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Colleen S. Conley PhD , Lea V. Travers MA & Fred B. Bryant PhD

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Major Article

Promoting Psychosocial Adjustment and Stress Management in First-Year College Students: The Benefits of Engagement in a Psychosocial Wellness Seminar

Colleen S. Conley, PhD; Lea V. Travers, MA; Fred B. Bryant, PhD

Abstract. Objective/Methods: This research evaluates the effectiveness of a psychosocial wellness seminar for first-year college students, from 2009 to 2011, using an 8-month prospective quasi-experimental design. **Participants/Results**: Compared with controls ($n = 22$) involved in an alternative seminar, intervention participants ($n = 29$) showed no differences at baseline, but reported significantly greater perceived improvements over the course of the intervention, in psychosocial adjustment and stress management. Furthermore, specific aspects of intervention engagement (attendance and student-rated skills practice, but not didactic mastery or facilitator-rated skills practice) differentially predicted beneficial outcomes: (1) psychosocial adjustment (increases in psychosocial well-being, decreases in psychological distress), after adjusting for baseline levels of these outcomes; (2) college-related stress management (lower college-related stress, greater adaptation to college); and (3) perceived improvements in psychosocial adjustment and stress management. **Conclusions**: This research indicates promising avenues for programmatic efforts to promote psychosocial adjustment and stress management in college students, during this critical developmental juncture.

Keywords: college students, intervention, mental health, promotion, wellness

College is a key developmental period of psychosocial risk versus resilience. Given that the transition to college brings a host of new demands and challenges, it is not surprising that this transition entails elevations in psychosocial distress and adjustment difficulties.[1,2] Although there has been extensive attention to mental health promotion and prevention in children,[3] similar work on college students is underdeveloped. Thus, the present study evaluates the effectiveness of a psychosocial wellness promotion program for first-year college students, with the goals of (1) improving psychosocial adjustment, by enhancing positive well-being and reducing negative distress, and (2) helping students successfully manage the stress and adjustment associated with the transition to college.

***Dr Conley**, **Ms Travers**, and **Dr Bryant** are with the Department of Psychology at Loyola University Chicago in Chicago, Illinois.*

Transition to College

The transition to college brings a host of developmental challenges and stressors. Academically, students encounter a rigorous curriculum and must manage their time effectively. Socially, many college students leave behind close friends and family members and must forge new relationships with peers, advisors, and faculty. College students frequently report loneliness, homesickness, conflict, and distress in interpersonal relationships.[4,5] Not surprisingly, college students report high levels of stress,[4] which interferes with academic performance.[6,7] These increased stressors can leave students vulnerable to stress-related mental health problems.[1,8] Given the developmental and psychosocial challenges they face, college students are prime candidates for preventive mental health efforts, including mental health promotion.[9,10] As the college context is structured around developing self-responsibility and new learning, it provides an ideal setting for mental health promotion. Teaching students psychosocial adjustment and stress management skills can help them deal with the stresses they commonly face in college, as well as prevent later problems. Research indicates that college students who develop essential skills in psychosocial wellness and stress management are likely to adapt to college most successfully.[11–14] In sum, the transition

to college offers a prime opportunity for promoting psychosocial strengths and skills that can chart a trajectory toward lifelong wellness, adjustment, and success.[15]

College Student Mental Health Services

College student mental health services typically employ an individual-based treatment model, with little emphasis on preventive services;[16] thus, it is not surprising that college campuses struggle with limited resources for addressing students' mental health needs.[17,18] Further, students might not recognize their need for mental health services, or they might hesitate to seek help for various personal, social, or cultural reasons.[19–21] Given these challenges, it is not surprising that mental health services are greatly underutilized on college campuses.[22,23] Despite evidence that a large proportion of students experience mental health symptoms that interfere with their functioning,[1,4,24] only about 10% of students receive campus mental health services.[4,25,26] Thus, in the face of increasing needs for student mental health services, the typical models for addressing these needs are limited.[20,27] In contrast, group- and classroom-based preventive interventions are ideally suited for the college setting and increase the likelihood that more students will receive needed mental health services.[28]

Mental Health Promotion

There is a growing body of mental health promotion programs for college students, but the effectiveness of these interventions seems to depend on effectively developing relevant skills.[29] There appear to be some psychosocial benefits for stress management programs that include cognitive modification techniques[30–33] or various behavioral and body-focused forms of relaxation,[34,35] as well as interventions that focus on mindfulness[36–39] or relationship skills.[40–42] Although some interventions show promise, reviewers have noted the need for more research with control groups, diverse outcome measures, and prospective longitudinal designs to assess the long-term benefits of these interventions.[14,29,34] As such, the present study included a control group, used multiple outcome measures, and collected data from participants at baseline (before starting college) and 8 months later (at the end of the intervention and the first year of college).

Effects of Intervention Engagement

Evidence from research on psychotherapy[43] and on prevention and promotion program implementation[44] suggests that participants' potential benefits are in part dependent on how actively they become engaged in the intervention. Researchers have conceptualized and assessed engagement in a range of different ways, from simple attendance[34] to participants' mastery of relevant didactic material,[40] to assessment of out-of-session skills practice.[39]

Data from existing evaluations have indicated difficulties with effectively engaging students in the intervention.[34,45–47] However, only a few college promotion studies have statistically evaluated the potential influence of engagement on outcomes. Whereas some studies find benefits of engagement,[39,48] others do not,[34,40,47] and in 2 cases practice frequency was associated with poorer adjustment.[49,50] Therefore, one goal of the present study was to shed further light on the role of intervention engagement in promoting beneficial student outcomes.

Because researchers define and assess engagement in different ways, the benefits of engagement are likely to vary depending on these definitions and assessments. Typically, students give their own retrospective self-reports of engagement (eg, frequency or amount of skills practice). Engagement ratings from intervention facilitators are likely to predict outcomes as well, though perhaps in different ways. Furthermore, comparing engagement ratings from different reporters, along with more objective indicators of engagement (eg, attendance records, attained knowledge), would allow for a more nuanced approach to uncovering intervention effects. Thus, another goal of the present study was to compare the outcomes of different aspects of intervention engagement, from multiple sources.

In sum, there seem to be several open questions not only about *whether* mental health promotion interventions work for college students, but also *how* they might work. The present study addresses these questions by examining whether and how different aspects of intervention engagement predict beneficial outcomes.

The Present Study

The present study assesses the effectiveness of a psychosocial wellness promotion seminar for first-year college students. The seminar aimed to provide students with skills in stress management, problem solving, cognitive restructuring, mindfulness, effective social communication, and life enrichment, intended to (1) promote their psychosocial well-being and reduce their psychological distress and (2) help them effectively navigate the various stressors and challenges commonly faced by entering students.

This research tests 2 hypotheses. First, compared with controls involved in an alternate seminar, intervention participants were expected to demonstrate several benefits at the end of the first year of college, including (a) better psychosocial adjustment (ie, greater psychosocial well-being and lower psychological distress), after adjusting for baseline levels of these outcomes; (b) greater management of college-related stress and adaptation, at the end of the intervention; and (c) more perceived improvements in psychosocial adjustment and stress management. Second, among intervention participants, more intervention engagement was expected to predict greater benefits in the above 3 domains. Specifically, this study assessed the unique benefits of 4 different aspects of intervention engagement: (1) attendance; (2) mastery of didactic material presented in the intervention; and students' out-of-session practice of targeted skills, as measured separately by (3) student self-reports of engagement in skills practice and (4) facilitator judgments of skills practice based on homework logs.

METHODS

Participants

Participants ($N = 51$; M age = 18.40; 65% female; 66% white; 12% biracial; 10% Asian; 6% Hispanic/Latino; 6% other) were first-year undergraduates at a private, midsize midwestern university, during 2009–2011. Intervention participants ($n = 29$) were drawn from 2 sections of a first-year seminar, Promoting Psychosocial Wellness. Control participants ($n = 22$) were drawn from 2 sections of an alternative first-year seminar, Global Citizenship. These were the only sections of these small-enrollment (13 to 17 students) seminars, so random selection was not necessary. Exact sample size varied slightly (intervention group ns = 25–29) across analyses, due to incomplete data for some respondents.

Intervention and control participants did not differ significantly on demographic variables (sex, age, ethnicity, residential status, college generational status, or high school achievement record). Nor did the groups differ on whether they had previously received a psychological diagnosis or psychological treatment prior to starting the study, or on any psychosocial adjustment measures collected at baseline.

Study Design and Procedure

The study, approved by the university institutional review board, utilized a prospective, quasi-experimental, cohort-controlled design. Baseline (preintervention) assessment took place the week prior to the start of the academic year. Postintervention assessment took place at the end of the academic year, 8 months later. Participants provided their informed consent and completed the assessment protocol online at each wave. Participants had a chance to win a $25 gift certificate and other token incentives.

The intervention and control seminars each met weekly for 50 minutes, over the fall and spring semesters. Both sections of the intervention seminar were taught by one faculty member (a licensed clinical psychologist), and both sections of the control seminar were taught by another faculty member. Each seminar was co-facilitated by a second faculty or staff member from the university.

The intervention covered a variety of topics related to psychosocial adjustment (eg, Emotional Awareness, Experience, and Balance; Mindfulness; Effective Communication for Rewarding Relationships; Life Enrichment, Positive Qualities, Resilience, Strengths) and stress management (eg, Stress and Responses to Stress; Relaxation; Coping with and Solving Problems; Cognitive Monitoring and Restructuring). For each module of the seminar, ranging from 1 to 3 weeks, students received didactic instruction (readings and informational presentations), completed journal entries on their experiences and reactions, participated in class activities and skills practice, and completed out-of-class skills practice. For example, for the 3-week unit on cognitive restructuring, students read a short reading each week (eg, on recognizing and challenging negative automatic thoughts and common cognitive distortions), and took an online, open-book quiz on each reading before class. In class, facilitators gave brief didactic presentations on the cognitive model of Activating events, Beliefs, and Consequent emotions (ABC).[51] Students then met in small groups to discuss common cognitive distortions, and put together a short, informative demonstration to illustrate examples of each. To practice the skills outside of class, students began by noticing and recording their automatic thoughts, and identifying cognitive distortions they were making. Once they mastered this, they moved on to evaluating, challenging, and disputing these thoughts (eg, looking for evidence), and then reframing with more adaptive, positive thoughts.

The control seminar covered a variety of topics around the theme of global citizens and citizenship (eg, worldwide solidarity in social and political organization; global social welfare and activism). Although the control seminar did not contain any mental health-related skills training, the course had a similar structure and format to the intervention seminar. Students in the control seminar completed readings, class discussions, reflective writing assignments, small group projects, and experiential activities. For example, students visited international neighborhoods in the surrounding metropolitan area to meet local residents. In small groups, students presented a multimedia reflection on the experiential component of the course, and each student wrote a series of reflection papers (eg, on the meaning of global citizenship, and on related experiential activities).

Measures

Background Information

At the start of the academic year, participants responded to questions about their background, including whether they had ever been diagnosed with or treated for a psychiatric disorder. With participants' permission, other demographic information was obtained from school records, including sex, age, ethnicity, high school GPA (grade point average), ACT (American College Testing) score, graduating high school class rank, residential status, and college generational status (based on parents' highest level of education).

Psychosocial Adjustment and Stress Management

At the start (preintervention) and end (postintervention) of the academic year, participants completed various measures of (1) psychosocial adjustment, including positive well-being and negative distress. Although not relevant to assess at baseline, at the end of the year participants also completed assessments of their (2) management of college-related stress and adjustment, and (3) perceived improvements across the year, in various domains of psychosocial adjustment and stress management. Table 1 presents measurement information, and Table 2 presents descriptive information, for all outcome measures.

We used confirmatory factor analysis (CFA) to construct parsimonious measurement models consisting of reliable multi-item composite factors for the (1) 16 measures of psychosocial adjustment and (2) 17 items of perceived

TABLE 1. Measurement Details for Assessed Outcomes

Construct	Scale name	Items, α	Rating scale	λ	R^2
Psychosocial Adjustment: Positive Well-Being[a]					
Self-efficacy	General Self-efficacy subscale[81]	17 items ($\alpha = .73$)	1 (*Strongly disagree*) to 5 (*Strongly agree*)	.72	.52
Self-esteem	Rosenberg Self-esteem Scale[82]	10 items ($\alpha = .90$)	1 (*Strongly disagree*) to 7 (*Strongly agree*)	.84	.71
Resilience	Connor-Davidson Resilience Scale[83]	10 items ($\alpha = .91$)	0 (*Not true at all*) to 4 (*True nearly all of the time*)	.77	.59
Hope	Adult Dispositional Hope Scale[84]	8 items ($\alpha = .85$)	1 (*Definitely false*) to 4 (*Definitely true*)	.72	.52
Life satisfaction	Satisfaction With Life Scale[85]	5 items ($\alpha = .91$)	1 (*Strongly disagree*) to 7 (*Strongly agree*)	.71	.50
Mindfulness	Mindful Attention and Awareness Scale[86]	15 items ($\alpha = .92$)	1 (*Almost never*) to 6 (*Almost always*)	.48	.23
Emotion regulation: Cognitive reappraisal	Emotion Regulation Questionnaire,[87] Reappraisal subscale	6 items ($\alpha = .75$)	1 (*Strongly disagree*) to 7 (*Strongly agree*)	.43	.18
Positive thinking	Automatic Thought Questionnaire—Positive[88]	30-items ($\alpha = .97$)	1 (*Never*) to 5 (*All the time*)	.69	.48
Relationship satisfaction: Friends	Developed for this research	1 item	1 (*Very dissatisfied*) to 5 (*Very satisfied*)	.35	.12
Relationship satisfaction: Parents	Developed for this research	1 item	1 (*Very dissatisfied*) to 5 (*Very satisfied*)	.21	.04
Psychosocial Adjustment: Negative Distress[a]					
Depression	Depression Anxiety Stress Scale,[89] Depression subscale	7 items ($\alpha = .94$)	0 (*Did not apply to me at all*) to 3 (*Applied to me very much, or most of the time*)	.87	.76
Anxiety	Depression Anxiety Stress Scale,[89] Anxiety subscale	7 items ($\alpha = .92$)	Same as above	.70	.49
Stress	Depression Anxiety Stress Scale,[89] Stress subscale	7 items ($\alpha = .91$)	Same as above	.81	.66
Perceived stress	Perceived Stress Scale[90]	10 items ($\alpha = .82$)	0 (*Never*) to 5 (*Very often*)	.78	.61
Expressive suppression	Emotion Regulation Questionnaire,[87] Suppression subscale	4 items ($\alpha = .82$)	1 (*Strongly disagree*) to 7 (*Strongly agree*)	.31	.10
Dysfunctional thoughts	Dysfunctional Attitudes Scale[91]	24 items ($\alpha = .87$)	1 (*Totally disagree*) to 7 (*Totally agree*)	.49	.24
Stress Management: Adaptation to College[b]	Student Adjustment to College Questionnaire[92]	67 items ($\alpha = .96$)	1 (*Doesn't apply to me at all*) to 9 (*Applies very close to me*)		
Stress Management: College-Related Stress[b]	Inventory of College Students' Recent Life Experiences[93]	49 items ($\alpha = .95$)	0 (*Not at all part of my life*) to 3 (*Very much part of my life*)		
Perceived Improvements: Psychosocial Adjustment[a,b]	Perceived Improvements Scale (developed for this research)	12 items ($\alpha = .92$)	−3 (*Worse*) to 0 (*Same*) to +3 (*Better*)		
Perceived Improvements: Stress Management[a,b]	Perceived Improvements Scale (developed for this research)	5 items ($\alpha = .83$)	−3 (*Worse*) to 0 (*Same*) to +3 (*Better*)		

Note. λ = standardized factor loading from confirmatory factor analysis of pooled data from the development and confirmation samples for the measures of psychosocial adjustment ($N = 1{,}332$), $\chi^2 = 1490.89$, $df = 100$, RMSEA = .10, SRMR = .07, CFI = .94, NNFI = .93, and perceived improvements ($N = 1{,}247$), $\chi^2 = 1536.74$, $df = 118$, RMSEA = .10, SRMR = .07, CFI = .95, NNFI = .94. R^2 = squared multiple correlation, or the proportion of variance in the measured variable that that underlying factor explains. The SACQ full scale comprises an average of all items from the 4 college adjustment subscales: academic, social, and personal/emotional adjustment, and attachment to the institution. The ICSRLE total score includes all items from the subscales of developmental challenge, time pressure, academic alienation, assorted annoyances, general social mistreatment, friendship problems, and romantic problems. The Perceived Improvements in Psychosocial Adjustment composite includes perceived improvements in: (1) psychological well-being ($\lambda = .74$, $R^2 = .55$), (2), positive emotions ($\lambda = .75$, $R^2 = .56$), (3) negative emotions (ie, less negative emotion; $\lambda = .48$, $R^2 = .23$), (4) emotion management ($\lambda = .65$, $R^2 = .42$), (5) positive thinking ($\lambda = .75$, $R^2 = .56$), (6) negative thing (ie, less negative thinking; $\lambda = .44$, $R^2 = .19$), (7) mindfulness ($\lambda = .57$, $R^2 = .32$), (8) self-esteem or self-worth ($\lambda = .74$, $R^2 = .55$), (9), attitude toward life ($\lambda = .83$, $R^2 = .69$), (10) quality of life ($\lambda = .81$, $R^2 = .66$), (11) quality of relationships ($\lambda = .69$, $R^2 = .48$), and (12) communication effectiveness ($\lambda = .38$, $R^2 = .14$). The Perceived Improvements in Stress Management composite includes perceived improvements in: (1) time and task management ($\lambda = .50$, $R^2 = .25$), (2) level of stress (ie, less stress; $\lambda = .53$, $R^2 = .28$), (3) tension management or relaxation ($\lambda = .86$, $R^2 = .74$), (4) managing or coping with stress ($\lambda = .89$, $R^2 = .79$), and (5) problem solving ($\lambda = .64$, $R^2 = .41$).

[a]These scales were derived from confirmatory factor analyses via LISREL 8[53] of the assessments (or items) noted.

[b]These scales were not relevant to assess at baseline, so they were only assessed at Time 2. All other assessments were taken at T1 (preintervention) and T2 (postintervention).

TABLE 2. Descriptive Statistics by Group

	All			Intervention			Control		
Measure	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Psychosocial Adjustment									
Positive well-being (T1)	50	0.00	0.60	28	−0.05	0.64	22	0.09	0.57
Positive well-being (T2)	50	0.00	0.64	28	0.00	0.68	22	0.01	0.59
Negative distress (T1)	50	0.00	0.64	28	−0.08	0.64	22	0.11	0.63
Negative distress (T2)	50	0.00	0.74	28	0.01	0.77	22	−0.01	0.73
Stress Management									
Adaptation to college	50	6.02	1.12	28	5.99	1.28	22	6.06	0.90
College-related stress	50	0.95	0.51	28	1.00	0.51	22	0.88	0.51
Perceived Improvements									
Psychosocial adjustment	51	0.70	1.03	29	0.97	1.03	22	0.35	0.94
Stress management	51	0.41	1.00	29	0.74	0.96	22	−0.03	0.89

Note. Psychosocial adjustment measures were assessed at the start and end of the academic year. Stress management measures assessed college-related factors not relevant at baseline, and perceived improvements measures assessed improvement over the course of the year (since baseline), and thus were only assessed at the end of the academic year.

improvements. Data for measurement modeling ($N = 1{,}332$ for psychosocial adjustment models; $N = 1{,}247$ for perceived improvements models) came from a larger research project of which the intervention and control groups were a part. Following established psychometric procedures,[52] we randomly divided the total sample in half (stratified by sex), using one half (ie, the development sample) to develop measurement models, and the other half (ie, the confirmation sample) to confirm the cross-sample generalizability of these models.

We used maximum-likelihood estimation via LISREL 8[53] to impose CFA models on the separate covariance matrices of the 16 psychosocial adjustment measures and the 17 perceived improvements items (see Table 1). Consistent with prior theory distinguishing between subjective well-being and distress,[54,55] we evaluated the goodness-of-fit of a 2-factor model, split by valence (positive psychosocial well-being, negative psychological distress). Considering the measures of psychosocial adjustment for the development sample ($N = 666$), the 2-factor model approached acceptable goodness-of-fit, $\chi^2 = 937.46$, $df = 103$, root mean square error of approximation (RMSEA) = .11, standardized root mean square residual (SRMR) = .08, comparative fit ındex (CFI) = .91, nonnormed fit ındex (NNFI) = .90. We therefore added theory-relevant correlated error terms to this 2-factor model, to explain additional sources of covariation among conceptually-related measures, including (a) stress and anxiety,[56] (b) depression and anxiety,[57] and (c) satisfaction with parents and with friends.[58] Modification indices supported the existence of these 3 correlated errors, and adding them to the model significantly improved its goodness-of-fit, $\Delta\chi^2 = 95.90$, $df = 3$, $p < .0001$, and produced acceptable model fit, $\chi^2 = 741.56$, $df = 100$, RMSEA = .10, SRMR = .07, CFI = .94, NNFI = .92. Validating cross-sample generalizability, this modified model also provided an acceptable goodness-of-fit in the confirmation sample ($N = 666$), $\chi^2 = 872.55$, $df = 100$, RMSEA = .10, SRMR = .07, CFI = .94, NNFI = .92. We thus standardized scores on constituent measures to construct composite indices of positive psychosocial adjustment or well-being (10 measures; $\alpha = .80$), and negative psychological adjustment or distress (6 measures; $\alpha = .84$). The 2 adjustment factors showed a strong negative correlation in the CFA solutions for both the development ($r = -.77$, $p < .0001$) and confirmation ($r = -.78$, $p < .0001$) samples. Table 1 lists the constituent measures, their standardized CFA factor loadings and squared multiple correlations, for each factor.

For the measures of perceived improvements, the 2-factor model did not approach acceptable goodness-of-fit, so we used exploratory principal-axis factor analysis with promax rotation to find an appropriate measurement structure. Results revealed 2 correlated factors ($r = .65$) that explained 52.2% of the total variance among the 17 items, reflecting perceived improvements in psychosocial adjustment and in stress management. Validating the cross-sample generalizability of the exploratory model, a CFA version of this 2-factor model provided an acceptable goodness-of-fit in both the development sample ($N = 625$), $\chi^2 = 858.12$, $df = 118$, RMSEA = .10, SRMR = .07, CFI = .94, NNFI = .93, and the confirmation sample ($N = 622$), $\chi^2 = 850.73$, $df = 118$, RMSEA = .10, SRMR = .07, CFI = .95, NNFI = .94. We thus averaged constituent items to construct composite indices of perceived improvements in psychosocial adjustment (12 measures; $\alpha = .92$), and in stress management (6 measures; $\alpha = .83$). The 2 perceived improvements factors showed a strong positive correlation in the CFA solutions for both the development ($r = .67$, $p < .0001$) and confirmation ($r = .69$, $p < .0001$) samples. Table 1 (see note) lists the constituent items, their standardized CFA factor loadings and squared multiple correlations, for each factor.

Intervention Engagement

Engagement was assessed for intervention participants only, using a multimethod approach. Attendance was determined by the percentage of intervention sessions each student attended. Mastery of didactics was a calculated average of scores on brief (approximately 10-item), open-book quizzes on the assigned reading material for each weekly topic (14 quizzes; $\alpha = .79$). To maximize students' opportunities for mastery, students could retake each quiz as many times as they liked.

Facilitator-rated skills practice was calculated by creating a composite of the scores on all out-of-class skills-practice assignments (15 assignments; $\alpha = .89$). Each assignment involved engaging with a physical, mental, emotional, or social process (eg, muscle tension, automatic thoughts, mindfulness attitudes, social dynamics); applying a newly learned skill (eg, relaxation, cognitive restructuring, mindfulness practice, effective communication); and reflecting on the experience and outcome. Students completed monitoring forms to record their activities and experiences with the exercises, typically practiced a few times per week. Assignments were scored for the thoroughness of the logs as well as the general thoughtfulness and depth of the responses.

For student-rated skills practice, participants reported on the extent to which they engaged in each of the assigned out-of-class activities, on a scale from 0% (*Not at all*) to 100% (*Completely*). As a benchmark, they were told that a rating of 100% meant that their performance on that assignment was complete, thorough, and did not contain any made-up or inaccurate responses. Students were asked to answer these questions honestly and were reassured that their responses would not be examined until after the course was completed, and thus would not have any bearing on their course grade. An overall average of student-rated skills practice was calculated from these 12 items ($\alpha = .82$).

RESULTS

Data Analysis Strategy

Hypothesis Testing Strategy

Group difference analyses included group or Group × Time (pre to post) analyses of variance (ANOVAs) to test for intervention effects, over time when relevant. Intervention engagement analyses consisted of multiple regressions, examining the unique effects of 4 different measures of intervention engagement (entered simultaneously) on outcomes postintervention, adjusting for baseline levels when relevant.

Power Analysis

We conducted a post hoc statistical power analysis[59] to determine the likelihood of obtaining significant results in our data analyses at $p < .05$. For independent groups t tests, our sample sizes provide 80% power to detect a large mean difference (Cohen's $d = 0.8$), but only 40% power to detect a medium-sized effect (Cohen's $d = 0.5$), at 2-tailed $p < .05$. In order for ANOVAs to have 80% power to detect a significant group effect, group membership must explain at least (a) 15% of the variance in the dependent variable, if T1 has a small effect on T3 ($R^2 = .01$); (b) 14% of the variance in the dependent variable, if T1 has a medium-sized effect on T3 ($R^2 = .09$); and (c) 12% of variance in the dependent variable, if T1 has a large effect on T3 ($R^2 = .25$). For regression analyses, assuming the other predictors together explain 10% of the variance in the dependent variable (ie, $R^2 = .10$), the current sample size of 25 to 27 (intervention group) achieves 80% power to detect the effects of another predictor if this additional variable explains at least 22% of the variance in the dependent variable.

We also conducted post hoc power analyses of similar research, published in reputable peer-reviewed journals, and found power in these studies to be similar to or lower than the power in the current study.[31,32,36,38,39,60] Thus, although our samples are small, they are large enough to support regression analyses and provide a level of statistical power that is comparable to or stronger than that typically attained in the extant literature evaluating similar interventions.

Statistical Significance and Effect Sizes

Given that our power analysis suggests that we are likely to miss small effects using null hypothesis testing, the present study reports effect sizes in addition to levels of statistical significance.[61] In ANOVAs, we examined η^2 values using Cohen's[62] standards for small ($\eta^2 \geq .01$), medium ($\eta^2 \geq .06$), and large ($\eta^2 \geq .14$) effects. In regression analyses, we examined R^2 values for overall models and β values for individual predictors, using Cohen's[62] standards for small ($R^2 \geq .01$; $\beta \geq 0.10$), medium ($R^2 \geq .09$; $\beta \geq 0.30$), and large ($R^2 \geq .25$; $\beta \geq .50$) effects.

Intervention Versus Control Group Differences

Means and standard deviations are shown in Table 2. Table 3 presents a correlation matrix of the study variables, separately for the intervention and control groups. As shown in Table 4, Group × Time (repeated-measures) ANOVAs predicting psychosocial adjustment (both positive well-being and negative distress) revealed no significant main effects for Group, Fs(1, 47) $\leq .48$, ps $\geq .491$; Time, Fs(1, 47) $\leq .08$, ps $\geq .782$; or Group × Time, Fs(1, 47) ≤ 1.19, ps $\geq .280$. Similarly, ANOVAs revealed no group differences for stress management outcomes, including adaptation to college, $F(1, 48) = 0.04$, $p = .839$, and college-related stress, $F(1, 48) = 0.77$, $p = .386$. However, ANOVAs revealed significant group effects for perceived improvements in both domains, such that intervention participants perceived greater improvements in psychosocial adjustment, $F(1, 49) = 4.82$, $p = .033$ (medium effect, $\eta^2 = .090$), and stress management, $F(1, 49) = 8.43$, $p = .006$ (large effect, $\eta^2 = .147$), by the end of the intervention.

Intervention Group: The Role of Engagement

A series of multiple regression analyses examined the unique contributions of 4 different measures of intervention

TABLE 3. Correlations Among Measures for the Intervention and Control Groups

	1	2	3	4	5	6	7	8	9	10	11	12
Psychosocial Adjustment												
1. T1 positive well-being composite	—	.411*	−.578**	−.158	.188	−.163	.187	.136	−.115	.058	−.334+	−.029
2. T2 positive well-being composite	.637**	—	−.580**	−.770***	.809***	−.610***	.617***	.507**	.189	.429*	.231	.354+
3. T1 negative distress composite	−.603**	−.343	—	.636***	−.322	.566**	−.208	−.192	−.295	−.086	.345+	.089
4. T2 negative distress composite	−.396+	−.572**	.629**	—	−.712***	.794***	−.364+	−.343+	−.611***	−.357+	−.066	−.229
Stress Management												
5. Adaptation to college	.347	.568**	−.578**	−.860***	—	−.648***	.405*	.379*	.459*	.429*	.185	.322
6. College-related stress	−.481*	−.710***	.550**	.836***	−.626**	—	−.374+	−.369+	−.486*	−.489**	.004	−.233
Perceived Improvements												
7. Psychosocial adjustment composite	−.048	.223	.033	−.414+	.443*	−.489*	—	.862***	.038	.395*	−.024	.067
8. Stress management composite	.072	.089	−.146	−.488*	.374+	−.479*	.812***	—	.127	.366+	−.085	−.024
Intervention Engagement												
9. Attendance	—	—	—	—	—	—	—	—	—	−.071	−.261	−.046
10. Student-rated skills practice	—	—	—	—	—	—	—	—	—	—	.156	.430*
11. Facilitator-rated skills practice	—	—	—	—	—	—	—	—	—	—	—	.370+
12. Didactic mastery	—	—	—	—	—	—	—	—	—	—	—	—

Note. Correlations in the intervention group are presented above the diagonal, and correlations in the control group are presented below the diagonal. *n*s = 26–29 intervention and 22 control.
$^{+}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

engagement (attendance, mastery of didactic material, student-rated and facilitator-rated skills practice) to the 6 outcomes of interest (2 outcomes each for psychosocial adjustment, stress management, and perceived improvements) at the end of the intervention, adjusting for baseline levels when appropriate. The multivariate nature of these analyses (ie, entering all 4 aspects of engagement simultaneously) captured the unique variance that each type of engagement accounts for in each outcome variable. Table 5 presents R^2 for each model (and ΔR^2 where appropriate), as well as standardized β coefficients and p values for each predictor, and indicates the strength of these effects according to Cohen.[62] Notably, 5 of the 6 models had large effect sizes ($R^2 \geq .25$); and the sixth model effect was just below this cutoff, yielding a medium effect ($R^2 = .22$).

Table 5 reveals an interesting pattern of unique contributions from the 4 aspects of intervention engagement. Greater attendance across the intervention generally predicted greater benefits at the end of the intervention, above and beyond baseline levels when relevant. As shown in Table 5, attendance significantly predicted better psychosocial adjustment (including more positive well-being and less negative distress) as well as better stress management (including greater adaptation to college and less college-related stress), and all effects were large. Also shown in Table 5, student-rated skills practice significantly predicted positive intervention effects for all 6 outcomes, including psychosocial adjustment (more positive well-being, less negative distress), stress management (greater adaptation to college, less college-related stress), and perceived improvements (in psychosocial adjustment and in stress management); all effects were medium or large. Facilitator-rated skills practice and didactic mastery did not significantly predict any of the 6 outcomes related to psychosocial adjustment, stress management, or perceived improvements over time, and all effects were null or small (see Table 5).

COMMENT

In response to recommendations from academics,[14,16,20,63] college personnel,[64] and governmental institutions,[10,65] the present study aimed to advance research on and thus improve programmatic efforts toward, mental health promotion and prevention for college students. Specifically, this research utilized a prospective, quasi-experimental, cohort-controlled design to evaluate the effectiveness of a psychosocial wellness promotion seminar for first-year college students, in improving psychosocial adjustment and stress management.

Intervention participants demonstrated gains in psychosocial adjustment and stress management at the end of the academic year, compared with controls, specifically as assessed by their appraisals of perceived improvements since starting college (and the intervention). Furthermore, this research

TABLE 4. Group (Intervention Versus Control), Time (Pre- and Postintervention), and Interaction Effects, From Analyses of Variance (ANOVAs)

	Group effects				Time effects				Group × Time effects			
Measure	*df*	*F*	η^2	*p*	*df*	*F*	η^2	*p*	*df*	*F*	η^2	*p*
Psychosocial Adjustment												
Positive well-being	1, 47	0.48	.010*	.491	1, 47	0.00	.000	.962	1, 47	0.80	.017*	.375
Negative distress	1, 47	0.09	.002	.770	1, 47	0.08	.002	.782	1, 47	1.19	.025*	.280
Stress Management												
Adaptation to college	1, 48	0.04	.001	.839		—	—	—		—	—	—
College-related stress	1, 48	0.77	.016*	.386		—	—	—		—	—	—
Perceived Improvements												
Psychosocial adjustment	1, 49	4.82*	.090**	.033		—	—	—		—	—	—
Stress management	1, 49	8.43**	.147***	.006		—	—	—		—	—	—

Note. Intervention group: $n = 29$ (for Perceived Improvements analyses); $n = 28$ (for Adaptation to College and College-Related Stress); $n = 27$ (for Positive Well-Being and Negative Distress). Control group: $n = 22$.
*$p \leq .05$, $\eta^2 \geq .01$.[62]
**$p \leq .01$, $\eta^2 \geq .06$.[62]
***$p \leq .001$, $\eta^2 \geq .14$.[62]

demonstrated an interesting pattern of benefits from different aspects of engagement in the intervention. Specifically, higher levels of attendance and skills practice contributed to enhanced psychosocial adjustment and stress management over the academic year, above and beyond assessed baseline levels.

Detecting Intervention Impact

Compared with controls, intervention participants reported that they experienced greater improvements in psychosocial adjustment and stress management, across the academic year. Although the intervention yielded strong benefits for participants' perceived improvements in these domains, it did not

TABLE 5. Results of Multiple Regression Analyses Using Intervention Engagement to Predict Psychosocial Adjustment, Stress Management, and Perceived Improvements

	Overall model		Attendance			Student-rated skills practice			Facilitator-rated skills practice (homework)			Didactic mastery (readings)		
Measure	ΔR^2	ES	β	*p*	ES	β	*p*	ES	β	*p*	ES	β	*p*	ES
Psychosocial adjustment														
Positive well-being	.471	***	.50	.004	***	.55	.005	***	.13	.412	*	.03	.870	
Negative distress	.450	***	−.63	.000	***	−.41	.002	**	−.15	.178	*	−.00	.993	
Stress management														
Adaptation to college[a]	.527	***	.60	.001	***	.51	.013	***	.08	.662		.06	.728	
College-related stress[a]	.523	***	−.56	.002	***	−.66	.002	***	.17	.343	*	.03	.883	
Perceived improvements														
Psychosocial adjustment composite[a]	.216	**	.14	.483	*	.52	.024	***	−.01	.947		−.15	.527	*
Stress management composite[a]	.303	***	.28	.159	*	.60	.007	***	−.01	.973		−.27	.221	*

Note. For outcomes with baseline measures (psychosocial adjustment, both positive well-being and negative distress), the regression models included a prior step adjusting for the relevant outcomes. ΔR^2 = change in R^2 value on entry into the regression analysis following entry of pretest levels of the outcome measure (or R^2 value if no prior step). β = standardized beta coefficients from the step of entry in regression analyses. ES = effect size according to Cohen's[62] guidelines: *$\beta \geq 0.10$ (small effect), **$\beta \geq 0.30$ (medium effect), ***$\beta \geq .50$ (large effect), and R^2 values, *$R^2 \geq .01$ (small effect), **$R^2 \geq .09$ (medium effect), and ***$R^2 \geq .25$ (large effect). *n*s range from 25 to 27 (intervention group only).
[a]These measures were not relevant prior to starting college, so were not assessed at baseline (preintervention). Thus, these regression models consisted of 1 step, including the 4 aspects of engagement as simultaneous predictor variables, predicting the end-of-intervention outcomes (no baseline adjustment).

exhibit detectable gains in the other assessments of psychosocial adjustment and stress management. Notably, perceived improvements were assessed on a relative scale (from *Worse* to *Same* to *Better*), whereas the other measures used an absolute scale (eg., from *Not at all* to *Very much*; see Table 1). Absolute scales have been found to have weaker predictive validity in comparison with relative scales,[66] and thus may be less sensitive in assessing change, detecting group differences, and evaluating program impact. Furthermore, as many of the standard scales used in the present study were designed to assess fairly stable psychological characteristics, they may be less sensitive in detecting the type and degree of change that are likely to result from a universal intervention for a relatively healthy sample.[67,68] Indeed, given that universal prevention programs are conducted with generally healthy samples, it is not uncommon for well-established assessment tools to fail in detecting certain types or degrees of intervention impact.[69–71] As the current results show, assessing change in other ways, such as by having participants rate their perceived degree of change, can reveal important psychosocial benefits that would otherwise go undetected.[72]

Benefits of Intervention Engagement

Predicting psychosocial adjustment and stress management from engagement revealed a strong pattern of findings, such that greater engagement in the intervention generally contributed to enhanced psychosocial adjustment and stress management over time, after adjusting for baseline levels when relevant. However, the effects varied for the 4 aspects of intervention engagement. It is interesting to note that attending the intervention sessions contributed to beneficial outcomes in both psychosocial adjustment and stress management, but that engaging in skills practice *beyond* intervention sessions (as reported by students themselves) additionally predicted perceived improvements in these domains.[73] In contrast, didactic mastery (reading assignments) and facilitator-rated skills practice (homework) did not significantly predict any of these outcomes over the academic year. These findings suggest that engaging in the intervention with a mastery or intrinsic (eg, practice-focused) orientation, as opposed to a performance or extrinsic (eg, homework-focused) orientation, might be key to reaping the benefits of a psychosocial wellness promotion program.[74,75] These results also replicate what is generally known about promotion and prevention programs, namely that knowledge alone might not be sufficient to produce desirable outcomes.[76] Finally, these findings underscore the importance of considering the manner and conditions under which researchers assess engagement, and of evaluating multiple types of engagement.

Strengths and Limitations

The current study aimed to improve on previous research in this area in several ways, yet there also are areas for improvement in future research. First, the present study's sample size yielded sufficient power to detect only medium to large effects. In the face of this challenge, this research demonstrated a strong pattern of findings, particularly for the benefits of intervention engagement. Second, whereas several other college-student interventions take place outside of class, this intervention was designed to fit within an existing college course structure, making it less susceptible to attrition, and more portable and generalizable for various college student groups and campuses. At the same time, because this intervention has only demonstrated benefits in one sample, from one college campus, future research is needed to verify this generalizability.

Third, by utilizing a prospective (pre–post), quasi-experimental, cohort-controlled design, with a control group that demonstrated no demographic or psychosocial differences at baseline, the present findings reasonably can be attributed to the intervention, rather than self-selection effects.[37,38,77] Of course, a randomized design would be ideal for determining whether demonstrated benefits could be attributed to the intervention. Yet, random assignment is rare in college student mental health promotion research, and even in cases of random assignment, other research has demonstrated more baseline differences than in the present study.[42] Certainly, self-selection could yield a group of students who are more open to engaging with the intervention, compared with a random sample of students. However, having students elect to participate in the seminar, rather than being randomly assigned to it, makes the intervention more realistic to implement and more readily translatable to other college settings.[34,78]

Fourth, although most of the measures in the present study were based on self-report methods, this research assessed a wide variety of processes (including diverse aspects of intervention engagement, only one of which was self-reported) and outcomes (including pre- and postintervention ratings on established scales of psychosocial adjustment and stress management, as well as participants' ratings of changes they perceived in these domains). Future research would do well to incorporate such a variety of assessment tools in order to capture the diverse ways in which intervention impact might surface.[46,79]

Conclusions

Theoretical Contributions

The present study contributes to a growing body of literature on the value of mental health promotion and prevention for college students by demonstrating benefits of effective engagement in a psychosocial wellness promotion intervention. Consistent with previous research, the present study demonstrates a mixed pattern of effects of engaging college students in a mental health promotion program. Intervention participants only exhibited gains over controls in perceived improvements, yet engagement in the intervention (most notably, students' engagement in skills practice) predicted benefits across all outcomes assessed. Attending the intervention also demonstrated several benefits for psychosocial adjustment and stress management, but didactic mastery and facilitator ratings of skills practice did not. As

this pattern of results suggests, the benefits of the intervention might be limited by the nature and degree to which students engage. Indeed, variability in students' engagement might explain the inconsistent findings on the effectiveness of mental health prevention and promotion interventions for college students, both in the present study and elsewhere. Future research should build on this use of various assessment methods to determine which measures of engagement most effectively capture participants' involvement in the intervention. In addition, research should continue to assess multiple aspects of engagement to determine which aspects most effectively contribute to beneficial outcomes.

Practical Applications

Given the importance of intervention engagement demonstrated in this study, scholars and practitioners can work together to enhance student engagement in effective interventions. For example, interventions like the present one might show even greater benefits by addressing engagement more directly, such as by allowing students to set goals for themselves and take ownership of these goals and the related skills they practice. The present findings suggest that such improvements in engagement would likely yield greater benefits in psychosocial adjustment and stress management.

Given challenges faced by college mental health services,[17] and a push toward preventive, small-group programs,[16,20,63] many college campuses could benefit from empirically supported, generalizable, and portable interventions. Course-based interventions, such as the one in the present study, show particular promise for meeting the needs of a broad range of college students; importantly, this type of intervention holds appeal for students who face reservations or challenges in seeking needed mental health services. Furthermore, as an intervention that demonstrates effectiveness with a healthy sample, it may have an even greater impact on participants at risk for psychosocial adjustment difficulties.[69–71,80] Finally, by taking a universal approach, this intervention can be applied to—or customized for—different campuses, contexts, and special populations.

Ultimately, mental health promotion and prevention interventions such as this one are designed to reduce the occurrence of mental health and adjustment problems in college students, and thus to minimize the overwhelming burden faced by many campus health services. Ideally, this research will continue to inform practice on college campuses, so that all students can have the opportunity to improve their psychosocial adjustment and stress management during this critical developmental period.

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NOTE

For comments and further information, address correspondence to Colleen S. Conley, Department of Psychology, Loyola University Chicago, 6525 N. Sheridan Road, Chicago, IL 60626, USA (e-mail: cconley@luc.edu).

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