group discussion. In addition to comments recorded in our field notes (FN) and anonymous narrative writings (PW), we asked participants in the interview (IN) to discuss the role that facilitators played in their experience. The group facilitators formed, nurtured, and reinforced a culture of psychological safety in the C-Change Institute. In this section, we highlight key actions of facilitators and curricular elements that observers and participants identified as contributing to the safety of the cohort.

Celebrating the Cohort as a Group

The first and most explicit facilitation function was the promotion of group identity through

welcome, affirmation, and celebration. As participants gathered on Zoom on the first day of the first cohort, both facilitators emphasized the diversity and value of the group. One facilitator described seeing the faces on the screen: "My experience is wow, look who we are here; look what's behind the faces on this screen. I see this quilt, this wonderful weaving that's happening here, as you are weaving your different threads" (FN). Similarly, in the first session of the second cohort, a facilitator shared that "We've been planning to meet you for a very long time. Huge wow factor. What you do, you can do together. This is really fulfilling to me. I'm too old to do work that doesn't have value for me." This facilitator frequently expressed a feeling of warmth and love for the participants throughout the sessions of both cohorts. Placing the facilitator's superlative valuation of this work within the context of the group reinforced the mutuality expected in the planned intervention. At another point, the facilitator exclaimed, "we have the perfect group" (FN). A South Asian male participant remarked that "It didn't matter what background you came from ...everybody felt that their stories were relevant." He attributed the safety, friendliness, and nonjudgmental space to facilitators' skill and role modeling (IN).

Both facilitators addressed "all of you," calling them "co-creators" and uplifting "what you bring." One facilitator called the group "team human" and "a strong team." On the second day of the meeting, one facilitator greeted each participant, adding: "It's very nice to see your faces. It's like seeing old friends. Just thinking of yesterday, we hardly knew each other existed." Later, the facilitator expressed, "I really feel honored to work with you." Participants, in their introductions, adopted similar language, expressing openness to "learn from all of you" or openness "to hear someone else's story" (FN). These affirmations of the collective identity of the group set the tone for the whole Institute, creating a sense of shared pride and community spirit that continued throughout each of the sessions.

Role Modeling. Facilitation animated the "work" of the curriculum in other ways. Facilitators offered challenge and support for participants in ways that participants imitated for one another in the small and large group settings. Facilitators showed vulnerability from day one, sharing their own personal stories and identities (e.g., professional failure, experiences of discrimination). Participants followed suit, sharing personal and professional challenges, losses, and insecurities (FN). Facilitators also asked constructive questions, listened carefully, and gave affirming feedback, establishing a group leadership paradigm of mutuality and respect in which power differentials were minimized. Several participants mimicked the facilitators, directly copying their language and mentoring strategies when questioning their peers (FN). This helped participants to envision themselves as potential facilitators in their home environments, acting as agents of culture change to spread the model of leadership they observed and experienced during the C-Change Institute (IN).

Graduated Storytelling & Listening Skills. Several curricular activities fostered listening, reflection, and peer problem-solving skills. Throughout each cohort experience, participants were prompted to tell stories about personal milestones, overcoming obstacles, feeling powerful and powerless, their cultural background, and moments of joy and satisfaction at work. Participants experienced structured exercises to build listening skills without responding, making judgments, giving advice, or asking questions.

In the second cohort, one participant connected "safety" with the early vulnerability others showed in the circle (IN). Another felt she belonged because she identified with peers' struggles: "and people who are willing to share their struggles, like that somehow makes you feel less alone" (IN). She cites two peers—one who said he was "putting himself out there" to give others permission to do the same (IN) and another who shared family disabilities and personal struggles (FN)—as models of vulnerable sharing. Another woman pointed to two men who had modeled emotional sharing, explaining that hearing others' stories of discrimination added to her sense of "not feeling alone" (IN). An outwardly strong, confident woman cried cathartically as she shared a history of discrimination and fear (FN), crediting the group's "trust and love" for allowing her to focus on her vision and commit to being herself at work (FN, IN).

Integrating Personal Identities. One function of storytelling was to access participants' own life experiences as data for clarifying patterns that informed their identity and purpose, including strengths, weaknesses (e.g., shadow side), values, passions, interests, and sources of joy. The experience of "being heard" by their peers built a sense of belonging in a community and enabled them to be "authentic" (PW, IN). Four remarked that bringing one's "true" or "whole" self—especially when it involved the need for self forgiveness—is difficult to do in their work environments where vulnerability is avoided or could be penalized (FN, IN). Participants laughed nervously as they shared stories of their strengths, which many said, "I don't usually tell"; or "stories we would not share with colleagues" like a cancer survival story, "because it affects work" (FN). One man emphasized the group's collective development of "dedication to each other's wellbeing" and becoming "more comfortable sharing things" over time, especially between the second and third sessions of cohort 2 (IN). Hearing other participants' stories made him "want to hug everyone," which he never feels at work (FN). The contrast with the sense of safety in the C-Change Institute helped some participants name the lack of this culture in their

home environments (FN).

Several participants emphasized confidentiality as they shared issues within their institutions; two shared toxic relationships with key mentors; one man disclosed his unusual family geography; and one shared her gender identity journey in the third session, noting it was easier to share when removed from her institution (FN). One facilitator made explicit that sharing and active listening exercises early in the Institute had developed trust and group identity so that the "brave space" for dialogue about differences (or commonalities) could surface in the third session. A facilitator concluded the second session with "my awareness that we have become a community of learning, an intercultural community of learning. We can speak authentically across gender, race, and country of origin" (FN).

Facilitators led a conversation on the complexities of discussing race in session three. In one exercise, participants silently read quotes posted on a wall—about sexism, racism, and abuse in academic medicine—writing comments in the margins, then discussing their responses in the large group with facilitated prompts. Participants linked the identity stories and thematic discussions of diversity in session three to "safe environment" and deepening relationships. Facilitators noted in this session the emotional vulnerability that participants demonstrated, attributing it to the work they had done in previous sessions to build relationships and safety (FN). In interviews, participants cited listening activities, small group dialogue practice, and the exercise as key examples of taking in the perspectives of others while being invited but not compelled to share (IN).

The "safe environment" was built on intentional structure, the agency to participate, skilled facilitation and role modeling, continual affirmations of group identity, the repetition and adoption of group norms, and the curriculum of listening skills and graduated storytelling.

Sustaining a Safe Environment

Throughout the C-Change Institute, peers increasingly affirmed peers. Facilitators encouraged them to address individuals using names and second person pronouns, even within a larger group. Modeling how to navigate threats helped sustain a safe environment, as participants interpreted challenges as well-intentioned corrections, not as critiques, attacks, or liabilities. In addition, the group withstood other threats: missed cues, lateness, and absence, interrupting, calling out of individuals, and occasional conflicts (FN).

Session three, the first in-person gathering for the first cohort, marked a shift in energy. Participants expressed openness and optimism, eager to relearn what it means "to be among people again" after remote work during the pandemic (FN). One woman shared that she felt "invisible in my place of work," noting in surprise and contrast that other Institute participants reminded her of things she said in previous sessions: "It feels nice to have been seen and heard and remembered" (FN). In session three of this first cohort, a White woman missed the first day, and the group welcomed her back. A Black man remarked: "You guys are a new family to me. One of my family members wasn't here. I'm so glad to see you" (FN). In both cohorts, participants who missed a session received warm welcomes from peers and the facilitators.

During the second cohort, in person for all sessions, plentiful informal interactions helped the group to develop a collective identity more quickly. Participants shared meals, snacks, breaks, informal walks, travel time, and special occasions. During a break in the second session, the group savored petit fours, tea sandwiches and cake, singing "Happy Birthday" to one participant. The latter hugged a facilitator, and another woman declared as the song finished, "I love us!" (FN). At a morning gathering, a facilitator played the song "Lean on Me!" to reinforce the group identity and reciprocal support of peer mentoring (FN). As evening came, one man remarked that the informal time during dinners and breaks enabled the formal exercises to go deeper, with a sense of presence, engagement, and connection to others (FN).

After a leadership exercise in the fourth session, several participants expressed amazement and gratitude. One focused on "relationships: We've taken the time and trust … develop[ed] through the exercises [the facilitators] have taken us on. I feel seen, heard, valued, and respected in this group. … These types of connections matter." She attributed to the group itself the creation of a safe space necessary to share personal stories hidden from colleagues (FN). Another noted the evolution of the group: "everybody brought a unique set of lived experiences and life work challenges. … Hear[ing] life stories…challenges people were facing inside of work and outside. That's a bonding experience, and that helps gel the group. It wasn't that things changed. It was the familiarity that you gain in working together as a group over time" (FN).

Rupture & Repair: Managing Threats to Safety.

Despite the randomization of the cohort participants, the first cohort included two from one medical school and three from a second medical school. There were also three in one sub-specialty but from different institutions. Occasional self-censoring and lack of safety resulted when they shared contrasting experiences within their institution or professional group (FN). Notably, however, other participants appreciated being from the same institution or field, crediting the C-Change Institute with initiating new research and committee collaborations (FN, IN).

Validating Reluctance & Vulnerability. Some participants resisted curricular activities. As participants shared their ten-year goals, one

woman presented vague goals rather than "fake" specific ones, despite a facilitator's gentle redirecting (FN). After two others shared specific goals for family and career, the facilitator reassured the group that no one is better than anyone else and all are in different places. Unlike every other member of her cohort, a female participant refused to share that day's "meaningful learnings" (daily reflections). In keeping with the ground rules, the facilitator validated that some may feel "rushed" and reaffirmed participants' contributing voluntarily (FN). Another expressed discomfort on the first day about "invasive" questions:

> I don't ever share my personal life with anyone. I've always kept it very separate with my mentees. I haven't had any mentees where we've had to cross that line. For me, it was a new experience. An invasive one for me.

The facilitator acknowledged and validated the discomfort: "You don't have to do anything you don't want to" (FN). This participant, however, subsequently withdrew from the C-Change Institute.

When potentially unsafe situations occurred, the facilitators stepped in. For instance, after a paired activity, a participant started to share his peer's story. A facilitator checked in with the peer, role modeling consent for disclosure. Other participants practiced consent and confidentiality, even in unscheduled social interactions. For instance, one asked another during a meal if she could ask a follow up question about a statement about her sense of return to reality from COVID life, referencing the ground rule of double confidentiality (FN).

Transforming Conflict. The most significant episode of conflict in either cohort came in the final moments of the second cohort's first session. As a facilitator handed out readings on mindfulness to prepare for the second session, an Asian-American participant raised the question of cultural appropriation when Western physicians or psychologists are presented as experts on a practice with roots in Hinduism and Buddhism. Neither facilitator initially acknowledged this point. The group had a broader, heated conversation about the principles of inclusion and exclusion. A White woman, recalling this incident, noted: "a lot of discontent with how some of the sessions were run, not inclusive enough in the right ways." She feared "saying the wrong thing." A Black woman approached her at the end and apologized for being "pretty aggressively anti-whatever I had said" (IN). What the Asian American participant recalled, though, is significant: "The support that I received from the rest of the group in that moment was something that was fully unexpected. When raising these issues before, I am usually met with silence or … the group has come at me." She was prepared to drop the issue, whatever the response, because she was not "invested in this community." But "this dynamic that happened … Then [an African American woman] and a few others … came in and really wanted to hear it. … I never felt that kind of support in that kind of situation, professionally or personally" (IN).

When the group met next, three months later, a facilitator purposefully presented a contextualized history of mindfulness and its use in health and psychology circles. The Asian-American participant recalls,

> We talked about it, the whole therapy element of that. All of it was, I think, a really important repair that the group needed … For me, it brought me closer to the people in the group. … And I think once that happened, I was able to really feel safe enough to talk about all the things. (IN)

Unfortunately, the fractious incident happened in the last minutes of the session, just before participants were departing. The repair, three months later, was too late for two participants who withdrew after session one and cited this conflict as part of a pattern of facilitator rigidity and resistance to feedback (IN). The conflict, acknowledgment, and repair were important aspects of restoring safety for the remaining participants. Almost half of the participants cited this episode as one of the most important moments in the group's development, whether in opening their eyes to new perspectives or in bonding with others and deepened most participants' trust in the facilitators and in the group (IN).

Safety as a Continuous Project.

While the agency to participate was an important element in maintaining psychological safety, some counterexamples deserve mention. Two second cohort participants recalled how intimidating it was to do the check-in with a circle of peers on the first day (IN), directly addressing one another; the check-ins continued until everyone had spoken (FN). One of the structural elements of an inclusive environment was the formation of a large group circle where all could see one another. When participants stood outside the circle or moved their chairs, a facilitator invited and encouraged them to rejoin. In one session during the first cohort, a participant refused to sit in the circle. The following day, the participant intentionally moved a chair into the circle (FN). In the second cohort, others protested when a facilitator moved someone else's chair, noting the implied insistence on circles and participation (FN). On the last day of the Institute, two women (White and Black) were reluctant to read the written affirmations they received from other participants. Both facilitators urged them repeatedly to share, but one did not agree, appearing annoyed under the pressure (FN).

While many expressed gratitude for the explicit discussion of diversity, some desired greater

inclusion. In the first cohort, one Asian participant felt it was "impossible to challenge" the opinion of a woman of color (IN). A Euro-American woman, in contrast, felt that

> There were multiple moments when I felt like the women of color in our group's needs might not have been fully heard. Whether it was their sharing of their feeling of safety (during travel) or need to not fully engage. It just felt unexplored/discussed. Difficult—and I'm sure hard to share—comments were expressed and then we just moved on. It just left me feeling unsettled (IN).

Another participant mentioned that he felt uncomfortable sharing some conservative religious perspectives on gender identity and orientation since the rest of the group seemed uniformly "liberal" (IN). In these instances, participants did not feel the psychological safety necessary to express a different viewpoint. It is important to note that a sense of psychological safety was neither universal nor linear, but participants engaged on their own terms.

Enabling Growth: Building on the Foundation of Safety

Psychological safety provided the foundation for the peer learning community. The scaffolded, gradual invitation to share one's story, values, personal and professional goals, struggles, joys, and hopes—to bring one's whole person—built on this foundation. Psychological safety activated a network of intermediate outcomes or mechanisms within the C-Change Institute, including vulnerable self-disclosure, expressions of support and challenge, group bonding, relationship formation, and individual epiphanies necessary for the intended outcomes of personal and career development, appreciation of differences, and continued relationships beyond the intervention (FN). Various participants articulated a desire to import the culture of the C-Change Institute to their home institutions (PW, IN, FN).

For some participants, the safe space of the group affirmed their own sense of self-worth. As one expressed appreciation on the final day of the first cohort, "Without question, the interactions with colleagues as well as being part of a successful group. Group dynamics are often not great in my environment, and it is even somewhat of a relief and affirmation to be a positive contributor (hopefully) in a well-functioning, inclusive group" (FN). Another reflected after session 3 that the most important event was:

> Speaking about reasons I do not communicate openly about experiences of racism and sexism in the workplace. The feeling of submission and sadness can be overwhelming and likely contributes to the dearth of women of color in academic leadership positions. Several reasons why I've remained silent are (1) to be liked, (2) to remain under the radar, and (3) to not be penalized for voicing my feelings. (FN)

Yet another affirmed the inspiration they found in others' stories:

> The most impactful moment of the Institute was the day when we had to share the challenges we each face in our career. It was impactful because my colleagues were open and shared their most intimate thoughts, frustrations, and fears. At the same time, they shared their hopes and belief in the fact that, despite the challenges, they will make it. (PW)

Disclosing personal struggles—childhood experiences, financial circumstances, traumatic or difficult events, discrimination, and abuse; child, spousal, parental disabilities, and illness; cancer survivorship, family deaths, poverty, assault, and harassment—exposed the intersection and frequent conflict between personal and professional spheres (cf., Tawfik et al., 2021). Many began to see these domains as deeply integrated, requiring equal attention. As one participant reflected, "The story drives values; values drive the work" (PW). Facilitators often explicitly stated this ideal of personal-professional integration (FN).

Discussion

The C-Change Institute, where faculty participants simultaneously acted as mentors and protegees, supported the formation of constructive peer relationships, and the development of integrated goals for more satisfying personal and professional lives and leadership in their fields. The psychological safety experienced enabled a diverse group of academic medicine faculty members to bring their whole selves to their work. The C-Change Institute fostered a sense of belonging, trust, affinity, collaboration, investment in each other's happiness and success, authenticity, and vulnerability among a group accustomed to a harsher competitive work environment. In summary, the culture of the C-Change Institute arose through repeated invitations to participate freely, structured, graduated storytelling and listening exercises, skilled facilitation, and role modeling. It was sustained through repairing breaches after conflict and affirming individual and cohort identity.

The C-Change Institute affected participants' psychological safety, independent of gender identity. However, women reported lower psychological safety at baseline, consistent with our prior findings about the experiences of women faculty in academic medicine (Pololi, 2010; Pololi & Jones, 2010). Our research contributes to the literature documenting women's experiences of feeling a lack of organizational belonging and describing bias and barriers to advancement. This underscores the need for interventions to enhance

psychological safety for women faculty. The finding that MD and MD, PhD had higher psychological safety scores than PhDs is interesting, as many participants remarked (FN, IN) on how unusual it was for PhD science researchers and MDs to mix in their institutions, and they were surprised by shared challenges. Further research is needed to explore whether this is an artifact of these two cohorts or has greater significance.

Mentoring is a key process driving psychological safety in organizations (Moore & Wang, 2017). Peer mentoring relationships are more accessible, as communication, support, and collaboration among peers are more effective and mutually beneficial than in traditional dyadic mentoring relationships, where hierarchies and power differentials can have negative impacts (Kram & Isabella, 1985). Peer assisted learning interventions in medical education have enabled psychological safety, relationship formation, and a focus on self-directed learning (Tai et al., 2016; Tsuei et al., 2019).

Learning communities also enhance psychological safety for faculty of color in academia (Thomas et al., 2021). We hypothesize that psychological safety is especially critical for bridging inequity in academic medicine for individuals and communities historically marginalized and traumatized by chronic exposure to discrimination, oppression, violence, abuse, accidental death, and suicide (Mohatt et al., 2014). To have meaningful cross-cultural dialogue about diversity, equity, and inclusion in medical schools, safety is fundamental. And yet, learning communities and peer mentoring relationships must go beyond safety to make room for community belonging and authentic self-reflection, where one's whole self is welcome.

Tsuei et al.'s study (2019) of psychological safety in medical education proposed extending the concept of psychological safety beyond "taking risks" without fear of reprisal to describe educational safety: "the subjective state of feeling freed from a sense of judgment by others such that learners can authentically and wholeheartedly concentrate on engaging with a learning task without a perceived need to self-monitor their projected image" of competence (S32). However, how psychological safety is achieved and operates in mentoring is under-explored in career development for academic medical school faculty.

The C-Change Institute supported and challenged participants in a welcoming, structured environment where the learning contract was with the self (one's own goals, values, strengths, identities, obstacles) in an environment characterized by stable membership, longitudinal interpersonal relationships, caring and being cared for, friendliness and humor. These conditions correspond neatly with Tsuei et al.'s characterization of educational safety among medical students (Tsuei et al., 2019). Educational safety enables learners to be authentic at the intrapersonal level, vulnerable and responsive at the interpersonal level, and to develop social bonds within a community of peers.

Limitations

We observed a notable ceiling effect in terms of the quantitative measure of psychological safety. Edmonson's scale is well-validated, but in our study, it was not normally distributed. Of note, time 1 data were collected two weeks after the first session for each cohort, which included various activities and experiences that purposefully built relationships among participants and sought to establish psychological safety. At time 1, the vast majority of participants responded in such a way that their scores were in the top half of the 7-point distribution. It was not feasible, however, to ask respondents to rate their psychological safety in a group they had not yet experienced. Even though psychological safety significantly increased by C-Change Institute completion, we may not have captured all the variation in the positive direction of the scale. This study occurred under the unusual conditions of the COVID-19 pandemic. The facilitators began the first cohort on the Zoom virtual platform, so this group first met in person halfway through the intervention, with COVID-19 prevention measures in place. Initial exercises asking participants to share personal stories and values were visibly uncomfortable for many, as some also stated in interviews. Still during the pandemic, the second cohort began in-person, though in physically uncomfortable conditions with windows open in December. Nevertheless, the second cohort had the observable advantage of conversations and social gatherings outside of programmed exercises. It is difficult to account for the effects of these conditions on the development of psychological safety, though some studies have examined the effects of inclusive leadership (Zhao et al., 2020), work engagement and coherence (Domínguez-Salas et al., 2021), differential organizational support (Lee, 2021), and interventions that target meaning and purpose (Rosa et al., 2022) on healthcare workers' psychological distress and safety during the COVID-19 pandemic. We have discussed the effects of COVID-19 on the larger sample (matched controls and participants) elsewhere, finding that increased meaningfulness in work and professionalism and enhanced relationships moderated negative mental health effects (Pololi et al., 2021). Finally, because our inclusion criteria included receiving RO1 or equivalent grants, our findings may not apply to faculty who are not researchers or have achieved more limited funding success.

Conclusion

We describe how psychological safety can be created and sustained for academic research faculty. The principles, structure, processes, and facilitation techniques in the C-Change Institute could be replicated in other professional settings and institutions such that individuals experiencing the benefits of learning in a culture that feels

psychologically safe are more likely to avoid burnout and cynicism. In addition, such programs could equip participants to become transformative leaders who shift the culture of their institutions and fields through more vital mentoring, teaching, and administration.

References

Appelbaum, N. P., Santen, S. A., Perera, R. A., Rothstein, W., Hylton, J. B., & Hemphill, R. R. (2022). Influence of psychological safety and organizational support on the impact of humiliation on trainee well-being. *Journal of Patient Safety*, *18*(4), 370–375. https://doi.org/10.1097/PTS.0000000000000927

ATLAS.ti Scientific Software Development GmbH. (2023). ATLAS.ti [Qualitative data analysis software] (23.2.1) [Windows and Mac]. https://atlasti.com

Aubin, D., & King, S. (2018). The healthcare environment: A perfect ecosystem for growing shame. *Healthcare Quarterly* (Toronto, Ont.), *20*(4), 31–36. https://doi.org/10.12927/hcq.2018.25426

Bonifacino, E., Ufomata, E. O., Farkas, A. H., Turner, R., & Corbelli, J. A. (2021). Mentorship of underrepresented physicians and trainees in academic medicine: A systematic review. *Journal of General Internal Medicine*, *36*(4), 1023–1034. https://doi.org/10.1007/s11606-020-06478-7

Bowen, G. A. (2006). Grounded theory and sensitizing concepts. International *Journal of Qualitative Methods*, *5*(3), 12–23. https://doi.org/10.1177/160940690600500304

Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic analysis. In *Handbook of Research Methods in Health Social Sciences* (pp. 843–860). Springer Science+Business Media.

Creswell, J. W. (2018). *Research Design: Qualitative, quantitative, and mixed methods approaches* (Fifth edition.). SAGE Publications, Inc.

Domínguez-Salas, S., Gómez-Salgado, J., Guillén-Gestoso, C., Romero-Martín, M., Ortega-Moreno, M., & Ruiz-Frutos, C. (2021). Health care workers' protection and psychological safety during the COVID-19 pandemic in Spain. *Journal of Nursing Management*, *29*(7), 1924–1933. https://doi.org/10.1111/jonm.13331

Edmondson, A. C. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, *44*(2), 350–383.

Edmondson, A. C., Higgins, M., Singer, S., & Weiner, J. (2016). Understanding Psychological Safety in Health Care and Education Organizations: A Comparative Perspective. *Research in Human Development*, *13*(1), 65–83. https://doi.org/10.1080/15427609.2016.1141280

Edmunds, L. D., Ovseiko, P. V., Shepperd, S., Greenhalgh, T., Frith, P., Roberts, N. W., Pololi, L. H., & Buchan, A. M. (2016). Why do women choose or reject careers in academic medicine? A narrative review of empirical evidence. *Lancet* (London, England), *388*(10062), 2948–2958. https://doi.org/10.1016/S0140-6736(15)01091-0

Ferrère, A., Rider, C., Renerte, B., & Edmondson, A. C. (2022). Fostering ethical conduct through psychological safety. *MIT Sloan Management Review*, Summer, 39–43.

Kram, K. E., & Isabella, L. A. (1985). Mentoring alternatives: The role of peer relationships in career development. *The Academy of Management Journal*, *28*(1), 110–132.

Lee, H. (2021). Changes in workplace practices during the COVID-19 pandemic: The roles of emotion, psychological safety and organisation support. *Journal of Organizational Effectiveness: People and Performance*, *8*(1), 97–128. https://doi.org/10.1108/JOEPP-06-2020-0104

Mohatt, N. V., Thompson, A. B., Thai, N. D., & Tebes, J. K. (2014). Historical trauma as public narrative: A conceptual review of how history impacts present-day health. *Social Science & Medicine* (1982), 106, 128–136. https://doi.org/10.1016/j.socscimed.2014.01.043

Moore, J. H., & Wang, Z. (2017). Mentoring top leadership promotes organizational innovativeness through psychological safety and is moderated by cognitive adaptability. *Frontiers in Psychology*, *8*. https://www.frontiersin.org/articles/10.3389/fpsyg.2017.00318

O'Brien, B. C., Harris, I. B., Beckman, T. J., Reed, D. A., & Cook, D. A. (2014). Standards for reporting qualitative research: A synthesis of recommendations. *Academic Medicine*, *89*(9), 1245–1251. https://doi.org/10.1097/ACM.0000000000000388

Paguio, J. T., & Yu, D. S. F. (2020). A mixed methods study to evaluate the effects of a teamwork enhancement and quality improvement initiative on nurses' work environment. *Journal of Advanced Nursing*, *76*(2), 664–675. https://doi.org/10.1111/jan.14270

Patton, M. Q. (2015). *Qualitative Research & Evaluation Methods: Integrating Theory And Practice* (Fourth edition.). SAGE Publications, Inc.

Pololi, L. H. (2010). *Changing the culture of academic medicine: Perspectives of women faculty*. Dartmouth College Press : University Press of New England.

Pololi, L. H., Brennan, R. T., Civian, J. T., Shea, S., Brennan-Wydra, E., & Evans, A. T. (2020). Us, too. Sexual harassment within academic medicine in the United States. *The American Journal of Medicine*, 133(2), 245–248. https://

doi.org/10.1016/j.amjmed.2019.06.031

Pololi, L. H., Brimhall-Vargas, M., Bloom-Feshbach, K., & Laird, L. D. (under review). An effective culture change peer mentoring model for research faculty in academic medicine: Curriculum, process, and mechanisms of action. BMC Medical Education.

Pololi, L. H., Conrad, P., Knight, S., & Carr, P. (2009). A study of the relational aspects of the culture of academic medicine. *Academic Medicine, 84*(1), 106. https://doi.org/10.1097/ACM.0b013e3181900efc

Pololi, L. H., Evans, A. T., Brimhall-Vargas, M., Civian, J. T., Cooper, L. A., Gibbs, B. K., Ninteau, K., Vasiliou, V., & Brennan, R. T. (2023). Randomized controlled trial of a group peer mentoring model for U.S. academic medicine research faculty. *Journal of Clinical and Translational Science, 7*(1), e174. https://doi.org/10.1017/cts.2023.589

Pololi, L. H., Evans, A. T., Civian, J. T., Vasiliou, V., Coplit, L. D., Gillum, L. H., Gibbs, B. K., & Brennan, R. T. (2015). Mentoring Faculty: A US National Survey of Its Adequacy and Linkage to Culture in Academic Health Centers. *The Journal of Continuing Education in the Health Professions*, 35(3), 176–184. https://doi.org/10.1002/chp.21294

Pololi, L. H., & Jones, S. J. (2010). Women faculty: An analysis of their experiences in academic medicine and their coping strategies. *Gender Medicine, 7*(5), 438–450. https://doi.org/10.1016/j.genm.2010.09.006

Pololi, L. H., Vasiliou, V., & Bloom-Feshbach, K. (2021). Midcareer medical school research faculty perspectives on vitality and professionalism during the COVID-19 pandemic. *JAMA Network Open, 4*(8), e2120642–e2120642. https://doi.org/10.1001/jamanetworkopen.2021.20642

Purdy, E., Borchert, L., El-Bitar, A., Isaacson, W., Jones, C., Bills, L., & Brazil, V. (2023). Psychological safety and emergency department team performance: A mixed-methods study. *Emergency Medicine Australasia, 35*(3), 456–465. https://doi.org/10.1111/1742-6723.14149

Rodriguez, J. E., Campbell, K. M., Fogarty, J. P., & Williams, R. L. (2014). Underrepresented minority faculty in academic medicine: A systematic review of URM faculty development. *Family Medicine, 46*(2), 100–104.

Rosa, W. E., Roberts, K. E., Schlak, A. E., Applebaum, A. J., Breitbart, W. S., Kantoff, E. H., Pessin, H., & Lichtenthal, W. G. (2022). The critical need for a meaning-centered team-level intervention to address healthcare provider distress now. International J*ournal of Environmental Research and Public Health, 19*(13), Article 13. https://doi.org/10.3390/ijerph19137801

Tai, J., Molloy, E., Haines, T., & Canny, B. (2016). Same-level peer-assisted learning in medical clinical placements: A narrative systematic review. *Medical Education, 50*(4), 469–484. https://doi.org/10.1111/medu.12898

Tawfik, D. S., Shanafelt, T. D., Dyrbye, L. N., Sinsky, C. A., West, C. P., Davis, A. S., Su, F., Adair, K. C., Trockel, M. T., Profit, J., & Sexton, J. B. (2021). Personal and professional factors associated with work-life integration among US physicians. *JAMA Network Open, 4*(5), e2111575. https://doi.org/10.1001/jamanetworkopen.2021.11575

Thomas, S. D., Ali, A., Alcover, K., Augustin, D., & Wilson, N. (2021). Social and professional impact of learning communities within the Alliances for Graduate Education and the Professoriate Program at Michigan State University. *Frontiers in Psychology, 12*. https://www.frontiersin.org/articles/10.3389/fpsyg.2021.734414

Thompson, J. (2022). A guide to abductive thematic analysis. *The Qualitative Report*. *27*(5). https://doi.org/10.46743/2160-3715/2022.5340

Tsuei, S. H.-T., Lee, D., Ho, C., Regehr, G., & Nimmon, L. (2019). Exploring the construct of psychological safety in medical education. *Academic Medicine, 94*(11S), S28–S35. https://doi.org/10.1097/ACM.0000000000002897

Yulita, Idris, M. A., & Abdullah, S. S. (2022). Psychosocial safety climate improves psychological detachment and relaxation during off-job recovery time to reduce emotional exhaustion: A multilevel shortitudinal study. Scandinavian *Journal of Psychology, 63*(1), 19–31. https://doi.org/10.1111/sjop.12789

Zhao, F., Ahmed, F., & Faraz, N. A. (2020). Caring for the caregiver during COVID-19 outbreak: Does inclusive leadership improve psychological safety and curb psychological distress? A cross-sectional study. *International Journal of Nursing Studies*, 110, 103725. https://doi.org/10.1016/j.ijnurstu.2020.103725

Appendix I.

Edmondson's Psychological Safety Scale (Edmondson, 1999)

- If you make a mistake on this team, it is often held against you.
- Members of this team are able to bring up problems and tough issues.
- People on this team sometimes reject others for being different.
- It is safe to take a risk on this team.
- It is difficult to ask other members of this team for help.
- No one on this team would deliberately act in a way that undermines my efforts.
- Working with members of this team, my unique skills and talents are valued and utilized.

Appendix II.

Sample sizes, means, and standard deviations, with significance between baseline and Institute completion means

	Unimputed n	Unimputed mean	Unimputed SD	Z (Pr)
Overall	69	5.9	0.88	
At baseline	35	5.6	0.75	
At institute completion	34	6.1	0.95	**2.39 (0.017)**
Female	31	5.5	0.98	
At Baseline	16	5.2	0.72	
At institute completion	15	5.9	1.09	**2.26 (0.024)**
Male	38	6.1	0.72	
At baseline	16	5.2	0.72	
At institute completion	15	5.9	1.09	**1.17 (0.243)**
URM	33	5.8	0.97	
At baseline	17	5.6	079	
At institute completion	16	6.1	1.12	**1.34 (0.180)**
Non-URM	36	5.9	0.81	
At baseline	18	5.6	0.74	
At institute completion	18	6.2	0.81	**2.06 (0.039)**
MD or MD/PhD	40	6.1	0.72	
At baseline	20	5.7	0.68	
At institute completion	20	6.5	0.58	**3.52 (<0.001)**
PhD	29	5.5	0.97	
At baseline	15	5.4	0.81	
At institute completion	14	5.6	1.14	**0.47 (0.637)**
Treatment	37	5.9	0.84	
At baseline	19	5.7	0.80	
At institute completion	18	6.2	0.83	**1.89 (0.059)**
Waitlist	32	5.8	0.94	
At baseline	16	5.5	0.70	
At institute completion	16	6.0	1.09	**1.48 (0.139)**

Note: The z scores are from coefficients from GLM models including only time for the specified subpopulation.

About the Authors

Dr. Lance D. Laird, Ph.D. is a medical anthropologist, Assistant Director of the MS Program in Medical Anthropology and Cross-Cultural Practice, and Assistant Professor of Family Medicine and at Boston University Chobanian & Avedisian School of Medicine. He is the lead Qualitative Investigator at C-Change. With degrees in Religious Studies, Theology, and Islamic Studies, Dr. Laird's teaching and research has focused on intersections of American Muslim identities with the healthcare system, refugee and immigrant health, and healthcare professional development.

Dr. Kimberly Bloom-Feshbach, M.D. is an Assistant Professor at Weill Cornell in General Internal Medicine and a Qualitative Researcher at C-Change. She graduated from Yale, with a BA in Religious Studies, and worked as an epidemiological researcher at the NIH. She obtained her medical degree from Mt. Sinai, followed Medicine Residency at Brigham & Women's Hospital, before joining the faculty at Weill Cornell. Bloom-Feshbach designs and evaluates mentoring and communication strategies with the goals of increasing humanism, vitality, and diversity in medicine.

Dr. Tay McNamara, Ph.D. is a senior research associate National Initiative on Gender, Culture and Leadership in Medicine: C-Change, an initiative in the Institute for Economic and Racial Equity at the Heller School for Social Policy and Management at Brandeis University. She is a quantitative researcher with an M.A. and Ph.D. in sociology from Boston College. Her recent research has examined the effects of a peer mentoring program on various outcomes among academic medicine faculty. Past research has focused on quality of employment and equity at the workplace.

Dr. Brian Gibbs, PhD is the Vice President and Chief Diversity, Equity, Inclusion and Belonging Officer at UMass Memorial Health Care and serves as an Associate Professor in the Departments of Emergency Medicine and Neurology within the UMass Chan Medical School. Dr. Gibbs received his BS in Occupational Therapy from Eastern Michigan University, earned a MPA from California State University, Dominguez Hills, and received his PhD from Brandeis University where he was a Pew Health Policy Fellow. He also completed post-doctoral training at the Harvard School of Public Health. He has led equity and inclusion efforts at Oregon Health & Science University, University of New Mexico Health Sciences Center, Johns Hopkins School of Medicine, Harvard School of Public Health and directed the BS program in Occupational Therapy within the School of Allied Health Sciences at Florida A & M University.

Linda Pololi, MBBS, FRCP is Distinguished Research Scientist, Brandeis University, received her medical degree and postgraduate training at the University of London, UK, and fellowship training at the University of Illinois, Chicago. Pololi is nationally recognized for innovative contributions to the professional development of faculty in academic medicine, including women and underrepresented minority groups. She is PI on the NIH-funded RCT (U01) to test the efficacy of the C-Change Mentoring & Leadership Institute and study its mechanisms of action. Pololi is founding director of the National Initiative on Gender, Culture and Leadership in Medicine: C-Change, and directs the C-Change Mentoring and Leadership Institute. Her multi-institutional qualitative and quantitative research on the academic medical environment has created a foundation for national and international awareness and inquiry into the culture of academic medicine and its impact on the biomedical science workforce. She has served in professorial and administrative posts at the University of Illinois at Chicago, Brown University, East Carolina University and the University of Massachusetts schools of medicine, and in numerous educational advisory groups. Pololi is the recipient of the 2011 AAMC Women in Medicine and Science Leadership Development Award and is a fellow of the Royal College of Physicians (UK).