

iRest Yoga-Nidra on the College Campus: Changes in Stress, Depression, Worry, and Mindfulness

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Abstract

Objectives: There is evidence that yoga practice is associated with decreased stress, worry, and depression, and with improved mindfulness-based skills. These findings had not been previously replicated for a sample of college students. This study evaluated whether iRest yoga-nidra practice was associated with reduced perceived stress, worry, and depression, and increased mindfulness in a sample of college students. **Methods:** Sixty-six students age 18–56 completed an 8-week iRest yoga-nidra intervention that was offered for 8 semesters. Assessment occurred 1 week prior to intervention onset and during the class period following the intervention. Qualitative data were collected at Weeks 4 and 8. **Results:** Statistically significant pre- to posttest improvements in perceived stress, worry, and depression were found. Preexisting depression accounted for most of the change in worry and perceived stress scores. Pre- to posttest improvements in mindfulness-based skills were also detected. **Conclusions:** iRest yoga-nidra practice may reduce symptoms of perceived stress, worry, and depression and increase mindfulness-based skills.

Key Words: yoga, iRest, yoga-nidra, perceived stress, depression, worry, mindfulness, college students

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Each year thousands of college students across the United States complete the American College Health Association-National College Health Assessment (ACHA-NCHA-II). Stress, anxiety, and depression are consistently identified as the top factors that have a negative impact on academic performance. The most recent ACHA-NCHA-II survey reported that nearly 50% of respondents experienced overwhelming anxiety and 29.5% indicated that intense depression made it difficult to function (ACHA-NCHA-II, 2012). Nearly one-third of all American college students seek mental health counseling every year (Sieben, 2011). Of those, 1.6 million reported that their primary concerns had to do with anxiety and stress (National Association of Student Personnel Administrators, 2012).

University and college health centers struggle to address this mental health burden by using traditional interventions. There is also an increasing national trend to use contemplative practices, such as yoga and mindfulness meditation, to help manage stress-related difficulties (Woodyard, 2011). This study investigated the effects of iRest, or Integrative Restoration, yoga-nidra practice on college students' stress, depression, worry, and mindfulness skills. iRest is a form of mindfulness meditation that was developed as a secular, 10-stage protocol that consists of a combination of relaxation techniques, Western psychology principles, Patanjali's Yoga Sutras, and Swami Satyananda Saraswati's yoga-nidra (Miller, 2006).

Yoga and Mental Health Outcomes

Although much of the yoga therapy literature focuses on the physical benefits of yoga practice, such as strength, flexibility, and managing chronic disease, positive effects on psychological well-being and symptom reduction have also been found (McCall, 2007). There is growing evidence that contemplative practice is associated with a significant reduction in anxiety, psychological distress, and perceived stress among a general college student population (Black, Milam, & Sussman, 2009; Caldwell, Harrison, Adams, Quin, & Greeson, 2010; Deckro et al., 2010; Oman, Shapiro, Thoresen, Plante, & Flinders, 2008). A study that compared the pre- to posttest ratings of stress and mood by a sample of 15 college-age women following a 60-minute class revealed that both yoga and exercise were associated with significant improvements in mood and reductions in stress (Robson, 2011). A similar study of 79 college students showed that students enrolled in a 10-week yoga class reported an immediate and long-term pre- to postclass reduction of perceived stress (Wheeler & Wilkin, 2007).

Studies of the impact of yoga alone on a college population are fairly limited. One small study with graduate health science students found associations between participation in one 30-minute restorative yoga class that included light stretching, deep breathing, and meditation and decreases in blood pressure and psychological stress (Rizzolo, Zipp, Stiskal, & Simpkins, 2009). Another study of 128 students revealed that psychological distress, state anxiety, and perceived stress were reduced for those participating in six weekly sessions of yoga stretches and

mindfulness exercises, compared with controls (Deckro et al., 2010). Practices typically consisted of gentle physical postures, breath work, relaxation techniques, and mindfulness meditation. It is unclear which aspects of the yoga program contributed to a reduction in stress-related factors.

Several randomized trials have shown that yoga is effective for reducing anxiety (Smith, Hancock, Blake-Mortimer, & Eckert, 2007). Adults suffering from chronic low back pain who were randomly assigned to a 7-day comprehensive residential yoga program that consisted of *asanas*, *pranayamas*, meditation, yogic counseling, and philosophy reported reduced anxiety, depression, and pain, compared with controls (Tekur, Nagarathna, Chametcha, Hankey, & Nagendra, 2012).

Studies have also shown that yoga practice may help decrease symptoms of depression (Bennett, Weintraub, & Khalsa, 2008). Pilkington, Kirkwood, Rampes, and Richardson (2005) analyzed the results of five randomized, controlled trials for individuals with depression. Each used a different form of yoga. Results consistently indicated an association between yoga practice and decreased symptoms of depression.

Mindfulness and Mental Health Outcomes

Many yoga studies that demonstrate positive effects on mental health outcomes include a mindfulness component. A large body of research provides evidence of the effectiveness of meditation and mindfulness practices for reducing negative mental health symptoms, including stress and anxiety, as well as enhancing psychological well-being in general and in clinical populations (Baer, 2003; Brown, Ryan, & Creswell, 2007).

The 8-week Mindfulness-Based Stress Reduction (MBSR) program developed by Jon Kabat-Zinn (1990) incorporates yoga and mindfulness meditation. Studies find MBSR to be associated with improved mental health outcomes for a variety of clinical populations (Kabat-Zinn, 2005). A randomized, controlled trial conducted with a college student sample revealed that mindfulness-based meditation using the MBSR model was linked to reduced distress and improved positive mood states (Jain et al., 2007). MBSR was also found to be associated with significant pre- to postintervention reductions of perceived stress, negative affect, rumination, and anxiety and significant increases in positive affect for a group of graduate counseling psychology students (Shapiro, Brown, & Biegel, 2007).

Mindfulness-based approaches have two central components: development of an observing attitude toward one's experience and cultivation of a nonjudgmental acceptance of what is being experienced without the need to change or act on it (Kabat-Zinn, 1996). The iRest protocol, developed by Richard Miller, Ph.D., a clinical psychologist and yoga scholar, is consistent with mindfulness practices in that the practitioner embraces a welcoming attitude in each moment. There is also an initial deep relaxation component that facilitates the opportunity to mindfully and intentionally work with specific emotions, thoughts, images, or memories that manifest as physical sensations.

The iRest protocol uses the *koshas*, or the layers of the self, as a focal point through structured practice. These include

annamaya kosha (body), *pranamaya kosha* (breath/energy), *manomaya kosha* (emotions/mind), *vijnamaya kosha* (intellect/wisdom), and *anandamaya kosha* (bliss). iRest yoga-nidra includes elements of yoga asana (awareness of the body) and pranayama practice (breath/energy) and mindfulness meditation (emotions, thoughts, witness).

To date, no published studies have directly examined the impact of this practice on college students' mental health, including stress, depression, worry, or acquisition of mindfulness skills. This study was designed to investigate the effects of an 8-week iRest intervention on these outcomes for college students. We hypothesized that college students would demonstrate reductions in stress, worry, and depression and an increase in mindfulness following an 8-week yoga-nidra intervention.

Although graduate students presumably experience unique stressors, such as the transition from college to graduate school, and increasing financial or family responsibilities (Peters, 1997), many studies do not assess differences between undergraduates and graduate students (Hyun, Quinn, Madon, & Lustig, 2006). We hypothesized that graduate students would demonstrate greater pre- to postintervention change in stress, depression, worry, and mindfulness than would undergraduates. Graduate students were anticipated to evidence lower levels of stress, depression, and worry and higher levels of mindfulness at posttest, compared with undergraduates.

Method

Participants

Participants were recruited via mass email, departmental listservs, and flyers from primary care and mental health provider referrals during eight semesters between spring 2008 and spring 2012. Informed consent forms were signed by 174 study participants. Complete data for only 66 participants (37 undergraduate, 29 graduate) for the five mindfulness scales and 40 participants (20 undergraduate, 20 graduate) for the stress, depression, and worry scales were obtained, however, because of tester error and high rates of attrition.

The sample was split by academic (undergraduate and graduate) status. Undergraduates ranged from age 18 to 23 years ($M = 20.11$, $SD = 1.39$). The majority of the undergraduate participants were female ($n = 29$, 78.4%). Students identified themselves as European American ($n = 31$), African American ($n = 1$), Asian American ($n = 1$), Latino/Hispanic ($n = 1$), or other ethnic group ($n = 3$). The level of meditation and yoga experience ranged from none to considerable. Graduate students ranged from age 23 to 56 years ($M = 30.07$, $SD = 8.86$). The majority were female ($n = 21$, 72.4%). Students reported themselves to be European American ($n = 23$), African American ($n = 1$), Latino/Hispanic ($n = 1$), multiracial ($n = 1$), or other ethnic group ($n = 3$). The level of meditation and yoga experience of the graduate respondents ranged from none to considerable.

Measures

Participants completed a series of paper-pencil surveys 1 week

before and immediately after the 8-week intervention. Following are details about the measures:

The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) is a 10-item, self-report scale used to measure the degree to which situations in one's life are perceived as stressful. Respondents rated how frequently they felt or thought a certain way on a 5-point scale ranging from 0 (*never*) to 4 (*very often*). The PSS has been validated for use with college students. Internal consistency coefficients range from 0.84 to 0.86, with test-retest reliability equal to 0.85. Internal consistency coefficient for this study was 0.81.

The Beck Depression Inventory (BDI; Beck, Steer, & Brown, 1996) is a 21-item self-report, multiple-choice format survey used to measure the presence and degree of depression for adults and adolescents. Respondents rated their experience during the past week on a scale ranging from 0 (*least severe*) to 3 (*more severe*). The internal consistency coefficient for this study was 0.88. Scores of 0 to 13 denote minimal depression, scores of 14 to 19 denote mild depression, scores of 20 to 28 denote moderate depression, and scores of 29 and greater denote severe depression (Beck et al., 1996). For this study, individuals with scores ranging from 1 to 13 were considered not depressed and those with scores of 14 or greater were categorized as depressed.

The Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) is a 16-item, self-report questionnaire used to measure the tendency, intensity, and uncontrollability of worry. Items are scored on a 5-point scale ranging from 1 (*not typical at all of me*) to 5 (*very typical of me*), yielding a possible range of scores from 16 to 80. Higher scores reflect a greater degree of worry. Data were collected for seven of eight semesters. The internal consistency coefficient was 0.67 (posttest) and 0.77 (pretest).

The Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) is a 39-item instrument used to measure mindfulness on five subscales: Nonreactivity to Inner Experience, Observing/Noticing/Attending to Perceptions/Feelings/Thoughts, Acting with Awareness, Describing/Labeling with Words, and Nonjudging of Experience. Responses are given on a 5-point Likert scale ranging from 1 (*never or rarely true*) to 5 (*very often or always true*). Each of the scales showed adequate to good internal consistency, with alphas ranging from .75 to .91. Data from the "Describe" subscale were not collected during one semester.

Participants also completed a brief, four-item qualitative assessment designed by the instructor, at the beginning of the fourth class and following the eighth class. Questions included, "Describe your experiences in the iRest class thus far," "Things I have noticed about myself since I started practicing iRest," "I want to know more about...", and "How often are you practicing iRest outside of class?"

Intervention

The yoga-nidra program consisted of weekly classes of approximately 2 hours each for 8 weeks. Each class began with an introduction or review of key concepts and discussion of home

practice experiences. Each guided yoga-nidra practice session lasted approximately 45 minutes and was followed by 10 minutes of silence to enable the participants to integrate their experience. Sessions concluded with each student moving, sitting up, and leaving at their own pace. Participants were encouraged to journal their experience at this time. Students were reminded before each class that the instructor would be available after class for questions or to help process their experience. They were also able to schedule individual appointments with the instructor as needed.

The first session consisted of an orientation of the class process, a brief overview of the iRest yoga-nidra practice and history, and the opportunity to voluntarily participate in the study. The instructor reviewed the significance of posture to optimize comfort and demonstrated what a typical posture may look like using props (blankets, bolsters, eye pillows). The next step involved identifying an inner resource, heartfelt desire, and intention that participants would use during yoga-nidra practice. An inner resource is a person, place, or image that a participant brings to mind that allows them to feel a sense of emotional safety. An inner resource is used to empower an individual if he or she feels overwhelmed by a sensation, thought, or emotion. It is experienced as a "felt sense" in the body.

The heartfelt desire is verbalized as a positive affirmation stated as a present reality. An example of a heartfelt desire from a participant experiencing anxiety may be, "I am calm." Setting an intention during a yoga-nidra practice is considered an important stage to help keep the practitioner focused and motivated. An example of an intention may be to stay awake and alert or to welcome whatever arises in the moment. The first class ended with a 20- to 25-minute guided yoga-nidra experience.

Each class began with a relaxation through body sensing and breath awareness exercise. Body sensing involves the practice of progressive muscle relaxation—tightening and releasing the muscles throughout the body and rotating one's attention through the physical body in a specific sequence from high to low sensorial areas. Breath awareness involves directing attention to the rising and lowering of the abdomen with each breath cycle, breath counting, or alternate nostril breathing. Each class also began with the inner resource, heartfelt desire, and intention and ended with witnessing pure awareness experienced as complete peace and equanimity.

Other stages of the iRest yoga-nidra protocol were introduced during the 8-week intervention, including working with conflicting emotions or beliefs and experiencing inner strength and joy. Students were provided an audio recording of the yoga-nidra practice that included specific practices that coincided with the introduction of a new concept and skill.

Although yoga-nidra is a guided meditation practice, there is an unguided self-inquiry component that helps students individually discover the practice. This facilitates the experience of emotions or beliefs that arise spontaneously that otherwise may go unnoticed in a directed exercise. Students may work with a particular emotion or belief that prevents them from experiencing their innate well-being. See Appendixes A and B for additional details.

Analyses

Data were analyzed using SPSS 20.0 (PASW, 2012). Chi-square, independent *t*-test, analysis of variance (ANOVA), and non-parametric (Mann-Whitney U) analyses were performed to evaluate differences between intervention completers and non-completers. Descriptive and frequency analyses were conducted to examine pre- and posttest averages and standard deviations for all the scales and scores of interest. A repeated-measures multivariate analysis of variance (MANOVA) was used to investigate pre- to posttest group differences for stress, depression, and worry. A post hoc repeated-measures multivariate analyses of covariance (MANCOVA) with pretest depression as a covariate was used to investigate pre- to posttest group differences for stress, depression, and worry, after accounting for the influence of pretest depression. Repeated-measures multivariate analyses of covariance (MANCOVA) were used to investigate pre- to posttest group differences for the five mindfulness scales. Previous yoga experience was entered as a covariate.

A probability (*p*) value of 0.05 or less indicated statistically significant change. Effect sizes were computed using partial eta squared (η^2), with values of .01, .06, and .14 representing small, medium, and large effect sizes, respectively (Weinfurt, 1995).

Results

Preexisting Group Differences

Chi-square, independent *t*-test, ANOVA, and nonparametric (Mann-Whitney U) analyses were performed to assess pretest differences on each of the dependent variables (stress, depression, worry, and the five mindfulness scales) between those who completed the 8-week program and those who did not. No statistically significant demographic differences (sex, academic standing, previous yoga or meditation experience) were found between program completers and noncompleters. Significant between-groups differences in the levels of stress, depression, worry, observing skills, and observing and describing mindfulness skills were detected. Completers reported lower levels of pretest stress, depression, and worry and higher levels on the observing and describing mindfulness scales (see Tables 1 and 2).

Table 1.
Descriptive Statistics Between Intervention Completers
(*n* = 40/*n* = 66) and Noncompleters (*n* = 45)

Measure	Completers		Noncompleters	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Previous yoga experience	1.30	.98	1.49	.87
Previous meditation experience	1.15	1.03	1.04	.85
PSS	20.52	5.64	23.54	3.38
BDI	12.87	7.94	16.80	9.74
PSWQ	49.88	9.39	56.09	10.31
FFMQ				
Nonreact	18.62	5.34	18.00	4.31
Actaware	23.92	5.73	25.54	5.39
Observe	26.73	6.48	23.15	6.36
Describe	26.30	6.16	23.50	3.83
Nonjudge	23.88	7.51	23.98	7.49

Note. PSS = Perceived Stress Scale; BDI = Beck Depression Inventory; PSWQ = Penn State Worry Questionnaire; FFMQ = Five-Facet Mindfulness Questionnaire; +*n* = 40 for PSS, BDI, & PSWQ; *n* = 66 for FFMQ.

Table 2.
Analysis of Variance for Pretest Differences Between
Completers

(*n* = 40/*n* = 66) and Noncompleters (*n* = 45)

Source	Sum of square	<i>df</i>	Mean of square	<i>F</i>	Partial η^2
Pre-PSS	248.593	1	248.593	10.591**	.088
Pre-BDI	407.048	1	407.048	5.345*	.048
Pre-PSWQ	716.821	1	716.821	7.436**	.092
Pre-FFMQ					
Nonreact	10.461	1	10.461	.428	.004
Actaware	71.073	1	71.073	2.275	.020
Observe	346.465	1	346.465	8.374**	.071
Describe	212.980	1	212.980	7.481**	.064
Nonjudge	.268	1	.268	.005	.000

Note. PSS = Perceived Stress Scale; BDI = Beck Depression Inventory; PSWQ = Penn State Worry Questionnaire; FFMQ = Five Facet Mindfulness Questionnaire; +*n* = 40 for PSS, BDI, & PSWQ; *n* = 66 for FFMQ; **p* < .05. ***p* < .01.

Univariate Mean-Level Differences

Pre- to posttest differences for the entire sample for all measures are reported in Table 3. Data from 40 participants (20 undergraduate and 20 graduate) were used for the PSS, BDI, and the PSWQ because of list-wise missing values. Significant pre- to posttest differences were detected for each of the scales (Table 3).

Table 3.
***t*-test Results Comparing Pre- and Postintervention**
Differences on Stress, Depression, Worry, and Mindfulness

Measure	<i>n</i>	Pre		Post		<i>t</i> -test
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
PSS	40	21.90	4.68	16.70	6.12	5.031***
BDI	40	13.85	7.93	4.62	5.37	8.287***
PSWQ	40	49.70	9.44	42.05	6.19	4.750***
FFMQ						
Nonreact	66	18.62	5.34	23.55	4.53	-8.809***
Actaware	66	23.92	5.73	25.92	5.88	-2.527***
Observe	66	26.73	6.48	30.77	4.89	-6.332***
Describe	66	26.30	6.16	29.12	6.29	-4.641***
Nonjudge	66	23.88	7.51	27.91	8.15	-3.844***

Note. Number of participants = 40 for PSS, BDI, and PSWQ because of list-wise missing values. PSS = Perceived Stress Scale, BDI = Beck Depression Inventory, PSWQ = Penn State Worry Questionnaire, FFMQ = Five Facet Mindfulness Questionnaire; **p* < .05, ****p* < .001.

Multivariate Analyses: Perceived Stress, Depression, and Worry

A repeated-measures MANOVA was used to examine the pre- to posteffects of intervention (time) on stress, depression, and worry by academic standing (undergraduate and graduate). A significant main effect for time, as well as significant interaction effects, were detected. Statistically significant omnibus pre- to postintervention differences were found for stress, depression, and worry, Wilks' λ = .383, *F*(1, 38) = 61.121, *p* < .001, partial η^2 = .617. The effect of time differed depending on the scale, Wilks' λ = .701, *F*(2, 37) = 7.894, *p* = .001, partial η^2 = .299.

The group (academic standing) by time interaction was not statistically significant (see Tables 4 and 5).

Table 4.
Repeated-measures Multivariate Analysis of Variance for Stress, Depression, and Worry by Academic Standing
 ($n = 20$ undergraduate, $n = 20$ graduate)

Effect	Wilks'λ	F	df ₁	df ₂	partial η ²
Time	.383	61.121***	1	38	.617
Time x Academic Standing	.995	.188	1	38	.005
Mental Health x Time	.701	7.894**	2	37	.299
Mental Health x Time x Academic Standing	.923	1.545	2	37	.077

** $p < .01$, *** $p < .001$.

Table 5.
Between-subjects Effects for Stress, Depression, and Worry, by Academic Standing
 ($n = 20$ undergraduate, $n = 20$ graduate)

Source	Sum of square	df	Mean square	F	partial η ²
Intercept	147659.204	1	147659.204	1399.174***	.974
Academic standing	3.038	1	3.038	.029	.001
Error	4010.258	38	105.533		

*** $p < .001$.

A repeated-measures MANCOVA using pretest depression as a covariate and pre- to postintervention differences on stress and worry was computed to examine the influence of pretest depression on intervention effects (time). The results were not statistically significant when controlling for pretest depression, Wilks' λ = .929, $F(1, 37) = 2.828$, $p = .101$. There were no between-groups differences by academic standing, Wilks' λ = .999, $F(1, 37) = .019$, $p = .890$. The interaction between time and pretest depression was not significant, Wilks' λ = .948, $F(1, 37) = 2.019$, $p = .164$ (see Table 6). This suggests that pretest depression explained most of the variance in pre- to posttest change in stress and worry.

Table 6.
Between-subjects Effects for Pre-BDI Score and Academic Standing
 ($n = 20$ undergraduate, $n = 20$ graduate)

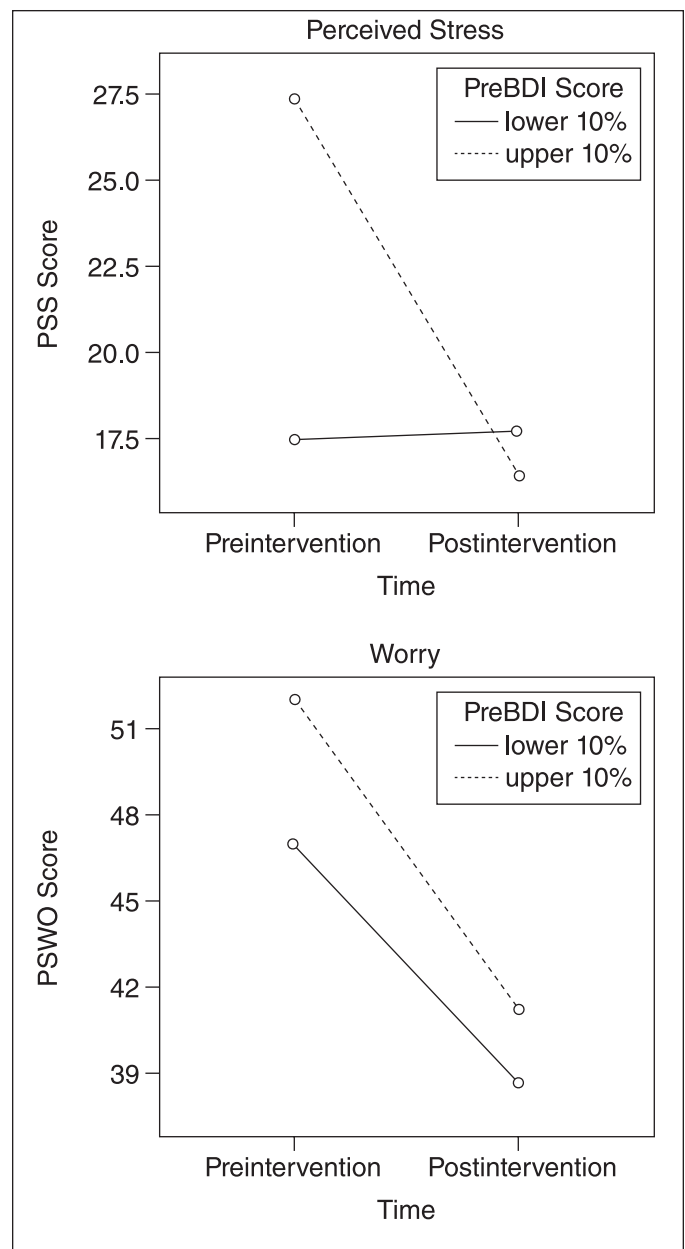
	Sum of square	df	Mean square	F	partial η ²
Intercept	32583.002	1	32583.002	476.228***	.928
Pre-BDI score	562.748	1	562.748	8.225**	.182
Academic standing	27.082	1	27.082	.396	.011
Error	2531.502	37	68.419		

** $p < .01$, *** $p < .001$.

Two groups were created using participants' pretest depression scores to more specifically examine the effect of depression on stress (i.e., upper and lower 10%). Those in the upper 10% of depression scores experienced a greater pre- to posttest change in stress than did those in the lower 10% of depression scores (see Figure 1).

Figure 1.
Display of Perceived Stress and Worry Scores at Pre- and Postintervention (Upper and Lower 10% pre-BDI).

The dotted line represents the change of the group mean of people who scored in the upper 10% for their pre-BDI score, indicating manifestation of relatively more depressive symptoms, whereas the solid line demonstrates people who scored in the lower 10% for their pre-BDI score, indicating manifestation of relatively less depressive symptoms.



Multivariate Analyses: Mindfulness

A repeated-measures MANCOVA was computed to test the effects of intervention (time) on the five mindfulness scales by academic standing (undergraduate and graduate). Previous yoga experience was included as a covariate to test the hypothesis that previous yoga practice would positively influence the acquisition of mindfulness-based skills (see Table 7). A significant main effect for time was detected. Significant pre- to posttest differences on an omnibus mindfulness score, Wilks' $\lambda = .971$, $F(1, 63) = 18.653$, $p < .001$, partial $\eta^2 = .228$, as well as on the five mindfulness subscales, were found after controlling for previous yoga experience, Wilks' $\lambda = .907$, $F(4, 60) = 1.542$, $p = .202$. Patterns of change over time were not statistically different across scales, depending on previous yoga experience, Wilks' $\lambda = .907$, $F(4, 60) = 1.809$, $p = .139$, or academic standing, Wilks' $\lambda = .924$, $F(4, 60) = 1.236$, $p = .305$. A series of post hoc repeated-measures ANOVAs were conducted to examine specific change by time effects for each of the five mindfulness scales (see Table 8). Significant pre- to posttest effects for each were detected.

Table 7.
Repeated-measures Multivariate Analysis of Covariance for Mindfulness Factor With Previous Yoga Experience and Academic Standing

($n = 37$ undergraduate, $n = 29$ graduate)

Effect	Wilks' λ	F	df_1	df_2	partial η^2
Time	.772	18.653***	1	63	.228
Time x Previous Yoga Exp.	1.000	.002	1	63	.000
Time x Academic Standing	.983	1.071	1	63	.017
Mindfulness x Time	.907	1.542	4	60	.093
Mindfulness x Time x Previous Yoga Exp.	.892	1.809	4	60	.108
Mindfulness x Time x Academic Standing	.924	1.236	2	60	.076
*** $p < .001$.					

Table 8.
Repeated-measures Analysis of Variance for Mindfulness Subscales

($n = 37$ undergraduate, $n = 29$ graduate)

Subscale	Sum of square	df	Mean square	F	partial η^2
Nonreact	800.189	1	800.189	77.594***	.544
Actaware	132.000	1	132.000	6.384*	.089
Observe	540.068	1	540.068	40.100***	.382
Describe	262.091	1	262.091	21.540***	.249
Nonjudge	536.030	1	536.030	14.776***	.185
* $p < .05$, *** $p < .001$.					

Qualitative Measures

Qualitative data were collected at Weeks 4 and 8. A review of participants' responses revealed that many felt more relaxed, calmer, were better able to sleep, and noticed an improvement in their body awareness. Many perceived an increased ability to gain perspective and manage their emotions, and realized that they gave "a lot of things and people power over how they felt" when in reality, they are actually in control. Participants also reported the ability to accept something as it is instead of allowing their feelings to consume their lives.

Discussion

Results from this study support our hypothesis that for a sample of college students, participation in an 8-week iRest yoga-nidra program would result in decreased ratings of stress, worry, and depression and increased mindfulness skills. Our findings are consistent with those reported in much of the literature, that yoga and mindfulness meditation practice may promote well-being (Jain et al., 2007; Smith et al., 2007).

When examining the overall decrease in depression scores, it is important to note that the group mean scores changed from a mild depression classification to minimal depression. This outcome suggests that the intervention was clinically relevant. These findings are consistent with those from previous studies that have reported that participation in a yoga program decreased symptoms of depression and associated physical and mood states (Bennett et al., 2008).

We examined the role of preexisting depression on stress and worry, given the effects of the intervention on depression. The impact of the yoga-nidra program on postintervention stress and worry was no longer significant after the influence of preexisting depression was controlled for. Changes in depression appear to play a large role in the reduction of stress and worry. This relationship suggests that this yoga-nidra program may primarily operate in terms of decreasing depressive symptoms, which helps reduce symptoms of stress and worry.

As expected, the intervention was effective for increasing the five skills of mindfulness (nonreactivity to inner experience, observing/noticing/attending to perceptions/feelings/thoughts, acting with awareness, describing/labeling with words, and nonjudging of experience). The pattern of increase was similar across skills.

Previous yoga experience did not influence the acquisition of mindfulness skills. This may be because of the type of yoga practiced or characteristics of the sample that were not measured. It is possible that students reporting previous yoga experience had participated in yoga practices that emphasize the physical while deemphasizing mindfulness. Students may also have had mindfulness skills prior to the intervention, which would reduce the potential for the acquisition of new abilities.

It was anticipated that graduate students, who tend to be older and more settled in their personal lives, would report greater pre- to posttest reductions in stress and worry than would undergraduates. This hypothesis was not supported by the findings.

Implications for Practice

Results suggest an iRest yoga-nidra practice is effective for helping college students manage stress and may be a useful adjunctive to mental health services. In light of the lack of resources and the clear need for mental health services on college campuses, yoga therapists may play a significant role in bridging yoga and health care. Primary care, mental health, and health promotion professionals may find yoga-nidra to be a cost-effective strategy to decrease stress, depression, and worry while increasing mindfulness. Many university health and counseling centers identify community resources to meet the demand for mental health and stress management for their students. Yoga therapists and those trained in yoga-nidra have the potential to make an important contribution to integrated mental health services for college students.

Limitations

A number of methodological limitations may influence the interpretation of study findings. Participants self-selected into the study and may not have been representative of the typical college population. The absence of a randomized control group did not allow us to compare those who received the intervention with those who may be using another structured form of stress management, traditional mental health services, or medication. Because the research took place during several semesters, it was difficult to recruit and retain participants in the active condition, and it would have been difficult to retain no-treatment controls. Future studies in which participants receive academic credit regardless of randomized condition might reduce the attrition rate and increase methodological rigor.

The study results were based on self-report data. In the absence of other confirmatory outcome measures or physiological data or a control group, it is difficult to ascertain the extent to which findings are directly related to the intervention or are the result of expectancy effects or other factors that were not systematically measured. It would be beneficial to assess quality of life, daily activities, sleep, social relationships, and academic performance to better understand the unique effects of yoga-nidra practice on the lives of college students. Objective physiological measures, such as EEG, heart rate variability, or cortisol levels, would also contribute to understanding the effects of practice. Future studies that address issues of depression and anxiety would also benefit from considering medication and ongoing mental health treatment as potential confounds of intervention effects.

Consistent with a great deal of yoga therapy research, we experienced an unusually high attrition rate of 50.57%. This considerably reduced sample size and statistical power. However, the attrition rate did not influence our ability to detect treatment effects. Future studies may consider increasing the incentive over time or linking an incentive to the completion of a designated percentage of the program. Consistent email reminders about weekly class participation may also improve attendance. Further research is needed to ascertain whether or not these strategies are useful for a college population.

Our limited qualitative and quantitative data suggest that noncompleters were experiencing significantly higher levels of stress, depression, and worry than were completers. This possibility raises questions about the feasibility and suitability of this type of intervention for those experiencing elevated levels of psychological distress.

Pragmatic restrictions limited our ability to examine longitudinal change beyond the conclusion of the 8-week intervention. It would be informative to know to what extent college students continue to practice yoga-nidra independently and whether or not these findings persist in the presence or absence of continued, systematic practice.

Analyses were hampered by inconsistencies in data collection. The PSWQ measure was administered during five semesters, and one of the FFMQ subscales was inadvertently omitted during one semester of data collection. The sample used in our analyses was attenuated by the fact that we did not have complete data for all our participants. More sophisticated statistical programs and analytic methods are required to impute missing data. Greater attention to methodological rigor will be needed in subsequent research.

Conclusions

Findings from this study suggest that a structured yoga-nidra intervention may help reduce symptoms of stress, depression, and worry and improve mindfulness skills in a sample of college students. Additional studies that use specific subpopulations, such as international or minority students, student veterans, those who have experienced trauma, or individuals with a history of substance abuse and/or dependence, will help elucidate who will benefit most from this program.

References

- American College Health Association. (Spring 2012). *American College Health Association-National College Health Assessment-II: Reference Group Executive Summary*. Retrieved from http://www.acha-ncha.org/reports_ACHA-NCHAI.html.
- Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice, 10*(2), 125–143.
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27–45.
- Beck, A. T., Steer, R. A., & Brown, O. K. (1996). *Beck Depression Inventory manual* (2nd ed.). San Antonio, TX: Psychological Corporation.
- Bennett, S. M., Weintraub, A., & Khalsa, S. B. (2008). Initial evaluation of the life force yoga program as a therapeutic intervention for depression. *International Journal of Yoga Therapy, 18*, 49–57.
- Black, D. S., Milam, J., & Sussamn, S. (2009). Sitting meditation interventions among youth: A review of treatment efficacy. *Journal of American College Health, 124*, e532–e541.
- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*(4), 211–237.
- Caldwell, K., Harrison, M., Adams, M., Quin, R. H., & Greeson, J. (2010). Developing mindfulness in college students through movement-based courses: Effects on regulatory self-efficacy, mood, stress, and sleep quality. *Journal of American College Health, 58*(5), 433–442.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385–396.

Deckro, G. R., Ballinger, K. M., Hoyt, M., Wilcher, M., Dusek, J., Myers, P., . . . Benson, H. (2010). The evaluation of a mind/body intervention to reduce psychological distress and perceived stress in college students. *Journal of American College Health, 50*(6), 281–287.

Hyun, J. K., Quinn, B. C., Madon, T., & Lustig, S. (2006). Graduate student mental health: Needs assessment and utilization of counseling services. *Journal of College Student Development, 47*(3), 247–266.

Jain, S., Shapiro, S. L., Swanick, S., Roesch, S. C., Mills, P. J., & Schwartz, G. E. (2007). A randomized controlled trial of mindfulness meditation versus relaxation training: Effects on distress, positive states of mind, rumination, and distraction. *Annals of Behavioral Medicine, 33*(1), 11–21.

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York, NY: Delta.

Kabat-Zinn, J. (1996). Mindfulness meditation: What it is, what it isn't, and its role in health care and medicine. In Y. Haruki, Y. Ishii, M. Suzuki (Eds.), *Comparative and psychological study on meditation* (pp. 161–170). Netherlands: Eburon Publishers.

Kabat-Zinn, J. (2005). Bringing mindfulness to medicine: An interview with Jon Kabat-Zinn, PhD. Interview by Karolyn Gazella. *Advances in Mind-Body Medicine, 21*(2), 22.

McCall, T. (2007). *Yoga as medicine: The yogic prescription for health and healing*. New York, NY: Bantam Dell.

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy, 28*(6), 487–495.

Miller, R. (2006). Your brain on yoga nidra: Questions for Richard Miller KYTA bulletin. Retrieved from http://kripalu.org/jyta_artcl.php?id=265.

NASPA: Student Affairs Administrators in Higher Education. *Mental Health on Campus Improvement Act*. Retrieved from <http://www.naspa.org/divctr/pp/mentalhealth.cfm/>.

Oman, D., Shapiro, S. L., Thoresen, C. E., Plante, T. G., & Flinders, T. (2008). Meditation lowers stress and supports forgiveness among college students: A randomized controlled trial. *Journal of American College Health, 56*(5), 569–578.

PASW Statistics 20.0 (Version 20.0.0) [Computer software]. (2012). Chicago, IL: IBM. Retrieved from <http://www.spss.com>.

Peters, R. (1997). *Getting what you came for: The smart student's guide to earning an MA or a Ph.D.* New York, NY: Farrar, Straus, and Grioux.

Pilkington, K., Kirkwood, G., Rampes, H., & Richardson, J. (2005). Yoga for depression: The research evidence. *Journal of Affective Disorders, 89*(1–3), 13–24.

Rizzolo, D., Zipp, G. P., Stiskal, D., & Simpkins, S. (2009). Stress management strategies for students: The immediate effects of yoga, humor, and reading on stress. *Journal of College Teaching & Learning (TLC), 6*(8), 79–88.

Robson, R. (2011). A critical assessment of the acute effects of yoga and cardiovascular exercise on markers of mood and stress. *Journal of Yoga Physical Therapy, 1*, 4.

Shapiro, S. L., Brown, K. W., & Biegel, G. M. (2007). Teaching self-care to caregivers: Effects of mindfulness-based stress reduction on the mental health of therapists in training. *Training and Education in Professional Psychology, 1*(2), 105–115.

Sieben, L. (2011). Nearly a third of college students have had mental-health counseling, study finds. *The Chronicle of Higher Education* [online]. Available at: <http://chronicle.com/article/Nearly-a-Third-of-College/>.

Smith, C., Hancock, H., Blake-Mortimer, J., & Eckert, K. (2007). A randomized comparative trial of yoga and relaxation to reduce stress and anxiety. *Complementary Therapeutic Medicine, 15*(2), 77–83.

Tekur, P., Nagarathna, R., Chametcha, S., Hankey, A., & Nagendra, H. R. (2012). A comprehensive yoga program improves pain, anxiety and depression in chronic low back pain patients more than exercise: An RCT. *Complementary Therapies in Medicine, 20*(3), 107–118.

Weinfurt, K. P. (1995). Multivariate analysis of variance. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding multivariate statistics* (pp. 245–276). Washington, DC: American Psychological Association.

Wheeler, A., & Wilkin, L. (2007). A study of the impact of yoga asana on perceived stress, heart rate, and breathing rate. *International Journal of Yoga Therapy, 17*, 57–63.

Woodyard, C. (2011). Exploring the therapeutic effects of yoga and its ability to increase quality of life. *International Journal of Yoga, 4*, 49–54.

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Appendix A

Stages of iRest

iRest Stage	Purpose
1. Setting an Intention	Staying focused, motivation to practice
2. Inner Resource	Provides emotional safety
3. Heartfelt Desire	A positive affirmation of what one truly wants in life
4. Body Sensing	Learning to tune into the body's signals and welcome present moment sensations
5. Breath Sensing	Learning to observe the natural rhythm of the breath calms the central nervous system
6. Opposites of Feelings	Observing physical feelings
7. Opposites of Emotions	Observing emotions that are present
8. Opposites of Beliefs	Observing thoughts and beliefs that are present
9. Joy	Experiencing a sense of inner joy
10. Witnessing and Pure Awareness	Witnessing awareness, sensing the inner peace that is always present

Appendix B

Sample iRest Yoga-Nidra Lesson Plan

<p>Orientation</p> <ul style="list-style-type: none"> • Attendance • Overview of iRest • 8-week class process and expectations • Voluntary research • Review of supplies and posture for physical comfort • Journaling • iRest practice audio support • Experiential taste of body sensing
<p>Class 1</p> <ul style="list-style-type: none"> • Setting an <i>Intention</i> • Develop individualized <i>Inner Resource</i> for use throughout the course • Develop <i>Heartfelt Desire</i> • Introduce body sensing concepts and skills • Witnessing awareness • Integration of experience
<p>Class 2</p> <ul style="list-style-type: none"> • Check-in, Q & A, review previous class concepts and skills, home practice • Introduce breath sensing concept and skills • Body sensing • Witnessing awareness • Integration of experience
<p>Class 3</p> <ul style="list-style-type: none"> • Check-in, Q & A, review previous class concepts and skills, home practice • Introduce alternative body sensing concept and skill • Introduce opposites of feelings concept and skill • Breath sensing • Witnessing awareness • Integration of experience

(continued on page 24)

(Appendix B continued)

<p>Class 4</p> <ul style="list-style-type: none"> • Check-in, Q & A, review previous class concepts and skills, home practice • Introduce alternative breath sensing concept and skill • Introduce opposites of emotions concept and skill • Body sensing • Witnessing awareness • Integration of experience
<p>Class 5</p> <ul style="list-style-type: none"> • Check-in, Q & A, review previous class concepts and skills, home practice • Introduce opposites of beliefs • Body and breath sensing • Emotions • Witnessing awareness • Integration of experience
<p>Class 6</p> <ul style="list-style-type: none"> • Check-in, Q & A, review previous class concepts and skills, home practice • Discovery of inner joy and strengths • Body and breath sensing • Emotions • Beliefs • Witnessing awareness • Integration of experience
<p>Class 7</p> <ul style="list-style-type: none"> • Check-in, Q & A, review previous class concepts and skills, home practice • Introduce concept of pure awareness • Body and breath sensing • Emotions • Beliefs • Witnessing awareness • Integration of experience
<p>Class 8</p> <ul style="list-style-type: none"> • Check-in, Q & A, summary of iRest practice, keeping the practice going, review application in daily life, resources handout for ongoing campus or community support, Integrative Restoration Institute resources, initial dyad discussion about what they will take away, key concepts or skills that resonated the most, and then transitioning to large group processing of the class • Voluntary research postclass data collection • Complete iRest practice involving all the stages