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Research Article

A Kindness-Based Meditation Study for Promoting Interpersonal Functioning in First-Year College Students

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Dedicated to Michael K. Suvak, Jean S. Millstein, and Thomas L. Micklin

Abstract

Objectives: First-year students face interpersonal challenges while transitioning to college that can negatively impact academic and psychosocial functioning. There is currently a need for brief, efficacious programming to address such problems. Accordingly, we designed a one-session skills-based meditation workshop for this population. **Methods:** 62 eligible incoming college students were randomized to the 90-minute workshop or a waitlist control group. Participants completed self-report measures of loneliness, social support, compassion for others, and roommate responsiveness before randomization and at the end of the semester. **Results:** Workshop participants reported a significant within-group reduction in loneliness over the semester, along with significantly greater semesters-end roommate responsiveness and compassion for a stranger in distress than waitlisted students. **Conclusion:** Findings suggest that participation in an early semester, single-session meditation workshop may beneficially influence social and emotional outcomes for incoming college students. With more research support, this workshop could be integrated into first-year student programming.

Keywords: First-year college students; Social support; Loneliness; Mindfulness; Compassion.

Although the transition to college can be a period of considerable growth and development, first-year students also face a myriad of challenges including increased academic pressure and heightened social expectations. Difficulties coping with these challenges may contribute to the well-documented increase in psychosocial problems among first-year college students [1-3]. Since the beginning of the Coronavirus disease (COVID-19) pandemic, additional challenges have been posed due to physical distancing, sudden school closures, widespread implementation of remote learning, and potential illness [4]. Students report increased anxiety, depression, and loneliness as a result [4]. Fortunately, supportive relationships have the potential to positively impact students' transitions to college. Perceived social support predicts first-year student academic persistence [5]. In addition, increases in perceived social support over the first year of college enhance self-esteem [6]. and improve emotional, social, and overall adjustment over this same period [7]. Social support appears to buffer students from the negative effects of stress,[8,9] loneliness [5], and reduces their risk for depression [3,10], and suicidal ideation [11].

Although students' academic success and psychological well-being can be enhanced by strong social support, students' social networks are often disrupted during the transition to college [12], particularly if they are living away from home. Physical distancing and remote learning during the COVID-19 pandemic may also contribute to difficulties in forming new social relationships. The majority of first-year students reported elevated levels of

loneliness, along with anxiety and depression, since the start of the COVID-19 pandemic [4]. These findings are concerning given that loneliness is among the most common triggers of collegiate mental health crises [13]. Moreover, research has linked loneliness to heightened stress [14], reduced immune response [15], depression, and poor sleep quality [16].

Another social stressor associated with the transition to college for residential students is the roommate relationship. Roommate misunderstandings and conflicts are common [2], and can they further erode social connections, increase stress, and decrease overall satisfaction with college [9]. According to the 2022 Center for Collegiate Mental Health Annual Report [17], specific relationship problems were the third most endorsed issue for students presenting to college counseling centers with over one in five students listing interpersonal functioning as a presenting concern. Similarly, relationship problems are among the top six reasons that college students seek counseling [18].

Though colleges and universities may offer programming aimed at helping first year students navigate social challenges associated with their transition, there is limited research examining the efficacy of such programs and obstacles hinder their implementation. For example, Transition to University (T2U) is a semester- to year-long social support intervention for college students that has been studied across different settings using slightly different program formats [19]. Participation in T2U has been shown to increase perceived social support [20], although one study found that only women reported this benefit [21]. The impact of T2U on loneliness is also unclear, as studies have produced mixed results [21,22]. Of note, students in T2U programs are not taught skills they can apply outside of sessions, an element of mental health programming that is generally associated with the strongest outcomes [23]. T2U is also resource intensive and the multi-week commitment increases the risk of student attrition from the program [24]. A briefer, more skills-oriented program supporting students through social transitions and challenges may better meet the needs of college students and administrators.

One particular social skill that may be important to help students cultivate as they transition to college is prosociality. Prosociality among college students has been shown to be associated with greater perceived social support [25] and lower levels of loneliness [26,27]. Holding prosocial relationship motivations (i.e., engaging in social relationships out of a concern for others and a desire to support them) among students has been shown to predict higher perceived social support, less loneliness, and more roommate responsivity over the course of students' first year of college [28,29].

One practice that might help students cultivate prosociality, and potentially improve their interpersonal functioning, is loving-kindness or compassion meditation (collectively referred to by some as kindness-based meditations or KBM) [30]. Existing research on the benefits of kindness-based meditation in college students is promising, though preliminary. Carrero et al. [31] found that college students who completed a single-session loving-kindness meditation program reported greater compassion (i.e., emotions, thoughts, and behaviors emphasizing concern, warmth, and an orientation toward helping and understanding other(s)), as compared to an active control group who practiced focused breathing. However, the post-assessment was completed immediately following the intervention; therefore, longer-term impact of the intervention is unknown. Similarly, He et al. [32] found that first-year students who completed a loving-kindness meditation program reported greater increases in their feelings of closeness with others, and demonstrated greater complexity in their understanding of others, relative to a no contact control group. The post-assessment was conducted a day after the meditation program and the longer-term impact of the program is also unknown. Weibel et al. [33] found that students who participated in a four-session KBM group reported a greater increase in compassionate love (i.e., thoughts, feelings, and behaviors focused on understanding and caring for/helping others) from baseline to post assessment than did students in a waiting-list condition. Students in the KBM condition also showed a significant within-group increase in compassionate love from baseline to follow-up, although students in the two groups did not differ on compassionate love at follow-up controlling for baseline scores. Unfortunately, this study did not explore whether participation in KBM, or increases in compassionate love, impacted social support or student loneliness. Relatedly, the ability to experience compassion toward others has been associated with an understanding that all humans share the experience of suffering and imperfection [34]. The recognition of these similarities between the self and others may be a key factor in cultivating compassion.

There is some indication that writing about personally held relationship values can also help students transcend self-interested relationship motivations [35], improve feelings of belonging [36], and build positive, other-oriented feelings like love and connectedness [37]. However, the impact of a values intervention on the interpersonal functioning of first-year college students has not been explored in a longitudinal study.

The goal of the present study was to develop and test the potential impact of a one-session group KBM workshop with a relationship values writing component on the interpersonal functioning of first-year students living on campus. We hypothesized that participants receiving the workshop would experience greater increases in social support, decreases in loneliness, and increases in responsive roommate relationships over the course of their first semester of college than participants in a no-intervention control group. In addition, we hypothesized that workshop participants would show greater compassion towards distressed others than would those

assigned to the control condition. We predicted that workshop participants who completed a narrative task involving writing to a simulated peer in distress would demonstrate increased compassion for, and similarity to, the simulated peer.

Materials and Methods

Participants

The present study received Suffolk University IRB approval (number 911009-9). First year students 18 years or older from three urban colleges/universities who were living on campus with a roommate and available on at least one of the pre-set workshop dates were eligible to participate in the study. To be included, students had to be first-year undergraduate living on-campus with a roommate. Students could receive an Amazon gift card or course credit if enrolled in introductory psychology coursework. The mean age of the sample was 18.14 (*SD* = .36) with 83.9% female and 73.2% white. The study was described as offering students the opportunity to learn to meditate. Students were recruited through flyers, e-mails to incoming students, and introductory psychology courses. Of the 106 students who accessed the online materials describing the study, 4 did not complete the eligibility screener or provide consent, 32 students were not eligible for a variety of reasons, primarily that they may not have lived on campus or been first-year students. Eight were eligible and consented but could not be randomized because they did not complete the baseline survey or provide contact information. The baseline characteristics of the sample are displayed in Table 1 (CONSORT diagram available upon request.).

	Total (n = 62)	Workshop (n = 36)	Waitlist (n = 26)
Age M (SD)	18.14 (.36)	18.19 (.40)	18.08 (.27)
Sex (% Female)	52 (83.9%)	29 (80.6%)	23 (88.5%)
Race (% White)	47 (73.2%)	27 (75%)	20 (76.9%)
Site (% primary institution)	57 (91.0%)	34 (94.4%)	23 (88.5%)
Previous experience with practices related to KBM			
Any meditation experience	15 (38.46%)	8 (33.3%)	7 (46.67%)
Current meditation practice	0 (0%)	0 (0%)	0 (0%)
Yoga experience	35 (56.5%)	19 (52.85%)	16 (61.5%)
Current yoga practice	5 (8.1%)	3 (8.3%)	2 (7.7%)
Other mindfulness experience (e.g. Tai Chi, Martial Arts)	12 (19.4%)	5 (13.9%)	7 (26.9%)
MSPSS total	5.35 (1.14)	5.38 (.86)	5.30 (1.46)
UCLA Loneliness	52.44 (12.00)	53.94 (11.19)	50.25 (13.02)
Compassion goals	3.84 (.55)	3.89 (.59)	3.77 (.49)
Self-Image Goals	3.18 (.62)	3.14 (.66)	3.25 (.57)

Table 1: Study Variables at Baseline; Note: Percentages of different KBM related practices were calculated using the 39 participants for whom a response to the question was available (24 from the workshop condition and 15 from the waitlist condition). MSPSS = Multidimensional Scale of Perceived Social Support. UCLA Loneliness = the UCLA Loneliness Scale; $p < .10$; * $p < .05$; ** $p < .01$.

Measures

Demographic/Background Measures

Participants completed questions assessing basic demographics (e.g. age, race, sex) and prior experience with mind/body practice (e.g. meditation, tai chi, yoga).

Primary Outcome Measures

Multidimensional Scale of Perceived Social Support [38] is a 12-item measure of perceived available social support. Items are rated on a 7-point Likert-type scale from 1 (very strongly disagree) to 7 (very strongly agree), with higher scores indicating greater perceived support [39]. The MPSS had excellent internal consistency at baseline ($\alpha = .94$) and follow-up ($\alpha = .95$).

UCLA Loneliness Scale - Version 3 [40] is a 20 item self-report measure of loneliness. Items are rated on 4-point Likert-type scale, from 1 (never) to 4 (always), with higher scores representing greater levels of loneliness. Due to a clerical error, the version in the current study asked participants to rate items on a scale from 1 (never) to 5 (very often). This version of the measure had excellent internal consistency at baseline (α = .91) and good internal consistency at the follow-up (α = .87).

Perceived Roommate Responsiveness [41] consists of two 6-item, self-report scales that measure the extent to which respondents perceive themselves and their roommates as conveying understanding, validation, and caring toward one another. The actor scale assesses how respondents describe acting towards their roommates, with items such as "*I try to make my roommate feel valued as a person."* The partner scale asks respondents about how they perceive their roommates' responses to them, using items such as "*My roommate tries to make me feel valued as a person*." Each item is rated from 1 (not at all) to 5 (very much). Because it was assumed that first-year students would not be able to accurately assess their roommate responsivity in the first weeks of the semester, these scales were only administered at follow-up. Cronbach's α was .95 for the actor scale and .94 for the partner scale.

The Narrative Compassion Task [42] is an activity that was designed to assess compassionate responding. Participants read a prompt allegedly written by a same-sex peer regarding a recent romantic breakup and were asked to rate how compassionate toward, and similar to, the peer they felt using a 7-point Likert-type scale ranging from 1 (not at all) to 7 (extremely). Participants were then prompted to write down "as many comforting suggestions as you can think of that embody feelings of care, encouragement, and support" for their peer. This measure was collected only at follow-up. These measures capture the degree to which participants could feel affiliation with a peer in distress.

Participants' qualitative responses to this prompt were rated to yield two scores. Length of response (i.e., word count) [43] served as a proxy for *effort* directed at supporting another person in distress [44]. The extent to which *compassion* was expressed was coded using Gumley and Macbeth's Narrative Compassion Coding System [45], (unpublished, see Braehler et al. [46] for a description). Two clinical psychology doctoral students rated each response, with condition masked, from -1 (Anti-Compassionate) to 9 (Exceptional Compassion) and the scores were averaged. We computed interrater reliability (IRR) to assess the correlation between coding pairs using the "one-way random" method [29] to control for heterogeneous raters in a combined dataset. Overall interrater reliability was moderate, and the average ICC was .62, with a 95% confidence interval of .31 to .79, F (44, 45) = 2.61, p = .001.[1]

Follow-up Measures

At the end of the semester participants received a longer set of self-report questionnaires. This included post-workshop measures (e.g., roommate responsiveness measures, narrative compassion task) as well as a set of questions asking workshop participants only about their impressions of the workshop, including which practices they used over the semester and how often.

Workshop

The 90-minute workshop protocol was informed by previous research [47] and classical mindfulness texts [48]. Specific material drew from canonical [49], contemporary [50], and scientific sources [51], linking kindness-based contemplative practices with prosociality. The format, overall pacing, delivery, and themes were inspired by research on mindfulness-based workshops aimed at reducing the risk of depression among first-year students [52,53].

The groups were led by one or two doctoral students in clinical psychology, all of whom had some training in mindfulness and meditation. Group leaders met with the first author to review the workshop and practice the exercises before they met with any students. After introductions, participants were introduced to the concept of interpersonal stress, common college student social stressors, and how relationship motives (compassionate, self-image) can exacerbate or ease stress. Mindfulness was introduced as a practice that can increase awareness of interpersonal habits and help us to cultivate compassion. Participants engaged in a mindful eating practice that emphasized the skill of awareness and a loving-kindness meditation aimed at enhancing compassion, and they participated in a discussion on the ways in which mindfulness and compassion can deepen connections with others. Participants also completed a writing exercise aimed at helping them to articulate the reasons why mindfulness practice may be valuable to them personally. Specifically, they were asked to write about interpersonal values (i.e., the ways in which they wanted to act in their interactions with others). After the workshop was completed, students received three e-mail prompts spaced out over the remaining weeks of their semesters reminding them to practice their skills and linking them to online mindfulness resources.

Near the end of the semester (M = 7.28; SD = 1.32 weeks after the completion of the workshop) all study participants were e-mailed a link to their follow-up questionnaires and a debriefing that described the study goals, revealed the deception associated with the *Narrative Compassion Task*, and provided participants with mental health and meditation related resources. Participants were provided with their chosen compensation (research credit, if they were eligible, or an Amazon.com gift card). Waitlisted participants were then invited to attend the workshop during the following semester.

Procedure

62 eligible participants were block randomized by sex and institution to the workshop or waitlist condition and notified of their assignments. Those randomized to the workshop were contacted several days later with the scheduled workshop time. All procedures performed were in accordance with the International Committee of Medical Journal Editors guidelines on Protection of Research Participants, The Belmont Report, and the Declaration of Helsinki. Written informed consent was obtained from all participants.

Data Analytic Strategy

To explore potential changes in variables over time, we conducted a change regression model [54] using Mplus [55] (allowing intent-to-treat analyses). Change regression modeling involves regressing the end of the semester ("follow-up") scores onto the beginning of the semester ("pre") scores and fixing the factor loadings of both the end-of and beginning-of-semester scores to one. This process effectively "subtracts" the pre-score from the follow-up score for a latent difference score (e.g., $Y_2 = 1*Y_1 + 1*D$). To supplement McArdle's [54] model, we specified a bidirectional relationship between pre-scores and latent change scores to study change over time without adjusting for pre-level. For measures assessed only at the follow-up timepoint, we used a series of Mann Whitney U tests to compare group means for non-normally distributed data.

Results

Baseline Group Characteristics

Results from a Mann-Whitney U test (on the non-normally distributed MSPSS scores) and a series of independent samples t-tests revealed no differences between those who participated in the study and those who did not in terms of self-reported perceived social support ($U = 74$, $z = -1.45$, $p = .148$, $r = .24$) or loneliness ($t(33) = .32$, $p = .751$, $\eta_p^2 = .00$).

There were no significant baseline differences between the workshop and the waitlist conditions on demographic or study measures. The sample has a mean age of 18.14 ($SD = .36$) and was predominantly female (83.9%) and white (73.2%.).

Follow-up Questionnaire Results

Of the workshop participants, 67% completed follow-up questionnaires. Of the waitlist participants, 58% completed follow-up.

Workshop Satisfaction and Skills Practice

Among the 26 participants in the workshop condition who completed their follow-up questionnaires, 88.5% described practicing mindfulness, KBM, and values articulation a few times total or more since the workshop ended. Only three participants described never having used any of the workshop skills during the follow-up period. Most of the participants (96.2%) who completed their follow-up questionnaires reported they planned to continue the skills they learned in the future and would recommend the workshop to a friend. Two participants (7.7%) reported that they had unpleasant experiences during the workshop; one student was struggling with an illness while trying to participate and the other found the small and quiet room a little uncomfortable.

Changes in Interpersonal Functioning Over Time

To assess potential change in self-reported interpersonal functioning by condition we conducted a series of latent change regressions [54] (Table 3). There were no significant changes in perceived social support over the course of the semester and no time by condition interactions. However, workshop participants showed a significant reduction in loneliness over time with a small to medium effect size ($b = -4.06$, $SE_B = 1.85$, $CR = -2.20$, $p = .028$, $d = .-.34$) whereas those in the waitlist condition did not. However, the difference in the magnitude of change between these two groups was non-significant, yielding a small-to-moderate effect ($b = .-4.45$, $SE_B = 2.80$, $CR = 1.59$, $p = .111$, $d = .-.37$).

Roommate Responsiveness at Follow-Up

We used a Mann-Whitney U Test to compare participants in the workshop and waitlist groups on the roommate responsiveness variables, which were only collected at the follow-up timepoint and were non-normally distributed (Table 2). Workshop participants reported greater perceived responsiveness *toward their roommates* ($Md = 4.00$, $n = 26$) compared with participants on the waitlist ($Md = 3.17$, $n = 23$; $U = 128$, $z = -3.46$, $p = .001$, $r = .29$). The difference between participants' perceived responsiveness *received from their roommates* was non-significant between those who received the workshop and waitlist condition ($U = 295$, $z = -.08$, $p = .936$, $r = -.01$).

Response to Narrative Compassion Task at Follow-Up

To test the hypothesis that workshop participants would report experiencing more compassion for, and similarity to, a person in distress and respond more compassionately to that participant on a written prompt, we again used the Mann-Whitney U test to compare means across groups. As shown in Table 2, students in the workshop condition reported feeling significantly more compassion ($Md = 6.50$, $n = 26$) for a person in distress than did participants on the waitlist ($Md = 5.00$, $n = 23$; $U = 183$, $z = -2.43$, $p = .015$, $r = -.35$). However, the workshop and waitlist participants did not differ on how similar they felt to the person in distress ($U = 2.58$, $z = -.84$, $p = .40$, $r = .12$) or on the number of words they wrote ($U = 274.5$, $z = -27$, $p = .788$, $r = -.03$). Participants in the workshop group ($Md = 1.50$, $n = 25$) demonstrated a small to moderate ($d = .38$) non-significant effect for greater compassion in their writing as rated by coders than did those in the waitlist group ($Md = .50$, $n = 23$; $U = 196.5$, $z = -1.89$, $p = .058$, $r = -.27$).

	Workshop (*n* = 26)		**Waitlist (*n* = 24)**	
	Baseline M (*SD*)	Follow-up M (*SD*)	Baseline M (*SD*)	Follow-up M (*SD*)
MSPSS total	5.38 (.86)	5.19 (1.07)	5.30 (1.46)	5.24 (1.46)
UCLA Loneliness	53.94 (11.19)	50.46 (7.51)	50.25 (13.02)	51.09 (11.73)
Compassion goals	3.89 (.59)	3.72 (.51)	3.77 (.49)	3.79 (.46)
Self-image goals	3.14 (.66)	2.96 (.73)	3.25 (.57)	3.06 (.73)
Roommate responsiveness		4.21 (.72) **		3.40 (.87)
Actor responsiveness		3.89 (.87)		3.86 (.87)
Narrative Compassion Task				
Word count		63.76 (55.23)		57.65 (46.64)
Compassion		6.12 (1.03) *		3.62 (1.94)
Similarity		3.62 (1.94)		3.13 (1.55)
Rater-Coded Compassion		1.70 (1.66) †		1.07 (1.67)

Table 2: Un-Transformed Means and Standard Deviations at Baseline and Follow-Up; Note. N's range from 50 to 48 due to occasional missing data. MSPSS = Multidimensional Scale of Perceived Social Support. UCLA Loneliness = the UCLA Loneliness Scale; † p < .10; * p < .05; ** p < .01.

Variable	**Group**	**Pre**		**Post**				
		M (95%CI)	d	M (95%CI)	d	b (95%CI)	p	d
MSPSS	WL	5.30 (4.87, 5.74)	.07	5.25 (4.75, 5.75)	.02	-0.05 (-0.62, 0.52)	.85	-0.05
	WS	5.38 (5.01, 5.75)		5.27 (4.8, 5.75)		-0.11 (-0.64, 0.42)	.69	-0.10
	Diff	0.08 (-0.49, 0.65)		0.02 (-0.67, 0.71)		-0.06 (-0.83, 0.72)	.89	-0.05
UCLA Loneliness	WL	49.77 (45.12, 54.41)	.35	50.16 (46.21, 54.1)	.02	0.39 (-3.74, 4.52)	.85	0.03
	WS	53.94 (50.04, 57.84)		49.88 (46.28, 53.49) *		-4.06 (-7.69, -0.44)	.03*	-0.34
	Diff	4.18 (-1.89, 10.24)		0.22 (-0.04, 0.48)		-4.45 (-9.93, 1.03)	.11	-0.37
Self-Image Goals	WL	3.06 (2.77, 3.34)	.11	3.21 (2.95, 3.46)	.10	0.15 (-0.13, 0.44)	.30	0.21
	WS	2.98 (2.72, 3.24)		3.14 (2.93, 3.35)		0.16 (-0.09, 0.41)	.22	0.23
	Diff	-0.08 (-0.46, 0.31)		-0.07 (-0.40, 0.26)		0.01 (-0.37, 0.39)	.97	0.01
Compassionate Goals	WL	3.76 (3.54, 3.97)	0.29	3.81 (3.61, 3.99)	-0.08	0.05 (-0.15, 0.24)	.64	0.10
	WS	3.89 (3.71, 4.07)		3.77 (3.59, 3.941)		-0.12 (-0.29, 0.05)	.15	-0.26
	Diff	0.14 (-0.15, 0.42)		-0.04 (-0.31, 0.23)		-0.17 (-0.43, 0.05)	.20	-0.36

Table 3: Latent Change for Main Study Variables at the Baseline and Follow-Up Timepoints; Note: MSPSS = Multidimensional Scale of Perceived Social Support. UCLA Loneliness = the UCLA Loneliness Scale; WL = waitlist condition; WS = workshop condition; Diff = Difference; † p < .10; * p < .05; ** p < .01.

Discussion

The one-session workshop examined in this study was developed to preliminarily test the potential impact of a program requiring limited resources on the interpersonal needs of incoming students. Although participants assigned to the workshop showed a significant within-group decrease in loneliness over the semester, the difference in the magnitude of the decrease in loneliness between conditions did not reach statistical significance, possibly due to limited power. However, the effect size of the change in loneliness was consistent with that typically found in loneliness interventions (see meta-analysis by Masi et al. [56]), including several multi-session programs. In this light, it is compelling that workshop participants showed decreases in loneliness in a potentially under-powered single-session study.

Contrary to our predictions, participants who received the workshop did not experience an increase in perceived social support. Although this likely suggests that the workshop was not effective in helping students in this domain, a longer follow-up period may be needed to detect change. There is some evidence that social support takes more than seven weeks to cultivate. For example, several studies assessing outcomes related to T2U have shown that positive effects of that program on social support are not apparent until the students' second semesters [20-22].

Findings on roommate responsiveness were somewhat consistent with the study's hypotheses in that workshop participants perceived themselves as more responsive to their roommates than did the waitlist participants. However, the two groups did not differ on self-reports of perceived responsiveness *from* their roommates.

KBM workshop participants reported greater compassion toward an individual portrayed in distress compared to those in the waitlist condition. Relatedly, workshop participants demonstrated a small-to-moderate effect for displaying greater compassion in their written responses to this person, as assessed by independent raters, although this group difference was not statistically significant. These findings are broadly in line with previous studies which suggests that KBM practice can develop perspective taking and empathy [57,58].

However, in contrast to our prediction, the groups did not differ on self-rated similarity to the person depicted as being in distress. There are several possibilities for why this hypothesis was not supported. It may be that our measure of perceived similarity was flawed and participants interpreted it literally, providing a low rating if had never experienced a significant romantic relationship and break-up. Given how low the average similarities were (3.37 on a scale that ranged from 1-7), this seems like a plausible explanation. Alternatively, social desirability may have differentially impacted participants ratings of compassion and similarity. Participants may have assumed that reporting compassion for, rather than similarity to, a distressed other, would be viewed positively by experimenters. Finally, it could be that the workshop helped students to develop a sense of compassion for a person in distress without necessarily needing to identify similarities with that person.

Implications

This workshop involved low investment of resources for one-session 90-minute, with three follow-up text tips. It was delivered by graduate students, rendering it more feasible than multi-session T2U programs and more accessible than programs that required highly seasoned meditation teachers [59]. Though preliminary and limited findings, this study has the potential to contribute to the research on supporting first-year students, the study of prosocial behavior, and contemplative science. It adds to a growing literature on the benefits of single-session workshops incorporating mindfulness for college students [60]. It also expands this literature by primarily targeting interpersonal functioning, a construct that is central to students' overall well-being.[2] For this reason, the present study may hold implications for university first-year programming.

Limitations and Future Directions

Despite useful findings, the present study has notable methodological limitations. We relied primarily on self-report measures, which increases the risk of common-method bias [61], and used a version of the UCLA Loneliness scale that allowed respondents to use a broader 5-point rating scale rather than the typical 4-point scale. This may have reduced the range of possible scores and lowered the measure's ceiling. Behavioral, implicit, or physiological measures of compassionate responding may be alternative options to vary measurement approaches and mitigate social desirability. Future studies may also consider collecting data directly from participants' roommates to provide a broader and more ecologically valid measure of roommate relations [9].

We assessed the potential impact of the workshop at one follow-up timepoint, which occurred approximately seven weeks after the program was delivered. Future studies should explore potential longer-term effects, particularly given research showing that changes in social support among T2U participants often take two semesters to emerge.[20,21,22] Assessing workshop participants at multiple timepoints during and beyond the semester could provide data on mechanisms and long-term effects on student outcomes and academic retention [62].

This study's findings may have limited generalizability due to use of a relatively homogeneous (primarily white, women) convenience sample [63]. Research suggests women may benefit more from meditation than men in a college setting [64]. Also, the use of a predominantly white sample in the current study may have obscured information about the ways in which minoritized status can influence students' adjustment to college [65], and response to interventions. Socially stigmatized groups may benefit more

from a program that acknowledges the prevalence of social threat [66]. Integrating KBM into university programming for first-year students would increase the heterogeneity of participant pools for future studies [53]. Future research may also provide the workshop online, which may broaden the participant pool and increase access for the college student population.

The use of a waiting list control-group in the current study limits the conclusions that can be drawn. Effect sizes may be exaggerated in studies that do not employ an active comparison condition [67]. Future studies may test the efficacy of the KBM workshop against a comparable active control group, such as a 90-minute T2U-type group, or a cognitive-behavioral skills group.

Allegiance effects [68] could also have impacted the findings in this study, as several groups were co-led by the study's first author. A meta-analysis found that though meditation programs produce increased empathy, compassion only increased in meditation studies when instructors were co-leaders and there was an inactive control group [67]. Researchers have also called for better monitoring of adverse events in meditation-based interventions [69,70]. Though none emerged in the present study, more comprehensive screeners now exist and should be integrated into future interventions among college students [71].

Focusing on prosocial outcomes may be valuable for students entering a new and challenging social setting. There will likely be a demand for further such research as transitioning college students remain subject to rising rates of social and emotional difficulties. As coping with isolation and loneliness becomes a starker reality in the changing landscape of higher education during the COVID-19 pandemic, the present findings may become especially relevant.

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