The Evaluation of a Mind/Body Intervention to Reduce Psychological Distress and Perceived Stress in College Students

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Abstract. The authors examined the effect of a 6-week mind/body intervention on college students' psychological distress, anxiety, and perception of stress. One hundred twenty-eight students were randomly assigned to an experimental group (n = 63) or a waitlist control group (n = 65). The experimental group received 6 90-minute group-training sessions in the relaxation response and cognitive behavioral skills. The Symptom Checklist-90-Revised, Spielberger State-Trait Anxiety Inventory, and the Perceived Stress Scale were used to assess the students' psychological state before and after the intervention. Ninety students (70% of the initial sample) completed the postassessment measure. Significantly greater reductions in psychological distress, state anxiety, and perceived stress were found in the experimental group. This brief mind/body training may be useful as a preventive intervention for college students, according to the authors, who called for further research to determine whether the observed treatment effect can be sustained over a longer period of time.

Key Words: cognitive behavioral therapy, college students, randomized clinical trial, relaxation response, stress

Stress is a major issue for college students as they grapple with a variety of academic, personal, and social pressures. In annual surveys between 1985 and 1995, increasing numbers of students reported feeling overwhelmed.[1] Although a certain level of stress is necessary and results in improved performance, too much stress negatively affects health.[2–4] In this study, we sought to evaluate the effectiveness of a simple mind/body intervention in reducing some of the negative psychological impacts of stress in a college population.

Over the 100 years since Walter Cannon[5] identified the fight or flight response as the physiological reaction to a threat, the concept of stress has been extensively researched and discussed. In college students, increases in stressful life events have been shown to be associated with anxiety and depression,[6] and the level of stress experienced by college students has been documented as a predictor of suicidal ideation and hopelessness.[7] Research in college students supports a relationship between heightened levels of stress and behavior patterns that may compromise health.[8,9] Excess stress also influences physical health. It is now widely believed that the cause of many disease conditions is a complex interaction among genetic and behavioral factors, and stress.[10,11] In college students, excess stress is associated with increases in headaches,[12] sleep disturbances,[13,14] and the common cold.[15]

Given these findings, an effective approach to managing stress in college populations is called for. In our study, we used a prospective randomized controlled design to evaluate the effect of a 6-week mind/body intervention on a self-selected group of students. The skills taught in the intervention can be broadly divided into relaxation response and cognitive behavioral techniques.

The Relaxation Response

The relaxation response (RR) is an integrated set of physiological changes that are the opposite of the fight or flight (stress) response described by Cannon[5] in 1914. These include decreases in oxygen consumption, heart rate, arterial blood pressure, and respiratory rate,[16] and changes in central nervous system activity.[17] The fight or flight response is triggered automatically by physical or psycho-

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logical stress. By contrast, one can consciously elicit the RR by repeating a word, sound, prayer, phrase, or muscular activity while passively ignoring distracting thoughts.[18]

In addition to immediate physiological effects, regular elicitation of the RR has been associated with more enduring changes. Studies by Hoffman[19] and Lehmann[20] suggest reduced responsivity to the stress hormone norepinephrine after 4 to 6 weeks of daily RR practice. In essence, regular practice of the RR increases one's resilience to stress.

Clinical interventions based on elicitation of the RR have been successfully used to treat a variety of medical disorders that may be caused or exacerbated by stress, including anxiety,[21] insomnia,[22] pain,[23] and diseases with a psychosomatic component.[24]

Cognitive Behavioral Techniques

Cognitive behavioral interventions (CBI) are based on the premise that emotions are influenced by thoughts and that many negative thoughts often contain distortions and exaggerations.[25,26] In fact, many believe that at times stress is caused more by the way we think about a problem than by the problem itself.[27] By becoming aware of negative thoughts and challenging them, an individual can break the cycle whereby thoughts contribute to negative emotional states. Research has shown that CBIs are effective in treating depression,[28] anxiety,[29] and panic disorders.[30]

Studies in College Students

Although higher education communities are increasingly implementing programs to address student stress, the lack of rigorous research evaluating their impact has been surprising. Few researchers use validated health-outcome measures; and even fewer use a randomized controlled design. We found only 4 studies measuring psychological outcomes and meeting these criteria, and 3 of the 4 focused on specific student populations. Two studies in nursing students demonstrated benefits: Heaman[31] demonstrated that a 5-week relaxation response and cognitive intervention significantly decreased anxiety (N = 40), and Johansson[32] evaluated a 6-session (RR and CBI) program (N = 76) and found significant reductions in anxiety and depression. In a study of behavioral medicine students (N = 28), Astin[33] showed a decrease in psychological distress following an 8-session mindfulness intervention. In the fourth study, Nicholson and colleagues[34] examined the effect of a 3-session stress management program on general well-being and anxiety in college students (N = 56) and failed to show significant effects.

Our goal was to expand on previous research by offering our intervention across the college population and to use a combination of validated measures to give a broader picture of psychological distress and perceived stress. The intervention we used was based on validated clinical programs[22–24] that had been adapted and pilot tested in the college population. Our experience, together with student feedback, led us to believe that a program consisting of 6 90-minute sessions would be optimal. It would allow us to cover the curriculum and give students support in making behavioral change without putting excess demands on their time. We hypothesized that college students who attended a 6-week RR and CBI intervention would demonstrate reductions in psychological distress, anxiety, and the perception of stress. In addition, the students would increase health-promoting behaviors, compared with those in a waitlist control group.

METHOD

Outcome Measures

Our primary outcome measure was change in psychological distress measured by the Global Severity Index of the Symptom Checklist-90-R from baseline to postintervention. Secondary measures were changes in anxiety, measured by the State Trait Anxiety Inventory; in perceived stress, measured by the Perceived Stress Scale; and in health-promoting behaviors, measured by the Health-Promoting Lifestyle Profile II.

Recruitment

After obtaining approval from the University Institutional Review Board, we recruited students through the use of direct mail, fliers posted on campus, and an advertisement in the college newspaper. The study program was called Maximize Your Potential. We offered students a $25 stipend for their participation. Approximately 150 students expressed interest, and 130 came to the university health services, where we told them individually about the study. Of those, 128 students signed an informed-consent form and completed the baseline battery of assessment tools. Every student received an informational sheet explaining counseling services available at the school.

We randomly assigned 128 students (51 men and 77 women) to experimental or control conditions, and all completed the pretraining assessments. A majority of the students were undergraduates: 25% were freshman/sophomores, 41% were junior/seniors, and 34% were graduate students. Their ages ranged from 17 to 60 years (M = 24 y, median = 21 y).

Students in the control group (n = 65) received no intervention during the study and were put on a waiting list. Students in the experimental group (n = 63) attended 6 90-minute weekly group-training sessions. Each member of the training team, which consisted of staff members from both the Mind/Body Medical Institute and the University Health Services (UHS), conducted evening sessions at UHS. Students selected 1 of 3 evenings to attend the training group and were encouraged to attend all sessions; we allowed them to switch evenings when they encountered scheduling conflicts.

Intervention

The intervention covered the curriculum outlined in Table 1. The format of the 6 sessions was consistent across the 3 training groups. Trainers followed a training manual. Each 90-minute training session consisted of the following:

- lecture, discussion, and demonstration of new material
- group discussion of weekly practice
- experience of mind/body (RR and CBI) skills

TABLE 1
Contents of a 6-Week Mind/Body Intervention for College Students

Relaxation-response-based skills	*Cognitive behavioral interventions*
Diaphragmatic breathing	Identifying automatic thoughts
Guided imagery	Challenging cognitive distortions
Progressive muscle relaxation	Affirmations
Brief relaxation exercises ("minis")	Goal setting
Yoga stretches	
Mindfulness	
Lecture and discussion topics	*Individual practice*
Stress, stress symptoms, and coping	Daily relaxation-response practice
Mind/body connection	Completion of practice log
Physiology of stress and the relaxation response	
Weekly discussion of relaxation practice	

The emphasis was on teaching a variety of RR and CBI skills that each student could integrate into his or her life on a regular basis. We gave students a manual covering the course curriculum and a CD with a selection of 10-minute RR exercises. They were encouraged to practice skills outside the sessions and were asked to complete daily logs recording RR practice that they would submit each week. The trainer also sent weekly relaxation reminders to each participant by e-mail.

During the week following the final session, trainers readministered the questionnaire battery to both experimental and control groups. The full 6-week training program was then offered to the control group.

Measures

- Symptom Checklist-90-Revised (SCL-90-R)
- Spielberger State-Trait Anxiety Inventory (STAI)
- Perceived Stress Scale (PSS)
- Health-Promoting Lifestyle Profile II (HPLPII)
- A demographic and health habits survey

Psychological Distress

The SCL-90-R[35] is a widely used standardized psychological inventory measuring current psychological distress. It consists of 90 questions, each rated on a 5-point Likert-type scale for increasing level of distress, ranging from *not at all* (0) to *extremely* (4). Scoring the SCL-90-R yields 3 global indices of distress: Global Severity Index, Positive Symptom Distress Index, and Positive Symptom Total. The 9 factor scores are somatization, obsessive-compulsiveness, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. We chose the Global Severity Index (GSI) as the primary outcome measure because it is the best indicator of current psychological distress.

We used adult nonpatient norms for scoring. College students have been reported to score higher on the SCL-90-R than do adult samples.[36] However, because the mean age of our student sample was 24 years and the sample also included a group of graduate students, we decided to use adult norms. Internal consistency coefficients for SCL-90-R subscales are satisfactory, ranging from .79 to .90. Test-retest reliability is in the range of .80 to .90.

Anxiety

The STAI[37] is a widely used self-report anxiety scale consisting of 20 "state" and 20 "trait" statements. State anxiety is a measure of how participants feel at the current moment, whereas trait anxiety is a measure of how they generally feel. Participants can choose responses ranging from *not at all* (1) to *very much so* (4). Scores for each scale range from 20 to 80. The test-retest reliability for the state scale ranges from .16 to .62 and is higher for the trait scale, which ranges from .65 to .86.

The Perceived Stress Scale[38] is a 14-item self-report scale that measures the degree to which situations in one's life are perceived as stressful. Respondents are asked to rate on a 5-point scale how often they have felt or thought a certain way, ranging from *never* (0) to *very often* (4). PSS has been validated for use with college students. Internal consistency coefficients for the PSS range from .84 to .86, and test-retest reliability is .85.

The HPLPII[39] uses 52 questions, each rated on a 4-point scale, to measure health-promoting behaviors. Its 6 subscales are health responsibility, interpersonal relations, nutrition, physical activity, spiritual growth, and stress management. Reliability coefficients for the subscales range from .702 to .904. We obtained the total score by averaging the scores of all 52 questions. The alpha coefficient for this score is .922.

RESULTS

Characteristics

At entry to the study, the students reported experiencing high levels of stress. More than two thirds of the sample (69%) reported "having excessive stress," and nearly two

thirds (62%) rated themselves as being "more anxious than most people." Insomnia, commonly associated with stress, was identified as a current problem by nearly one third (31%) of the students, and nearly one half (45%) said that they did not feel rested upon awakening. At entry into the study, 49 (38%) students reported using some form of relaxation, and 62 students (48%) said that religious or spiritual practice was important to them.

Training

Of the 128 randomly assigned participants, 90 (70%) completed both the pre- and posttraining assessments (46 from the intervention group and 44 from the control group). However, 38 (30%) discontinued participation or dropped out of the study (17 from the intervention group and 21 from the control group). Students who gave a reason for dropping out of the study cited lack of time to attend the training sessions or conflict with other activities as the primary reasons for their discontinuing participation. Of the 46 intervention participants who completed the pretest and posttraining questionnaires, 20 (43%) attended all 6 training sessions, 21 (46%) attended 3 to 5 sessions, 5 (11%) attended 2 or fewer sessions.

TABLE 2
Preintervention Scores for Students Who Completed Pre- and Postintervention Assessments and for Students Who Dropped Out of the Study

	Completed (n = 90)		Dropped out (n = 38)	
Measure	*M*	*SD*	*M*	*SD*
SCL-90-R				
GSI	64.07	10.34	64.68	9.99
STAI				
State	45.39	12.44	45.13	11.78
Trait	47.77	11.87	49.16	10.96
PSS				
Total	29.86	8.42	29.70	6.18
HPLPII				
Total	2.44	0.45	2.45	0.37

Note. SCL-90-R = Symptom Checklist-90-Revised; GSI = Global Security Index; STAI = Spielberger State-Trait Anxiety Inventory; PSS = Perceived Stress Scale; HPLPII = Health-Promoting Lifestyle Profile II.
All *p*s > .10.

Statistical Analyses

We found no baseline differences between the experimental and control groups on any of the psychological measures or on any of the demographic variables (age, gender, stress, insomnia, overall health, use of spiritual practices or relaxation, and substance use). There were no baseline differences for students who completed pre- and posttraining assessments compared with those who dropped out of the study (see Table 2). In addition, we found no correlation between the number of training sessions students attended and their change scores on any of the psychological measures. We used SPSS statistical software, version 10.0, to analyze the data.

Primary Outcome

For the primary outcome measure, change in GSI score, we used an intent-to-treat analysis, assigning a 0-change score for values missing as a result of students' dropping out of the study. This stringent analysis is often used in clinical trials. We calculated change scores by subtracting the posttraining score from the preassessment score. The results indicated a significant improvement ($p < .018$) on the GSI for the intervention group, compared with the control group (see Table 3). In order that primary and secondary outcomes may be compared, we also report GSI scores for those students who completed both pre- and posttests. For the experimental group, the mean GSI fell from 64.15 to 58.00 postintervention, a change score of 6.15. For the control group, the GSI fell from 63.97 to 61.20, a change score of 2.77. The difference in change scores was statistically significant ($p < .025$).

TABLE 3
Pretraining Score and Change Score Means for the Primary Outcome Variable Global Severity Index (GSI) From the Symptom Checklist-90-Revised (SCL-90-R)

	Pretraining				Change score +				
	Intervention (n = 63)		Control (n = 65)		Intervention (n = 63)		Control (n = 65)		
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*p*
SCL-90-R (GSI)	63.92	10.67	64.57	9.79	4.49	7.23	1.88	4.84	.018*

Note. A decrease in SCL-90-R scores denotes an improvement on the scale.
+A change score of 0.0 was used in calculating the mean change score for all subjects who did not complete the postassessment (Intervention n = 17 and Control n = 21).
*$p < .05$.

TABLE 4
Pre- and Postintervention Score Means and Change Score Means for the Secondary Outcome Variables: The State-Trait Anxiety Inventory (STAI), the Perceived Stress Scale (PSS), and the Health Promoting Lifestyle Profile II (HPLPII)

	Intervention				Control				Change score				
	Pre (n = 46)		Post (n = 46)		Pre (n = 44)		Post (n = 44)		Intervention (n = 46)		Control (n = 44)		
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*p*
STAI													
State	45.39	13.00	35.57	11.06	45.84	12.13	43.93	12.79	9.82	12.07	1.55	11.39	.001**
Trait	48.02	11.87	42.44	11.49	47.64	12.28	45.24	11.36	5.58	5.51	2.41	6.60	.017
PSS													
Total	30.24	8.55	25.13	8.50	29.45	8.37	27.89	8.64	5.11	7.39	1.57	4.63	.008**
HPLPII													
Total	2.45	0.41	2.62	0.40	2.42	0.48	2.48	0.45	0.17	0.27	0.05	0.22	.022

Note. Data are presented only for students who completed both the pre- and posttraining assessments.
**Significant after the Bonferroni adjustment for multiple comparisons ($p < .0125$).

Secondary Outcomes

We used data only from students who had completed both the pre- and posttraining assessments in our analysis for secondary outcomes. Because we conducted multiple secondary measures, we applied a Bonferroni correction, which resulted in a more stringent significance level ($p < .0125$). When we used this standard, we found significant decreases on 2 of the secondary outcomes: state anxiety as measured by the STAI and perceived stress as measured by the PSS (see Table 4). Differences on the trait anxiety and HPLPII indicated trends toward improvement for the intervention group, but they did not reach statistical significance.

COMMENT

Our findings in this study support our hypothesis that college students who attended a 6-week RR and CBI intervention would demonstrate reductions in psychological distress, anxiety, and the perception of stress, compared with a waiting list control group. Our findings confirm those of authors who have previously demonstrated reductions in anxiety[31,32] and also expand their findings beyond nursing students to the general college population. By showing a pattern of reduced psychological distress, anxiety, and perceived stress, the findings also expand on previous research.[31–34] We found a trend toward increases in health-promoting behaviors, but it did not reach statistical significance.

Although the title of our program, Maximize Your Potential, did not mention stress, the majority of students who chose to enroll reported having "excess stress." This self-report was supported by mean scores for state anxiety that were above the normal mean for college students[37] and mean scores for psychological distress considered high according to adult outpatient norms.[35] The clinical relevance of our program is supported by the finding that, after the students participated in the intervention, the elevated mean scores for state anxiety fell to below the mean for college students and the mean GSI fell into the nonclinical range for adults.

As long ago as 1982, a survey conducted at the University of Pittsburgh showed that students were more interested in learning how to manage stress than in any other health program.[40] Psychological distress is widespread on college campuses and some students who may be reticent to seek counseling may be more willing to avail themselves of mind/body programs. In view of the high stress levels on college campuses and the negative impact of excess stress on both health and behavior, we suggest that offering validated programs to address this problem is of the utmost importance for colleges.

Study Limitations

Although our study validates a brief RR and CBI intervention, it is important to point out some limitations. First, students who elected to take part in the study were self-selected and may not represent the college campus as a whole. Our sample had a higher proportion of women and a relative predominance of undergraduate students because we aimed our recruitment efforts toward undergraduates. Unless such programs become an integral part of student orientation or are otherwise made compulsory, participants will always be self-selected. In future studies, it would be interesting to examine how self-selected students might differ from the campus population at large.

Second, the 30% dropout rate could have had an effect on the outcome if students who dropped out were significantly different from those who remained in the study. It is, however, reassuring that participants who dropped out of the study did not differ significantly from the rest of the sample on any of the baseline measures.

Third, despite our having allowed students to switch training groups in an attempt to improve attendance, only 43% of the students attended all 6 training sessions. Students cited scheduling conflicts, too much work, and midterm exams as their main reasons for missing sessions. Analysis showed no correlation between the number of sessions a student attended and the change scores on any of the psychological measures. This may not be surprising because even during weeks when they were unable to attend, most students continued to maintain logs of relaxation practice. In future studies, attendance may improve if we do not schedule training during midterm periods.

Fourth, the study sample included a broad age range of students. Given the potentially wide range in stress levels and health conditions across these age groups, it may be important to look separately at undergraduate and graduate students in future studies. Finally, our intervention combined training in a variety of mind/body skills with group support and daily skill practice. We made no attempt to identify the relative efficacy of the different components.

Conclusion

We evaluated a reproducible, easily implemented, low-cost intervention in reducing psychological distress, anxiety, and the perception of stress in a self-selected student population. Our findings indicate that a 6-week RR and CBI training program for students can significantly reduce self-reported psychological distress, anxiety, and the perception of stress. In addition, we found a trend toward improvements for the intervention group on trait anxiety and health-promoting lifestyle profiles. Future studies should examine the sustainability of the effect of this intervention over time and determine whether students need continued support if they are to maintain the benefits they reported.

NOTE

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