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The Impact of Counseling Groups on STEM Graduate Student Well-Being: A Qualitative Investigation

Jayna Mumbauer-Pisano ^a, Sarah Keller ^b, Kristen Byrne ^a, and Ashby Kinch^a

^aUniversity of Montana; ^bMontana State University - Billings

ABSTRACT

STEM graduate students have high rates of stress, burn-out, and depression fueled by the competitive nature of these programs, financial and job insecurities, and the isolation that often comes alongside graduate school. The purpose of this study is to explore the impact of a brief counseling support group provided to STEM graduate students across two university campuses. Using a phenomenological framework, analysis of focus group and individual interviews revealed the unique challenges of STEM graduate school education, the therapeutic benefits of counseling groups, and the potential difficulties of providing mental health support to this population.

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Researchers compiled the most recent findings on graduate students' mental health and well-being and concluded that there is a "mental health crisis" in graduate education, with graduate students reporting rates of depression and anxiety two to three times higher than the general population (Evans et al., 2019). Despite the prevalence of mental health challenges, approximately a quarter of graduate students seek professional help (Bork & Mondisa, 2022; Crone et al., 2023; Vidourek et al., 2014). Although there is limited study of the barriers to help-seeking specific to graduate students, researchers believe that institutional barriers, systemic racism and discrimination, mental health stigma, financial concerns and social pressures contribute to low help-seeking among graduate students (Klein et al., 2023; Lewin et al., 2021).

STEM graduate students face mental health challenges at an increased rate compared to their non-STEM graduate peers (Randall et al., 2020). The rates of conditions such as anxiety and depression are elevated for all graduate students, but trend higher among STEM students (34–47% for STEM students and 17–24% for non-STEM students) (Evans et al., 2018; Evans et al., 2019; Jachim et al., 2023; Villarroel & Terlizzi, 2020). Job anxieties are another significant concern. While enrollment in STEM graduate education has increased, there are fewer and fewer faculty positions available for post-degree graduate students, creating a competitive landscape fueled even further by the "publish or perish" nature of STEM and limited grant funding opportunities for graduate students (Li, 2021). One third of graduate students say they worry about the value of their degrees (Woolsten, 2022c).

Furthermore, the burgeoning student debt crisis among graduate students creates an added layer of financial pressure on stressed STEM students, especially as student loan payments for many resumes in fall 2023 after a long freeze due to the expiration of the

COVID-19 emergency relief. Nearly 85% of graduate students worldwide report they worry about having enough money to buy food and pay for rent, and nearly half (45%) say that financial challenges could prompt them to quit their programs (Woolsten, 2022a). The most frequently reported challenges cited by STEM graduate students are work-life balance, financial strain, uncertain job prospects, mental health, timely completion of their studies, political realities, and uncertain value of their degree (Woolsten, 2022b).

While STEM graduate education is inherently stressful, historically excluded students in STEM face unique challenges as compared to their majority peers. Female identifying graduate students report less work-life balance in STEM programs based on their additional identities as caretakers, parents, and, sometimes, housekeepers (Kulp, 2020). Furthermore, STEM students of color report shouldering the emotional burden of DEI (diversity, equity, and inclusion) efforts within their departments, being simultaneously positioned as “representatives of progress” and uncompensated DEI consultants within their programs (Porter et al., 2018). The emotional burden that STEM students from underrepresented backgrounds carry has direct implications on their mental health and well-being, as well as their career productivity (Porter et al., 2018).

Given that graduate students are less likely than undergraduate students to seek help through individual counseling, there is a growing demand for academic institutions to provide alternative modalities for positive mental health and increased well-being among graduate students. STEM graduate students are a particularly vulnerable group, given the unique stressors they face and the heightened levels of mental health stigma and isolation they experience (Jachim et al., 2023; Villarroel & Terlizzi, 2020). Group counseling offers a cost-effective, accessible, and effective option for mental health support and is particularly suited as an antidote to the loneliness and isolation endemic to the graduate student experience (Lewin et al., 2021). In this paper the authors review an applied group counseling intervention for STEM graduate students and examine the self-reported outcomes from participants using a descriptive phenomenological framework (Creswell & Poth, 2017). This article explores both the challenges identified and perceived benefits of the approach.

Group Counseling on College Campuses

Group counseling has been offered on college campuses for decades to serve students with specific mental health and emotional needs while they navigate the pressures of an academic environment. Compared to individual counseling, group counseling is a more practical and cost-effective option for college counseling centers that often run long waitlists and only have the capacity to offer a limited number of sessions to students (Association for University and College Counseling Center, 2019).

Group counseling provides an effective means of supporting college students from historically excluded communities. Groups can promote healthy identity development, support, and connection for students experiencing stressors related to identity – be it racial, gender, class-based, or other status. Narvaez and Kivlighan (2021), who studied the benefits of group counseling for multiracial college students, wrote:

This involves the creation of a designated safe space for group members to confront Multiracial [or other] microaggressions in their lives and explore, validate, and affirm the chosen identity, or constellation of identities, of each group member. Ideally, members would experience

a sense of universality and belonging that may be less common in their daily lives, with the aim of achieving and maintaining a positive Multiracial identity . . . (p. 91)

College campuses often offer a multitude of support groups that can focus on general wellness or on a student's particular identity including addressing anxiety, LGBTQIA+ adults navigating the coming out process, black college women, international students, and more (Ali & Lambie, 2019; Jones & Pritchett-Johnson, 2018).

A diverse range of theoretical backing and framework of counseling groups on college campuses mirrors the diversity of the target populations. Group leaders use theoretical approaches including Positive Psychology (Peng, 2015), Cognitive Behavioral Therapy (Gayoles & Magno, 2020), mindfulness (Newton & Ohrt, 2018), Acceptance and Commitment Therapy (Klimczak et al., 2023), and art therapy (Zheng et al., 2021). Despite the diversity of approaches, the therapeutic nature of group counseling remains consistent across presenting concerns and theoretical perspectives. Regardless of the population or theoretical approach, group members experience cohesion, catharsis, instillation of hope, universality, and altruism in the confines of a safe, supportive, and therapeutic group (Yalom & Leszcz, 2005).

Group Counseling Among Graduate Students

Although few studies evaluate the effectiveness of group counseling specifically for graduate students, the existing studies offer a promising view of the modality as an effective intervention. Byars (2005) conducted a randomized experiment to examine the benefits of group counseling for counseling graduate students, in comparison with exercise interventions and a control group. Results of this study indicate both group counseling and exercise significantly reduce the symptoms of stress, anxiety, and depression in graduate counseling students as compared to the control group. Although no significant differences were found between the effectiveness of group counseling and exercise in alleviating symptoms of anxiety, stress, and depression in this population, the results suggest that group counseling is effective for alleviating symptoms of loneliness in graduate counseling students as compared to no treatment and exercise treatment.

Beauchemin (2018) evaluated the impact of a six-week, web-based, solution-focused counseling wellness group for graduate students and compared outcomes across a cohort (students within the same graduate program) and non-cohort group (students across graduate disciplines). Researchers found significant differences in well-being, mental health, and perceived wellness between baseline and six weeks in both groups. However, among the cohort group, wellness specific measures improved more as compared to the non-cohort group. Authors discussed the potential positive impact of familiarity within the group as a precursor to openness and sharing, especially given the brevity of the group intervention. Based on this study, research that further examines the impact of group counseling interventions for graduate students is suggested.

Lewin et al. (2021) evaluated a group-based acceptance and commitment therapy (ACT) intervention aimed to enhance graduate student psychological flexibility. Although the authors only collected preliminary evaluation data, the results were promising, with students reporting benefits of participation including improved overall functioning in graduate school. Qualitative data revealed that students

appreciated the format and flexibility of the groups and the ways in which the group allowed for deep, experiential learning. Given the limited data, authors are calling for future evaluation of group-based treatment options for graduate students (Lewin et al., 2021).

Application to STEM Graduate Students

While there are few studies specifically looking at the impact of group counseling for STEM graduate students, the literature surrounding STEM graduate student well-being demonstrates the importance of social support (Tompkins et al., 2016). Group counseling may be one avenue to increase perceived social support, especially among historically marginalized students. Gold et al. (2021) examined the impact of a support group for graduate and post-graduate women in STEM. Qualitative analysis revealed four major benefits of support groups: creation of community, having a safe space, emotional support, and peer mentorship. Despite the promising nature of STEM graduate student counseling groups, this is the only study to report on the therapeutic benefits of groups on STEM graduate students. The present study seeks to add to the existing literature by evaluating the self-reported impact of a six-week counseling group on STEM graduate students across two university campuses.

Implementation of STEM Graduate Student Counseling Groups

The STEM counseling groups in this project are implemented as one component of a larger grant initiative to support STEM graduate students titled *Mental Health Opportunities for Professional Empowerment in STEM* (M-HOPES). The goal of M-HOPES is to build a set of innovative, inclusive, evidence-based experiences that enable STEM graduate students to acquire skills to foster positive mental health and resilience. In order to target STEM graduate students, we began the project by sending out a baseline university climate survey which revealed imposter phenomenon, social isolation, financial burdens, and workload fatigue among the major stressors impacting STEM graduate students. The anonymous survey was administered online, through Qualtrics Survey Software, to a total of 687 graduate students across STEM disciplines at three campuses in the Western region of the United States. Approximately 173 students responded (25% response rate).

Given the unique benefits of group counseling as an antidote for social isolation and a means of bolstering positive mental health habits and coping, we provided a six-week counseling group to STEM students facilitated by Counselors-in-Training (CITs) enrolled in a Counselor Education program at University A and a community counselor at University B (University B does not have a counselor education program). Both university campuses were in the Western region of the United States, approximately three hours apart. All facilitators were required to have taken the course *Group Counseling* to be eligible for participation.

Prior to the first group session, facilitators participated in a 90-minute training which outlined the unique stressors impacting STEM graduate students (e.g., social isolation, financial and job insecurity, academic stressors), the goals of the counseling groups (e.g., enhanced group cohesion, instillation of hope, problem solving), and a review of group counseling skills. Facilitators engaged in experiential learning during this training including participation in brief positive psychology, mindfulness, and cognitive behavioral therapy

strategies that could be used in the group session. The facilitators were also provided access to a digital folder with additional coping skills interventions.

The counseling groups were semi-structured in nature. Facilitators were instructed to do a brief check-in activity, include time for group processing, and end with a concrete coping skill that participants could practice between sessions. Coping skills were from a variety of counseling approaches including Dialectical Behavioral Therapy, ACT, Cognitive Behavioral Therapy, and Positive Psychology. Facilitators were given the freedom to utilize their unique theoretical approach to counseling, they were also encouraged to ground their interventions in the “curative factors” of group counseling including universality, altruism, instillation of hope, and interpersonal learning (Yalom & Leszcz, 2005).

After receiving approval from the institutional review board at both universities, we recruited enough participants for three counseling groups (one group of 4, one group of 5, and one group of 6). The two groups at University A were co-facilitated by two CITs each while the group at University B was supervised by one licensed counselor. The first author provided supervision and consultation throughout the duration of the groups.

Methods

Phenomenology describes the meaning of individuals’ lived experiences pertaining to a particular phenomenon. Descriptive phenomenology aims to explore individual experiences in order to grasp the universal essence of that experience, including both “what” was experienced and “how” it was experienced (Creswell & Poth, 2017). An important philosophical assumption underlying descriptive phenomenology is that individuals perceive within the meaning of their experiences rather than the interpretations of researchers (Moustakas, 1994). Phenomenological researchers must suspend all judgments or presumptions of the phenomena, an act referred to as “epoche” (Creswell & Poth, 2017; Moustakas, 1994). Taking a phenomenological approach to examining the experience of group counseling is conceptually congruent, as many of the therapeutic forces experienced in group counseling – universality, interpersonal learning, and imparting of information (Yalom & Leszcz, 2005) – align with the goals of the phenomenological approach (Moustakas, 1994).

The goal of this research is to understand the lived experiences of STEM graduate students who participated in a six-week counseling group. Although we are aware the many unique stressors STEM graduate students encounter, we sought to understand these students’ expectations, experiences, and impact associated with engaging in a therapeutic group; we sought to explore possible ramifications of their participation in group on perceived well-being, social support, and their overall experience in graduate school. We also aimed to gain valuable feedback that would support future implementation of STEM graduate student counseling groups.

Role of the Researcher

Phenomenological researchers examine the ways in which background experiences, culture, identities, and values impact the research (Van Manen, 2017). The first and second authors are White, cis-gender educators at universities in the northwestern region of the United States. The first author is a counselor educator who worked as an academic counselor for STEM undergraduate students in her doctoral program. She is passionate about the power

of group counseling and has led several groups for graduate students throughout her career in higher education. She also served as the supervisor for the CITs who facilitated the counseling groups. The second author is a communications professor who has worked in narrative peer education for suicide prevention with young adults. The third author is a white cisgender woman and recent master's graduate of a counselor education program in the northwestern region. Professionally, she identifies as a researcher, advocate, and former clinical mental health counselor. Finally, the fourth author is a cis-gender white male, who has two decades of experience as a faculty member in English, and has served as an administrator for the past seven years in a graduate school in the northwestern region. During this tenure, he has promoted and funded initiatives in support of graduate student mental health, including working closely with graduate student stakeholder groups.

Researchers cannot fully remove themselves from the research; however they must remain acutely aware of how their identities, influence, and biases impact the research process (Maxwell, 2013). As researchers, we used reflexive journaling, prolonged engagement, inquiry auditing, and member checking to increase the trustworthiness of our research process. Researchers cannot fully remove themselves from the research; however they must remain acutely aware of how their biases and influence impact the research process (Maxwell, 2013; Yardley, 2000). We were in continuous conversations regarding how our identities and personal experiences may impact the research. For example, during the coding process we spoke of our professional identities (i.e., faculty member, graduate student, and administrator) may have influenced identification of significant statements and coding process.

Data Collection

Researchers collected data from seven STEM graduate students across two universities in the Western region of the United States. Five individuals from University A participated in a focus group and two individuals from University B were interviewed individually. The primary means of data collection were focus groups, selected because of the ways in which a focus group can mirror the experience of group counseling. As Luke and Goodrich (2019) highlighted, a researcher trained in leading groups can facilitate cohesion, safety, and track how group dynamics influence the focus group process. Moreover, group leaders can recognize when group think, monopolizing, or blocking takes place and intervene to encourage sharing of diverse perspectives (Luke & Goodrich, 2019). Unfortunately, the two participants from University B were unable to make the focus group, so individual interviews were used to get the largest sample size possible and subsequent feedback. Semi-structured questions were asked to both focus group and individual interviewer participants including:

- (1) What was your experience participating in the support group?
- (2) Did you have any specific stresses or challenges that prompted you to participate in this group?
- (3) Did participation impact your attitude toward your graduate school experience? If so, how?
- (4) Which parts of the experience were most helpful? Why?

- (5) What parts of the experience were least helpful? Why?
- (6) What were your thoughts before, during, and after the training?
- (7) How did the experience impact your relationships?
- (8) Is there anything that could have been added to the trainings that could improve the experience?

The first author conducted the focus group with five participants at one university and the second author conducted the two individual interviews at the other participating university. At the onset of each interview, researchers explained the consent forms, including the purpose of the study, confidentiality, and voluntary participation. The focus group lasted approximately 1.5 hours and the individual interviews lasted approximately 45 minutes each. Participants also filled out a brief open-ended demographic survey. Researchers provided lunch to participants and a \$25 gift as an incentive. [Table 1](#) describes the characteristics of the study sample.

Data Analysis

The authors recorded and manually transcribed the interviews. After transcription, the authors read through each interview and discussed initial impressions and major emerging themes. Next, each author independently coded 20% of the data, identified “significant statements” that provide an understanding of the phenomenon, developed clusters of meaning from these statements, and began constructing textural descriptions that chronicle the context and setting of the phenomenon. They met once again, compared their a-priori findings, and came to consensus on the broad themes emerging from the data and the “essence” of the phenomenon informed by their common experiences with the participants (Creswell & Poth, 2017). Next, each author coded the rest of the data which resulted in several emerging sub-themes. Authors met again and compared analysis. Authors were in near total agreement except for one sub-theme: alternative perspectives. While one author coded this as general social support, the other author thought of it as a distinct phenomenon separate from social support. After discussion that considered the unique benefits expressed by participants about the benefit of interdisciplinary collaboration and connection that expanded participants’ perspective, both researchers opted to add this as an additional subtheme.

Table 1. Participant information.

Participant Pseudonym	Age	Gender	Race	Program of Study	Campus
Jenn	27	Cisgender Female	Asian	Social Sciences	Campus A
Andie	27	Cisgender Female	Bi-Racial (White and Chinese)	Biological Sciences	Campus A
Leah	26	Cisgender Female	White	Physical Sciences	Campus A
Jamie	30	Cisgender Female	White	Physical Sciences	Campus A
Aaron	27	Cisgender Male	Asian	Mathematics	Campus A
Olivia	30	Cisgender Female	White	Physical Sciences	Campus B
Emily	32	Cisgender Female	White	Physical Sciences	Campus B

Table 2. Themes and initial coding framework.

Theme	Initial Coding Framework	<i>n</i> of Participants Contributing (<i>N</i> =7)	<i>n</i> of Transcript Excerpts
Theme 1: Challenges of graduate school	• Lack of advocacy and faculty advisement • Loneliness • Lack of resources • Feeling overburdened • Systemic issues within university	6	16
Theme 2: Therapeutic benefits of support groups • Universality • Problem-solving • Alternative perspectives • Attitudes toward help-seeking • Social support	• Ability to share and be heard • Validation from group • Similar experiences and group comparison • Contact with other students • Diversity in group members and perspectives • Increased optimism and personal insight • Gender affirmation	7	42
Theme 3: Difficulties associated with participating in groups	• Scheduling • Time commitment • Low participation	5	7
Theme 4: Recommendations for future groups	• Skill building • Group purpose • Focused direction	6	13

Findings

Four broad themes emerged from our exploration of STEM graduate students' experiences in a counselor facilitated support group: (a) challenges of graduate school, (b) therapeutic benefits of the support groups, (c) difficulties associated with participating in the groups, and (d) recommendations for future groups. The second theme, which was the most robust, included five sub-themes: universality, problem-solving, alternative perspectives, attitudes toward help-seeking, and social support. Detailed descriptions are provided for a more comprehensive understanding of the themes and sub-themes. [Table 2](#) features the initial coding framework and themes.

Challenges of Graduate School

Participants highlighted several challenges of being a STEM graduate student. Five sub-themes emerged from the discussion: (a) lack of advocacy and faculty advisement; (b) loneliness; (c) lack of resources; (d) feeling overburdened; and (e) systemic issues within university.

While the primary objective of this study was to explore the lived experiences of STEM graduate students engaging in a support group, the open-ended questions we asked participants also led to an exploration of the challenges associated with being a STEM graduate student, many of which acted as catalysts for joining a counseling group. Participants expressed the general challenges of pursuing a graduate degree and the unique stressors faced by graduate STEM students were discussed. Participants spoke of the isolation they experienced as graduate students. One participant, Emily, described it as, "that feeling that you are alone ... going to school and working full-time, sometimes it feels like people don't understand." Participants also spoke of

feeling like an imposter. Jamie stated, “Since last summer I’ve been experiencing burn-out and major feelings of imposter syndrome, thoughts of ‘How am I going to succeed?’”

Participants also expressed disappointment and frustration by the lack of attention and care given to them by their advisors. Emily explained that her graduate program dissolved after she enrolled, leaving her without a designated advisor. She stated, “We [graduate students] are drowning all the time, trying to find our own way. [We] don’t have strong faculty advisement. We can’t go out and socialize with other grad students. We have no guidance . . . faculty aren’t available. The ones who are here don’t have answers.” Later in the interview while reflecting on her relationship with her advisor, she said, “He’s supposed to be that [a mentor] for me. But I don’t know if I would characterize it that way. A lot of the time, I’ve had to find my own way. He wants me to solve my own problems.” Another participant, Jenn, confided in her advisor her history of mental health struggles and was warned to be careful who she shares that with and reminded that disclosing her mental health history during her interview process for the graduate program could have impacted her admissions. As she recalled the experience she stated, “So if I had mentioned that I had mental health issues, you’re saying that would have impacted the perception of me or outcome of my interview? Sounds a lot like discrimination.”

Participants were disheartened by the lack of resources provided by their university. Andie stated, “Grad students have asked for more support, more resources, more funding, and have consistently been denied those things.” She went on to explain that the university offers free counseling but it’s limited and after a few sessions you get referred out. This process can be discouraging as some graduate students are without comprehensive health insurance, and cannot afford therapy outside of the free university options. Leah echoed this sentiment, “I feel like there aren’t enough mental health resources. We are just kind of expected to put up a bunch of nonsense during grad school, especially during a particularly nonsensical time in the world.” When asked about why they joined the group, Andie further explained the attitude she had, “I think I joined because I was feeling frustrated that the university doesn’t give us any resources and is just like, go! It was coming at the heels of feeling pissed off and hung out to dry and it was kind of out of spite that I was like, fine! I am going to take advantage of the one resource you’re giving me. And it was really good.”

Benefits of the Support Groups

Participants highlighted several benefits of the counselor-led support groups. Five sub-themes emerged from the discussion: (a) universality, (b) problem-solving, (c) alternative perspectives, (d) next steps, and (e) group dynamics.

Universality

While many participants shared their challenges in navigating graduate school, they also expressed how validating it felt to hear from other group members about their personal challenges. Jamie explained, “It was nice that there are other people who do understand just how much time it takes and what a balance it is to juggle everything. It was really great to have those sanity checks.” Aaron echoed this sentiment, “It was nice to have other people’s experiences in the room and be able to see my experiences through the lens of other folks. It was nice to have the same people in the group because you developed trust and got to know

others through that.” The other focus group members nodded as Aaron shared his perspective, seemingly in agreement that the validation provided through the group was beneficial.

Through the group process, participants began to realize their struggles were not unique to themselves but part of a larger, systemic problem within graduate education. Leah explained, “It validated my personal perception and I realized it’s an institutional system issue, not a personal one. It’s not me not being able to cope with a stressful advisor, it’s something else.” Jenn reflected this as well, “I am doing a lot of work in accepting that I AM doing my very best and I can still be miserable at the same time and that is no fault of my own . . . it’s just because this is very hard and there’s little support.” Another participant, Andie, explained how her perception shifted over the course of the group, “I don’t know if it made me more jaded, but it definitely made me think, ‘why don’t we talk about this more?’ If we are all feeling like this, why do we normalize this grind?”

Problem-Solving or Enhanced Coping

Participants spoke about how group discussion often facilitated problem-solving. For example, Jamie shared that a group member was having issues in the laboratory where she works, and someone offered to help.

The equipment things - one of the gals mentioned that her machine was delayed - and someone offered to lend her the machine in her lab. This happened a lot, people would help each other solve problems. Even if we felt like we were commiserating it would lead to a solution. Those were really great; I actually found it really helpful.

Another participant, Leah, was prompted to make changes to her research proposal, “I went to my advisor and was like, ‘hey, my proposal is too big, I need to cut it down.’ So, it gave me a little bit more confidence to advocate for myself in this way and say, ‘I can’t do this. I need to reduce this load if I’m going to finish on time and feel like a human being.’” Emily, who is a mother to four children, reflected on the benefits of the coping skills centered around stress and time management, “Trying to set aside those times and to compartmentalize so that stress from one item isn’t creeping into your day. Those are good skills for anybody. Taking a minute to calm down and reset. Even if it’s just one of those visualization strategies.”

Alternative Perspectives

Participants expressed appreciation for the opportunity to connect with graduate students across disciplines, an experience they seldom encountered prior to participating in the counseling groups. Andie explained,

The small group was really nice, but I know if I had walked in the first day and had seen someone from my own program, I would have been out of there. It was really valuable for me to have people who weren’t in the program. Our group was so personal. At work, you put on such a facade and just focus on work things. There were distinct parts of me, and I needed that to be separate. That would have been something that would have taken away the experience for me, if there was someone from my own program.

Exposure to alternative perspectives also helped participants make meaning and personalize the coping skills they were learning in group. Jamie, when asked about her experience using the skills presented in group, said:

I've tried implementing some of them, but I think the thing that helped the most was "here's a suggestion, here's a method" and then we would all talk about it and then someone would say "here's how I adapted it for me." I found that the most helpful because I thought "oh, I never thought about it like that. Maybe I'll incorporate it." The conversation surrounded the method and alternations everyone made were more helpful than the method itself. Because you know some tools work for you, and some don't. But it's hard to decide how to adapt a tool unless you get to hear what other people are doing.

Relatedly, Andie recalled how a group members' explanation of where they were in terms of their own emotional literacy impacted their personal insight:

I think that one of the most useful parts of group therapy was how self-revelatory it made us. I'm so far from being able to use tools that would help and . . . one of the other people in my group said early on "I don't even know how I feel, that's where I'm starting from. I don't even know my own feelings yet let alone how to deal with them." One of the things I realized is that I never considered myself a high-stress person or anxious person. I thought I was totally chill until I joined group and I realized I do feel stressed out . . . all the time. And I just bury it down really far.

Finally, interacting across fields aided students in finding resources they may not have known about otherwise. Olivia explained, "Just the group discussions of the differences between the departments were very helpful. Sometimes I found out about things that [my university had] that I didn't know were here."

Next Steps

We were particularly interested in how participation in the groups might spur changes in perception or behavior regarding graduate school and overall coping. For most participants, the support groups served as their first experience with counseling. Participants expressed curiosity about trying one-on-one counseling after the groups ended. Leah said, "I'd like to try one-on-one counseling with [the university counseling center]. I was told that the first ones are free. I'd like to try it out and see how it goes. I would like to see what a one-on-one would feel like."

Participants voiced varying degrees of motivation to "change the system" within graduate school education. This was a surprising finding, as we did not ask any questions directly related to advocacy efforts. Andie explained:

It [the counseling group] didn't impact my graduate school experience but maybe it's changed my perception. Like, wow this is a corrupt system. I'm personally more motivated to change the system that I'm a part of. And to make sure that we aren't having these unchecked power imbalances, that we aren't putting future students through the ringer because we struggled.

Jenn expressed appreciation for the group members' advocacy efforts while explaining that they didn't personally have the capacity to advocate for systemic changes:

I definitely don't feel like I have any capacity to do that, in terms of like bettering the system here. Maybe eventually if I got to a role where I'm paid hopefully enough, I would be more willing to do that. But I definitely don't have any sort of capacity to make a positive change right now.

Group Dynamics

Participants noted the importance of group dynamics. Jamie stated, “Group dynamics are key to the success of this. I feel bad saying this but when we started out, we had five people and at least for me, one of the people in our initial meeting was a vacuum in the group. . . needed a lot more attention, I guess? That doesn’t feel right either. But the group dynamic was really important.” Leah compared their experiences with individual versus group counseling, “I had less expectations for group support than one-on-one therapy. For group support, it’s a lot more communal but not only am I there to offload and grow but I’m also there to support my peers, so coming in with an objective doesn’t feel great to me in a group scenario.” Participants also reflected on how the facilitators contributed to the group dynamics, “They self-disclosed the right amount. They didn’t just sit there. Their personal styles went a long way to make things feel comfortable.”

Participants valued the free-flowing nature of the groups. Jamie explained, “The fact that it was so chill without objectives is what made it feel like a relief. It is the one thing you come to campus for that is not directly related to what your primary objectives are. You can just relax and talk to the void, that part made me want to come, the fact that it *wasn’t* purpose driven.” Aaron echoed this sentiment, “Yeah, I really strongly agree with that. That was helpful and kind of comforting in its own way, to come to this space and it was the right amount of time and it just worked really well.”

Challenges of Peer Support Groups

With the hopes that these groups would continue and improve in therapeutic value, we were particularly interested in the potential challenges of group participation and recommendations for improvement. Unsurprisingly, participants shared that the most challenging issue regarding their participation in group was time, a rare commodity for a STEM graduate student. Leah explained, “The only thing that I would say is a drawback was having to commit to showing up for so many weeks, And I often was like scrambling and late because I’ve been like finishing up a bunch of work, trying to get stuff done. That was the only thing though.” Jamie echoed this, “The timing of when the meetings . . . the last half was where the semester was wrapping up, we still went, and it was great, but you could tell that some of us were starting to be time crunched.”

Recommendations for Future Groups

Participants shared that although they enjoyed the free-flowing open nature of the groups, it may be helpful to have a more structured approach in the future focused on specific topics. Jenn explained:

And at the time it was really helpful . . . just the talking. I think that building that connection was helpful, although I don’t know how long only that connection would have been helpful. I think if it were to continue, we would have to do other things . . . like more skill building.

Another group member replied that while the skill building was helpful, more direction would have amplified the experience:

I liked the amount of skill building that we did . . . but having a little bit more direction for each group session would have been a little more helpful. It was great to show up and vent but if it were to go longer term, I think it would be helpful to have that focused direction.

Leah suggested specific topics for each session, “Maybe if you covered certain topics like imposter syndrome, time management, or relationships with your advisors or having sections that you focus on as much as possible, hard-hitting topics.”

Other suggestions provided by participants included presenting statistics related to graduate student mental health at group meetings, “It might have been nice to know more stats nationally about the things we were talking about. Yes, you’re not alone. Studies have shown that X percentage of graduate students feel these same things,” and providing resources to students like “affinity groups, women in science groups, etc.” Jenn and Leah both suggested that the M-HOPES grant provide advisors with resources to work more effectively and compassionately with graduate students. Jenn explained:

It would be helpful if resources were sent to faculty and advisors. I’m trying not to name names but personally I’ve had an interaction where an advisor . . . well now you know it’s an advisor . . . hopefully you don’t know who my advisor is. They weren’t very understanding and compassionate about mental health issues.

Trustworthiness

Due to the subjective nature of qualitative analysis, Lincoln and Guba (1985) call for independent coders to analyze the data and comment on the trustworthiness of the researchers’ work. A counseling graduate student with training in qualitative research was invited to review our codes and independently code the data and reflect on the results we derived.

The independent auditor noted that her analysis aligned with the researchers in terms of universality; challenges of grad/STEM life; benefits of group counseling (divided differently, as indicated below); alternative perspectives (diversity of members and perspectives); and recommendations. The auditor diverged from the researchers’ coding in the following areas: (a) *Ability to share and be heard*. The auditor believed this was a unique theme in itself due to a few comments highlighting the small sizes of the groups enabling participants more time to share and engage in activities; (b) *When help feels hopeless*. The auditor noticed the tendency of participants to feel frustrated when “support” didn’t feel helpful for them personally; these supports typically revolved around CBT specific interventions that one participant reported made them feel “terrible;” and (c) *Systems talk and advocacy*. To the auditor, this theme was notably separate from the challenges of being a graduate student and the benefits of group support since through their group experience, multiple students began to notice the systemic issues affecting their experiences and education. Finally, (d) *Groups as a last resort* was also a unique category for the auditor. She wrote, “While this might seem like it is a challenge of being a graduate student, it felt different to me. The [group support] registration was almost out of desperation because there are no other affordable options for mental health.”

In examining the auditor’s diverging perspectives, the authors noticed how their positionality as faculty members may have impacted their thematic analysis, despite attempts at bracketing and suspending assumptions. In particular, the faculty authors highlighted more significant statements pertaining to the benefits of the groups themselves, while the independent auditor, a graduate student, emphasized the systemic and intuitional barriers endemic to graduate school. After ample conversation and reexamining of the qualitative

data, the authors reasoned that it was critical to include these challenges as it impacts their meaning-making and experiences within the counseling groups. After deliberating, authors re-worked their existing themes to be more inclusive of their overall experience in graduate school, including systemic and institutional barriers, and the ways in which their graduate programs perpetuated the stress and emotional turmoil inherent within graduate education.

Member checking refers to a method of systematically soliciting feedback about your data and conclusions from the people you are studying. Maxwell (2013) states that member-checking is the “single most important way of ruling out the possibility of misinterpreting the meaning of what participants say and do and the perspective they have on what is going on, as well as being an important way of identifying your biases and misunderstandings of what you observed” (p. 127). After generating our themes, we engaged in member-checking by sending a brief e-mail to participants asking them to examine our findings and consider whether it resonates with their lived experiences. We also asked participants if there was anything else they would like to add to our findings that would more fully capture their experiences as a participant in a STEM counseling group. Of the seven participants, we received e-mails back from four participants. Three participants stated that they had nothing to add. One participant added that she agreed with the sentiment expressed by another participant that M-HOPES should be providing support to advisors who can in turn, better support STEM graduate students.

Discussion

While graduate school is inherently stressful, STEM graduate students encounter unique challenges and barriers to positive mental health and well-being. Despite decades of debate and discussion, critical questions endure about how best to support STEM graduate students. An absence of empirical backing for strategies to improve STEM student engagement and well-being challenges the field to explore alternative approaches. In this article, we explored the lived experiences of seven STEM graduate students, across two university campuses, who participated in a six-week group counseling intervention.

In several ways, our findings are congruent with previous published literature on the mental health and well-being of STEM graduate students. Students in our study reported on the struggles of graduate school education including loneliness, feelings of imposter phenomenon, challenging advisor relationships, financial scarcity, and lack of resources, including comprehensive healthcare. Interestingly, six of the seven participants in our study identified as women and three of the seven participants identified as BIPOC students. Given that STEM fields are disproportionately represented by white males (National Science Board, National Science Foundation, 2022), our sample is far from representative of STEM graduate students overall. In considering why our sample primarily consists of historically marginalized groups, we speculate that students of these backgrounds are more likely to take advantage of mental health supports because of the emotional burden they carry as “representatives of progress” in higher education (Porter et al., 2018, p. 127) as well as the systemic barriers they encounter in their graduate studies (Brunsma et al., 2017; Evans et al., 2019). In alignment with previous literature, the participants in this study who identified as women and BIPOC students expressed increased dissatisfaction and barriers to mental health and well-being within their graduate school experience.

We found that overall, students reported positive benefits of the counseling groups on their mental health and well-being. In alignment with Yalom and Leszcz's work on the benefits of group counseling (Yalom & Leszcz, 2005), participants expressed feelings of universality, problem-solving, social support, and the benefits of hearing alternative perspectives. One compelling finding was the apprehension STEM graduate students felt about the group initially and how their feelings changed over time. As our independent auditor noted, students felt as though the groups were a last resort and seemed to have low expectations regarding the group's potential benefits. This apprehension grew into pleasant surprise as they began to experience the therapeutic benefits of group counseling. Given that one of our primary goals for this study was to garner valuable feedback regarding future implementation of STEM graduate student counseling groups, we are now focused on recruiting students who may experience the same disenchantment regarding their graduate education and subsequent apprehension regarding mental health support.

While not a major finding of the study, it is also important to note that we had a tremendously difficult time recruiting students to participate in the counseling groups. Despite our initial climate surveys indicating that STEM graduate students yearned for more mental health and social support, there was very little initial interest in the groups, regardless of substantial recruitment efforts. Out of 676 STEM graduate students across two universities, we had a total of 15 participants enroll in group counseling. This reinforces our impressions that STEM graduate students are less likely to take advantage of mental health supports compared to non-STEM graduate students and that further efforts are needed to destigmatize mental health treatment and increase accessibility of services.

Finally, in addition to our primary study findings, we leave this study challenged as researchers and faculty to consider the ways in which we operate as change-agents within the system of higher education within which we work as faculty and researchers. As one participant stated, "It's an institutional, system issue, not a personal one. It's not me not being able to cope, it's something else." While participants did express the many therapeutic benefits of group counseling, they also remained steadfast in their perception that change is needed within their graduate programs and that upstream approaches focused on making graduate school education more accessible, inclusive, and health-promoting are needed first and foremost. To this end, the five students who participated in the focus group, began to discuss graduate student unionizing immediately upon completion of the interview.

Limitations and Future Research

Randomized controlled studies involving larger samples of students could enable stronger claims about the efficacy and generalizability of this intervention approach. Second, an expanded range of outcome measures, including quantitative measures, is needed to elucidate the diverse ways in which STEM graduate students are impacted by group counseling. Although much attention has focused on broad social interaction behaviors, little is known about how these interventions affect the goal attainment, skill acquisition, and group therapeutic factors. Additionally, our sample is predominantly white (4 out of 7 participants) and comprised mostly of cisgender women (6 out of 7 participants) and thus lacks diverse racial representation of STEM graduate students. Considering women make up only 34% of the STEM workforce (National Science Foundation, 2022) and 85% of our

sample, transferability cannot be made to STEM graduate students broadly speaking. However, this study may shed light on the unique stressors for cis-gender females, an underrepresented group within STEM graduate programs.

Finally, two participants noted the importance of training and support for faculty who advise STEM graduate students. While faculty support is a major component of the M-HOPES grant, we realize the importance of involving student perspectives within these trainings and raising student awareness of the other wrap-around initiatives taking place to improve culture within STEM graduate programs. Future research that investigates the impact of faculty advisor training on STEM graduate students will be beneficial.

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Notes on Contributors

Jayna Mumbauer-Pisano, PhD is a counselor and an assistant professor in the Department of Counseling at the University of Montana in Missoula, MT.

Sarah Keller is Professor of Communication Studies at Montana State University Billings, where she researches communication strategies interventions for public health attitude and behavior change.

Kristen Byrne works on diversity, equity, and inclusion efforts in STEM-related fields at the University of Montana. She holds an M.A. in Counselor Education with a focus in Clinical Mental Health Counseling from the University of Montana in Missoula, MT.

Ashby Kinch is Professor of English and Dean of the Graduate School at University of Montana, where he researches Middle English literature and attitudes toward death and dying.

ORCID

Jayna Mumbauer-Pisano  <http://orcid.org/0000-0002-3384-7764>

Sarah Keller  <http://orcid.org/0000-0001-8641-5562>

Kristen Byrne  <http://orcid.org/0000-0002-5573-4832>

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