

Learning from Spiritual Models and Meditation: A Randomized Evaluation of a College Course

Doug Oman · Shauna L. Shapiro · Carl E. Thoresen ·
Tim Flinders · Joseph D. Driskill · Thomas G. Plante

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Abstract Effects of two meditation and mindfulness-based spiritual interventions were examined in college undergraduates ($N = 44$). Compared to a control group, both interventions decreased negative religious coping ($d = -0.80, p < .01$) and images of God as mainly controlling ($d = -.73, p < .01$). One intervention provided more training in tools for learning from community and tradition-based spiritual exemplars. It produced gains in famous or traditional spiritual exemplars' perceived influence ($d = +.81, p < .05$) and availability ($d = +.66, p < .10$), in self-efficacy for learning from spiritual exemplars ($d = +.92, p < .05$), and in nonmaterialistic aspirations ($d = +0.65, p < .05$).

Keywords Social learning · Social cognitive theory · God images · Passage meditation · Mindfulness Based Stress Reduction

D. Oman (✉)

School of Public Health, 140 Warren Hall MC#7360, University of California, Berkeley,
CA 94720-7360, USA

e-mail: DougOman@post.Harvard.edu

D. Oman

Public Health Institute, 555 12th Street, Oakland, CA 94607

S. L. Shapiro

Department of Counseling Psychology, Santa Clara University, Santa Clara, CA

C. E. Thoresen

School of Education and Departments of Psychology and Psychiatry, Stanford University, Stanford, CA

D. Oman · S. L. Shapiro · C. E. Thoresen · T. Flinders · T. G. Plante

Spirituality and Health Institute, Santa Clara University, Santa Clara, CA

J. D. Driskill

Pacific School of Religion, Graduate Theological Union, Berkeley, CA

T. G. Plante

Department of Psychology, Santa Clara University, Santa Clara, CA

Many dimensions of human well-being have long been a concern of pastors and other religious professionals in all major faith traditions. Spiritual well-being has always been a preeminent but not an exclusive pastoral concern. Most faith traditions view people as responsible to exercise wise stewardship of their physical and mental health, so that they may better serve God. Individual stewardship of health is a necessary complement to collective stewardship that expresses itself in efforts to promote social justice and alleviate systemic injustices, such as racism (Ramsay, 2004). Partly for the sake of fostering better physical and mental health, pastoral counselors have long sought to learn from modern psychology, sometimes at the expense of their own inherited pastoral counseling traditions (Oden, 1984).

However, until very recently, mainstream psychology neglected and often denigrated the importance of spiritual factors, instead focusing solely on physical and mental health. There remains a dearth of scientific study of religious and spiritual outcome variables, especially of how to foster them using appropriate programs or interventions (Thoresen, Oman, & Harris, 2005).

In this paper, we report results from a randomized study of two spiritually-based interventions that were conducted with college undergraduates. The interventions were each based on teaching a form of sitting meditation. Each was conducted in 8 weekly small group meetings of 90 minutes each. Adaptations of each intervention could potentially be presented to general congregations. Individual self-study and a wide range of other potential pastoral applications are also facilitated by substantial published documentation that is available for each underlying program (e.g., Easwaran, 1978/1991; Kabat-Zinn, 1991). The program underlying one of these interventions, based on Easwaran (1978/1991), was recently a focus of a national conference of Unitarian Universalist ministers, and has been used in retreats for Episcopalian seminarians. Both programs have been successfully taught in multiple health-care and academic settings, and have generated wide international and multicultural interest. Basic materials for each program have been translated into more than 15 languages (Oman, Hedberg, Downs, & Parsons, 2003).

The core of each intervention consisted of training in a specific method of sitting meditation. Participants receiving one treatment, termed Passage Meditation (PM), were trained in a method described by Easwaran (1978/1991). Those receiving the other treatment, termed Mindfulness Based Stress Reduction (MBSR), were trained in a method described by Kabat-Zinn (1991). As shown in Table 1, these methods, and the pedagogies employed in the corresponding interventions, bear many strong similarities. More specifically, each method teaches a version of sitting meditation as a central skill, but also offers corollary practices and supports for deepening meditation and for integrating meditative states of mind into daily living.

Physical and mental health benefits from meditation are now well-documented (Seeman, Dubin, & Seeman, 2003; Walsh & Shapiro, 2006). Previous randomized studies have linked each intervention to improved measures of mental health in both adults (Oman, Hedberg, & Thoresen, *in press*; Shapiro, Astin, Bishop, & Cordova, 2005) and college students (Astin, 1997; Shapiro, Schwartz, & Bonner, 1998; Winzelberg & Luskin, 1999). An earlier investigation of the present study participants confirmed that the PM and MBSR interventions led to stress reductions in a college cohort (Oman, Shapiro, Thoresen, Plante, & Flinders, *in press*).

Far less empirically clear is what types of spiritual benefits might be fostered by these programs. Suggestively, earlier studies of each program have indicated that each can foster gains in spirituality as assessed by a short additive scale assessing belief in and closeness to a Higher Power, or by a single question on the extent one is “a spiritual person” (Astin, 1997; Oman et al., 2003; Shapiro et al., 1998). But how might each program affect a

Table 1 Summary of parallel practices and pedagogy for interventions

	Specific methods used by each intervention	
	PM ^a	MBSR ^b
Spiritual practice		
Meditation (sitting)	Passage meditation	Mindfulness meditation
Daily practices (nonsitting or “informal”)	Focused attention; Recalling the mind to a cue word; etc.	Mindful attention; Recalling the mind to the breath; etc.
Attitudinal supports	Slowing down; Detachment; etc.	Patience; Letting go; etc.
Motivational supports	Readings reflecting meditative perspectives	Poetry reflecting mindfulness perspectives
Intervention pedagogy ^c		
Instructional setting	Group	Group
Instructional period	8 weekly meetings of 90 minutes	8 weekly meetings of 90 minutes
Instructor	Personally uses and models skills	Personally uses and models skills
Long-term support (encouraged)	Meet regularly with group of others doing similar practices	Meet regularly with group of others doing similar practices

^aFor details of Passage Meditation (PM) practices, see Easwaran (1978/1991).

^bFor details of Mindfulness Based Stress Reduction (MBSR) practices, see Kabat-Zinn (1991).

^cRepresents the pedagogy implemented in the present study, as well as what was recommended or most commonly used in previous studies.

richer, multidimensional set of spiritual assessments tapping spiritual constructs including, for example, images of God, life aspirations, and religious coping?

In this paper, we address this issue by reporting findings on the impact of these two meditation-based programs on a set of 13 spiritual outcome measures. Because of the broad similarities in effects from different forms of sitting meditation, we suspected that many effects of the PM and MBSR interventions might be similar (Cahn & Polich, 2006; Walsh & Shapiro, 2006). However, the two interventions are not identical (Table 1). Each program possesses specific strengths and advantages. For example, MBSR possesses a stronger empirical research base, and a correspondingly greater recognition by health professionals (e.g., Grossman, Niemann, Schmidt, & Walach, 2004). Another difference between the programs is the degree to which those who practice them are exposed to *spiritual models*, that is, to other persons who function as examples or models of spiritual qualities, such as compassion, forgiveness, or faith.

Learning from spiritual exemplars

All major religious traditions affirm that spirituality is often “caught, not taught,” and endorse the importance of ongoing exposure to spiritual models (Oman & Thoresen, 2003). The centrality of learning from other persons, termed social learning, has long been supported by modern psychological theory and research (Bandura, 1986). More specifically, modern psychology suggests that learning from all types of models, including from spiritual models, occurs through four major psychological processes: attention to the model, retention of information about the model’s behavior and attitudes, reproduction in behavior, and motivation to persist (Bandura, 2003; Oman & Thoresen, 2003). A close examination of the PM and MBSR programs suggests that each offers support for spiritual modeling (learning

from spiritual models), but that the PM program appears to offer stronger support as it is specifically incorporated into the program, whereas it is only implicit in the MSBR program.

More specifically, Oman and Beddoe (2005) recently reviewed the extent that spiritual modeling is supported by several scientifically studied forms of meditation. They found that PM and MBSR both offered much more support than two other widely known forms of meditation (Transcendental Meditation and Benson's method). For example, MBSR is typically taught in a group setting, which allows fellow participants to draw on each other as models. Furthermore, texts from spiritually oriented poets such as Jalaluddin Rumi, Walt Whitman, or others, are commonly used in MBSR sessions to illustrate, inspire and support meditative states of mind (for example, a poem from Rainer Rilke conveys an attitude of trust in a higher power: "Life has not forgotten you, it holds you in its hands and will not let you fall," Shapiro, 2001, p. 506).

However, PM was rated as offering even stronger supports for spiritual modeling. In Passage Meditation, the focus of meditation is not on the breath (as in MBSR), or on a single spiritual phrase (as in Benson's method and TM), but on a memorized *inspirational passage*. Practitioners select and memorize a carefully chosen text from a scripture or a major spiritual figure. Recommended inspirational passages from Judeo-Christian sources include the 23rd Psalm, the Beatitudes of the Sermon on the Mount, the Prayer of Saint Francis, and Saint Paul's Epistle on Love (1 Corinthians 13). Any inspirational passage used for meditation is recommended to be "positive, practical, inspiring, and universal" (Easwaran, 1978/1991, p. 234). During the period of sitting meditation, PM practitioners slowly mentally recite a memorized passage. When one passage is completed, they may repeat that passage or begin a different memorized passage of their own choosing. In the PM intervention studied here, each participant was supplied with a sourcebook containing numerous suitable inspirational passages, drawn from all major religious traditions so as to accommodate all backgrounds and spiritual dispositions (Easwaran, 1982/2003). In its focus on an inspiring text, PM is similar to the well-known Christian practice of *lectio divina*, in which one attends to a text with slow repetitions intended to deepen its impact (Casey, 1996; Driskill, 1999).

PM offers much support for spiritual modeling in part because each inspirational passage conveys information about a famous or traditional spiritual exemplar's attitudes or behaviors (Oman & Beddoe, 2005). Memorizing and meditating upon the Psalmist's expressions of faith in the 23rd Psalm, for example, fosters *attention* and *retention* of his beliefs and attitudes, two of the four psychological learning processes mentioned earlier (Oman & Thoresen, 2003). *Motivation*, a third process, is fostered by the positive experiential testimonies contained in many meditation passages (e.g., "my cup runneth over"). The fourth process, *reproduction in behavior* of spiritual qualities, is fostered by ancillary PM program practices (such as focused attention and putting others first—see Easwaran, 1978/1991). To complement the PM program's strong support for learning from traditional spiritual models, the PM intervention implemented here also included a brief review of skills and techniques for learning from community-based spiritual models (see Oman, Flinders, & Thoresen, *in press*).

The PM and MBSR programs thus possess strong similarities as well as potentially important differences. To the extent that changes in an outcome variable are shaped primarily by effects from sitting meditation, these programs might be expected to produce similar effects. But to the extent that an outcome variable is shaped by spiritual models, especially traditional models, we might expect to see more pronounced effects in the PM group. Furthermore, intriguing recent empirical work has documented unequal health effects from using different foci for meditation among college students who were mostly slight or moderate in spirituality and religiousness. Wachholtz and Pargament (2005) found that in comparison with a secular focus such as "I am joyful," a spiritual focus, such as "God is joy," was more effective

in reducing anxiety and improving mood and pain tolerance. These considerations led us to develop several research questions aimed at teasing out both similarities and potential differences between effects from the PM and MBSR programs.

Research questions

Based on theory and previous research, we developed three exploratory research questions. These questions focus on variables *not* directly and strongly linked to spiritual modeling, but that might plausibly be affected either by meditation or by spiritual modeling, or by both.

First, both PM and MBSR may be viewed as providing coping skills, long a topic of major interest in health psychology. Pargament (1997) synthesized a great deal of research documenting specifically religious forms of coping. He has identified two broad patterns of religious coping responses that he terms positive and negative. Greater use of positive religious coping methods, such as searching for spiritual connection, have been strongly associated with beneficial outcomes that include fewer symptoms of psychological distress, more spiritual growth, and more stress-related growth (e.g., broadened perspectives). Greater use of negative religious coping methods, such as appraising God as punishing, have been associated with poorer outcomes that include more symptoms of distress, more depression, and callousness towards others (Pargament, Smith, Koenig, & Perez, 1998).

Meditation and ancillary practices in both PM and MBSR are specifically intended to support altered responses to problematic and stressful situations. Participants using these practices might plausibly change how they use various religious and secular coping methods. Religious coping might also be altered by exposure to spiritual models who demonstrate alternative responses to stressors (e.g., “Let anyone among you who is without sin be the first to throw a stone at her” John 8:7, NRSV). Previous studies confirm that usage of religious coping methods can be altered by interventions (e.g., Murray-Swank & Pargament, 2005). However, very little is presently known about impacts of different interventions on positive and negative religious coping in non-clinical college populations. Furthermore, it is unclear whether any effects on coping would come primarily through the practice of meditation (similar between the two interventions), or from cognitive effects of exposure to spiritual models. An important first step is to assess overall patterns of impact, suggesting the first exploratory question:

Exploratory Question 1: How will usage of (a) positive and (b) negative religious coping change due to each intervention?

Second, the experience of meditation provided by both PM and MBSR might affect participants’ understandings of the nature of spiritual realities in the universe. Within religious traditions, meditation and contemplative prayer are viewed as methods for approaching God, and for allowing Higher Being to make itself known (Goleman, 1988; Walsh & Shapiro, 2006). Positive experiences in meditation might encourage participants to view Higher Powers as more loving, or as less punishing and more amenable to working as a collaborative partner (Pargament, 1997). Exposure to spiritual models could similarly affect views of the nature of spiritual reality, sometimes called God-images (Benson & Spilka, 1973). The second exploratory question aims to clarify these influences:

Exploratory Question 2: How will God-images of a Higher Power as (a) loving and (b) controlling change due to each intervention?

Finally, it seems possible that PM and MBSR might influence participants' life goals. Very broadly, many life goals common in modern society can be divided into more materialistic "extrinsic" goals such as financial success and social recognition, and more nonmaterialistic or "intrinsic" goals such as community service and loving personal relationships. Importance of nonmaterialistic goals empirically correlates with several dimensions of health, including more vitality, less depression, and fewer physical symptoms (Kasser & Ryan, 1996). To the extent that meditation experientially fosters greater self-awareness and experiences of nonmaterial realities, both PM and MBSR might foster shifts towards nonmaterial personal goals. But such aspirations vividly embedded in many inspirational passages (e.g., the Prayer of Saint Francis) might also plausibly cause further shifts in the goals of PM participants. Ambiguity in the relative importance of influences from meditation and spiritual models suggest the third exploratory question:

Exploratory Question 3: How will (a) nonmaterialistic/intrinsic and (b) materialistic/extrinsic aspirations change due to each intervention?

Clear differences between effects from PM and MBSR might be expected for variables that directly focus on participants' relationships with spiritual models. Based on the stronger support in the PM program for learning from spiritual models, we developed three hypotheses. First, because PM tools so clearly support spiritual modeling, we hypothesized that participants in the PM group would experience gains in their self-confidence for learning from spiritual models, technically termed self-efficacy (Bandura, 1986; Oman & Thoresen, 2006):

Hypothesis 1: Increases in Spiritual Modeling Self-Efficacy will be greater for the PM group than for controls. This will hold true for self-efficacy for learning from (a) all spiritual models, (b) community-based models, and (c) famous models. Finally, although the differences are likely to be smaller than with controls, we also expect that (d) compared to the MBSR group, the PM group will also show a pattern of larger gains in these three types of self-efficacy.

Second, spiritual modeling supports given to the PM group seem likely to enhance the *influence* of famous spiritual models:

Hypothesis 2: Gains in the influence of famous spiritual models will be larger for the PM group than for either (a) controls or (b) the MBSR group.

Finally, we hypothesized that PM group participants would increase their reported *numbers* of famous spiritual models.

Hypothesis 3: Changes in famous spiritual models living (a) all time periods, (b) before 1900, and (c) after 1900, will be larger for the PM group compared to controls and (d) the MBSR group.

Method

Recruitment, randomization, and schedule of assessments

Participants were undergraduates enrolled at a Roman Catholic university in California. Recruitment efforts were directed especially at first and second year students, most of whom live on campus. Third year students were also eligible. Recruitment was conducted

through flyers, emails, classroom presentations, and special recruitment sessions in the Fall term, 2004. Approximately 80 students attended two recruitment sessions that were held in on-campus residential facilities. Approximately 220 additional students were notified through six presentations in psychology department classrooms. Flyers were also posted in residential housing facilities, academic building bulletin boards, in the library, student union, gymnasium, and other locations on campus. In addition, approximately 75 eligible students expressed interest by directly contacting the recruitment manager, who answered questions and disseminated consent forms. A total of 54 completed consent forms were returned. In early January, these 54 participants were emailed instructions for the online pretest, which 47 completed. Using computer software, these 47 participants were randomly allocated between the MBSR ($n = 16$) and PM ($n = 16$) training groups, and a wait-list control group ($n = 15$).

Prior to the first group meetings, we allowed a few students to change between the two intervention groups because of scheduling conflicts. Three students changed from the PM group (scheduled for 3:30 pm) to the MBSR group (scheduled at 5:30), and two participants were permitted to change from the MBSR to the PM group. Due to the death of a parent, one PM participant dropped out after attending only one session. Two MBSR participants never attended any meetings (one reporting no reason, the other deciding he had overextended himself). Twenty-nine participants completed either the PM ($n = 14$) or MBSR ($n = 15$) training. Of these 29 participants, 83% attended all ($n = 11$) or all but one ($n = 13$) of the 8 training meetings, three missed 2 meetings, and one each, due to sickness, missed 3 or 4 meetings.

Eight weeks later, after the conclusion of the interventions, a link for the online posttest assessment (Exam 2) was emailed to all participants. Exam 2 was completed by all but one of the 44 participants (98%). After 8 more weeks, a link for the online follow-up assessment (Exam 3) was emailed. All but one (98%) completed it. Participants were mailed checks of \$10 after doing the pretest, \$20 after doing the posttest, and \$30 after doing the follow-up assessment. This project was approved by the Institutional Review Boards of Santa Clara University and of the Public Health Institute of Oakland, California.

Participants

The 44 final participants included in the intent-to-treat analysis ranged in age from 18 to 24, were primarily 18 years old (59%), first-year (66%), female (80%), white (73%), and were mostly Roman Catholic (49%) or had no religious affiliation (42%). Selected participant characteristics are displayed in Table 2. Except for more nonwhite participants in the PM group, neither treatment nor drop-out condition was significantly associated with covariables or pretest values of any of the 13 outcome variables ($p > .10$).

Measures

Positive and negative forms of religious coping were measured with scales adapted from a well-known set of brief measures developed by the Fetzer Institute (1999, pp. 86–87). Three items measured three facets of positive religious coping (search for spiritual connection, collaborative religious coping, and seeking spiritual support). Two items measured negative religious coping (punishing God reappraisal, spiritual discontent). Examples of items include “I think about how my life is part of a larger spiritual force” (positive coping) and “I feel God is punishing me for my sins or lack of spirituality” (negative coping). Respondents indicated the extent that each item was used in coping “with major problems in your life.” Responses were coded from 0 (“not at all”) to 3 (“a great deal”). Summary scores ranged from 0 (not

Table 2 Selected participant characteristics, by treatment condition

Characteristic	Level	Number (percent), by group			MBSR	Control	p (diff) ^a
		Combined	PM	Control			
Year in school	1st	29 (66)	10 (71)	8 (53)	11 (73)	0.52	
	2nd or higher	15 (34)	4 (29)	7 (47)	4 (27)		
Gender	Female	35 (80)	9 (64)	14 (93)	12 (80)	0.15	
	Male	9 (20)	5 (36)	1 (7)	3 (20)		
Ethnicity	White	32 (73)	7 (50)	13 (87)	12 (80)	0.097	
	Nonwhite ^b	12 (27)	7 (50)	2 (13)	3 (20)		
Major field of study	Social science	17 (39)	5 (36)	8 (53)	4 (27)	0.57	
	Business/marketing	12 (27)	4 (29)	4 (27)	4 (27)		
Spiritual identity	Other	15 (34)	5 (36)	3 (20)	7 (47)		
	Spiritual and religious	11 (25)	3 (21)	6 (40)	2 (13)	0.60	
Religious denomination	Spiritual, not religious	22 (50)	9 (64)	5 (33)	8 (53)		
	Religious, not spiritual	5 (11)	1 (7)	2 (13)	2 (13)		
Extent spiritual	Neither	6 (14)	1 (7)	2 (13)	3 (20)	0.57	
	Roman Catholic	21 (48)	6 (43)	9 (60)	6 (40)		
Meditating at pretest	Other ^c	5 (11)	3 (21)	1 (7)	1 (7)		
	None	18 (41)	5 (36)	5 (33)	8 (53)	0.40	
All combined	Very	10 (23)	5 (36)	4 (27)	1 (7)		
	Moderate	16 (36)	5 (36)	5 (33)	6 (40)		
Ever ^d	Slightly/hot at all	18 (41)	4 (29)	6 (40)	8 (53)	0.78	
	Never	14 (32)	4 (29)	4 (27)	6 (40)		
Total	Never	30 (68)	10 (71)	11 (73)	9 (60)		
	(Total)	44	14	15	15		

Note. PM = Passage Meditation, MBSR = Mindfulness Based Stress Reduction.

^aFisher exact tests of differences between three treatment conditions.

^b“Nonwhite” included responses of Asian ($n = 5$), Hispanic ($n = 5$), mixed descent ($n = 1$), and nonresponse ($n = 1$).

^c“Other” included responses of Buddhist, Episcopalean, United Church of Christ, Mormon/individual path, and nonresponse (each $n = 1$).

^dOne participant reported meditating several times per week at pretest, and all others indicated 3 times per month or less.

used) to 9 (greatly used) for positive coping, and 0 (not used) to 6 (greatly used) for negative coping.

Images of God were measured with a commonly used 10-item measure developed by Benson and Spilka (1973). This measure includes two 5-item subscales, one for God viewed as loving, and one for God viewed as controlling. Summary scores range from 0 to 30 for each subscale. Items use a 7 point response scale with endpoints anchored by a pair of adjectives. Respondents were asked to indicate where on the scale best represents a description of “God or the Highest Power in the Cosmos as you understand it.” Examples of item pairs include “freeing” versus “restricting” (Controlling God subscale) and “forgiving” versus “unforgiving” (Loving God subscale).

Life goals were measured using an abbreviated version of the Aspiration Index developed by Kasser and Ryan (1996). Each item represents a potential personal goal of the respondent. Respondents indicate the importance they place on future attainment of each goal, ranging from 1 (“not at all important”) to 5 (“very important”). Goals fall into two overarching domains, nonmaterialistic and materialistic (termed “intrinsic” and “extrinsic” by Kasser and Ryan, 1996). We used 18 items equally balanced between nonmaterialistic and materialistic subdomains (self-acceptance, affiliation, community feeling; financial success, social recognition, appealing appearance). Examples of items include “I will work to make the world a better place” (nonmaterialistic/community feeling), and “my name will be known by many people” (materialistic/social recognition). Nonmaterialistic and materialistic subscale scores each potentially ranged from 9 to 45.

Measures of self-efficacy and the influence and number of famous spiritual models were assessed with Spiritual Modeling Inventory of Life Environments (SMILE) questionnaire. This questionnaire is organized similarly to a structured interview, with three parts, each part setting the conceptual context for the following part. The SMILE’s introductory section describes the concept of ultimate concerns (e.g., “what matters most in life”). Respondents rate the importance for living of 14 widely recognized character strengths such as hope, compassion, and faith (Peterson & Seligman, 2004), and are permitted to insert and rate up to two additional open-ended responses. The SMILE’s second section builds on the first sectioning, explaining that the word “spiritual” will refer to skills in “what’s most important/consequential in life.” Respondents indicate if any spiritual models exist among persons known in four major life domains: family, school, religious organization, and famous people. Respondents also indicate the model’s role (for community models) or name (for famous models). Respondents are asked to identify by name up to two famous spiritual models from before 1900, and two from after 1900. The number of named famous models identified in each category constituted our measures of pre-1900 famous models (range 0–2), post-1900 famous models (range 0–2), and total famous models (range 0–4).

Our measures of self-efficacy and influence of famous spiritual models were drawn from the SMILE’s third section, which involves several global queries. For each of the four life-domains mentioned earlier, participants were asked how much people in that domain, living or dead, have “influenced your feelings, views and practices regarding what’s most important in life,” with responses coded from 1 (*not at all influential*) to 5 (*very much influential*). We analyzed the item assessing influence of famous spiritual models.

Self-efficacy was also assessed in the SMILE’s third section. Total self-efficacy for learning from spiritual models was assessed with a 10-item scale containing two 5-item subscales, one for community models, and the other for famous models. Each subscale contains one item about ability to *identify* spiritual models (e.g., confidence to “Identify famous people who can be good spiritual examples for me”). The other four items in each subscale corresponded to the four psychological learning processes described earlier (e.g., for attention,

confidence to “Be aware almost daily of the spiritual actions and attitudes of people in my family and community”; for retention, “Remember, at least one month after hearing about it, a wise spiritual action or attitude of a famous person who is a profound spiritual example”). Following standard self-efficacy scale design, responses to each item ranged from 0 (not confident at all) to 100 (completely confident). Total scale and subscale scores, computed as means of corresponding items, could range from 0 to 100.

Statistical analysis

Effects of treatment condition on the 13 outcome variables were assessed in separate hierarchical linear regression (HLM) models that adjusted for preexisting individual differences in levels of outcome variables (using what Raudenbush & Bryk, 2002, call a Level 2 random effect). To explore whether the treatment effect might change over time, initial regression models permitted the treatment effect to vary between Exams 2 and 3 (“time-varying treatment effect”; further details in Appendix). Additional models assumed the treatment effect was constant across Exams 2 and 3 (“time-constant treatment effect”), or was constant between PM and MBSR interventions. For outcomes that departed significantly ($p < .10$) from a normal distribution in Shapiro-Wilk tests, HLM analyses were supplemented with nonparametric Wilcoxon tests for group differences in change from Exam 1 to Exams 2, 3, and the median of Exams 2 and 3.

Results

Tables 3 and 4 present estimates and confidence intervals for changes since pretest on outcome measures. No adverse effects from training were observed. Alpha reliabilities for outcome measures were comparable with available reports from previous studies. In Table 3 and Table 4, rows labeled “Exam 2 & 3” present regression estimates that model treatment effects as constant in Exam 2 and 3 (the “time-constant” treatment effect model). Although we report all pooled estimates for completeness, the assumption that treatment effects are constant across time appears supported for some outcomes (religious coping and God images), and clearly not supported for others (self-efficacy).

Exploratory questions

Religious coping

There were no significant changes in positive religious coping. However, participants in each treatment group demonstrated large, statistically significant, and sustained reductions in negative religious coping. Compared to the control group, the PM group showed reductions of 1.16 (two-tailed p value [p_2] = .009) at the Exam 2 post-test, more than one full pretest standard deviation [SD] in magnitude ($d = -1.10$), constituting what Cohen (1988) calls a “large” treatment effect. PM group treatment effects at Exam 3 remained sizeable (0.72, $p_2 = .053$, $d = -0.68$). Effects in the MBSR group were nearly as large, as shown in reductions of 0.84 ($p_2 = .04$, $d = -0.80$) at Exam 2, and 0.67 ($p_2 = .07$, $d = -0.63$) at Exam 3. In time-constant models that assumed equal treatment effect magnitudes at Exams 2 and 3, PM and MBSR did not significantly differ in their effects ($p_2 = .38$). Furthermore, in time-constant models, each treatment showed independently significant reductions in

Table 3 Observed treatment effects on religious coping, images of God, and materialistic/nonmaterialistic aspirations ($N = 44$)^a

Variable (observed reliability ^b)	Pretest values Mean (SD)	Exam	Group-specific treatment effects				Combined effects both vs Cx ^d	
			PM vs Cx		MBSR vs Cx		Mean (SE)	<i>p</i>
			Mean (SE)	<i>p</i>	Mean (SE)	<i>p</i>		
Positive coping ($\alpha = .74$)	3.02 (2.39)	2	0.57 (0.65)	.30 ^c	-0.18 (0.64)	.96 ^c	0.17 (0.55)	.52 ^c
		3	0.47 (0.63)	.43 ^c	0.41 (0.63)	.53 ^c	0.43 (0.54)	.40 ^c
		2&3	0.51 (0.55)	.37 ^c	0.12 (0.55)	.68 ^c	0.31 (0.47)	.43 ^c
Negative coping ($\alpha = .85$)	0.64 (1.06)	2	-1.16 (0.34)	.009 ^c	-0.84 (0.34)	.04 ^c	-1.00 (0.29)	.004 ^c
		3	-0.71 (0.34)	.053 ^c	-0.67 (0.34)	.07 ^c	-0.69 (0.29)	.03 ^c
		2&3	-0.93 (0.29)	.007 ^c	-0.75 (0.29)	.03 ^c	-0.84 (0.25)	.003 ^c
Loving God ($\alpha = .75$)	25.02 (4.11)	2	0.00 (1.56)	.91 ^c	0.22 (1.51)	.83 ^c	0.12 (1.31)	.84 ^c
		3	1.78 (1.54)	.24 ^c	1.58 (1.51)	.29 ^c	1.68 (1.29)	.18 ^c
		2&3	0.92 (1.33)	.47 ^c	0.92 (1.30)	.59 ^c	0.92 (1.12)	.45 ^c
Controlling God ($\alpha = .81$)	10.24 (5.73)	2	-3.72 (1.96)	.06 ^d	-4.23 (1.89)	.03 ^d	-3.99 (1.64)	.02 ^d
		3	-4.26 (1.93)	.03 ^d	-4.40 (1.89)	.02 ^c	-4.33 (1.62)	.009 ^d
		2&3	-3.99 (1.65)	.02 ^d	-4.32 (1.61)	.009 ^d	-4.16 (1.40)	.004 ^d
Nonmaterialistic ($\alpha = .80$)	41.05 (3.88)	2	1.69 (1.91)	.097 ^c	0.79 (1.88)	.85 ^c	1.24 (1.63)	.40 ^c
		3	2.54 (1.89)	.03 ^c	0.30 (1.86)	.27 ^c	1.36 (1.61)	.056 ^c
		2&3	2.11 (1.63)	.11 ^c	0.55 (1.61)	.60 ^c	1.30 (1.39)	.21 ^c
Materialistic ($\alpha = .88$)	25.88 (6.93)	2	-0.78 (2.36)	.74 ^d	1.11 (2.31)	.63 ^d	0.22 (2.01)	.91 ^d
		3	-0.60 (2.33)	.80 ^d	-1.63 (2.29)	.48 ^d	-1.19 (1.98)	.55 ^d
		2&3	-0.71 (2.01)	.72 ^d	-0.28 (1.99)	.89 ^d	-0.50 (1.72)	.77 ^d

Note. Exam 2 is post-test, Exam 3 is 8 week follow-up, PM = Passage Meditation, MBSR = Mindfulness Based Stress Reduction, Cx = Control group.

^aChange differences between PM and MBSR were nonsignificant for all outcomes ($p > .15$, two-tailed).

^bAlpha reliability at Exam 1 ($N = 43$ for aspirations, 42 for coping, 41 for God as controlling, 40 for God as loving).

^cP-values from two-tailed nonparametric tests for group difference in mean change since pretest.

^dP values from two-tailed *t*-tests for group differences in mean change since pretest, from hierarchical linear models.

Table 4 Observed treatment effects on self-efficacy and famous spiritual models ($N = 44$)

Variable (observed reliability ^a)	Pretest values		Group-specific treatment effects					
	Mean (SD)	Exam	PM vs Cx		MBSR vs Cx		PM vs. MBSR	
			Mean (SE)	<i>p</i>	Mean (SE)	<i>p</i>	<i>p</i>	
Self-efficacy for learning from models								
All models ($\alpha = .86$)	2	56.76 (16.62)	2.02 (6.58)	.38 ^b	-0.68 (6.38)	.54 ^b	.34 ^b	
	3		15.27 (6.51)	.011 ^b	1.54 (6.31)	.40 ^b	.02 ^b	
Famous ($\alpha = .79$)	2&3	46.10 (20.04)	8.76 (5.71)	.06 ^b	0.54 (5.56)	.46 ^b	.08 ^b	
	2		1.56 (8.72)	.43 ^b	-1.17 (8.47)	.55 ^b	.38 ^b	
Community ($\alpha = .85$)	3		18.39 (8.63)	.02 ^b	0.80 (8.37)	.46 ^b	.02 ^b	
	2&3	67.43 (18.22)	10.10 (7.57)	.09 ^b	-0.06 (7.37)	.50 ^b	.09 ^b	
	2		2.37 (6.11)	.35 ^b	-0.32 (5.93)	.52 ^b	.33 ^b	
	3		12.02 (6.04)	.02504 ^b	2.28 (5.86)	.35 ^b	.055 ^b	
	2&3		7.29 (5.24)	.08 ^b	1.07 (5.10)	.42 ^b	.12 ^b	
Famous spiritual models: influence and number								
Influence	2	2.32 (1.01)	0.82 (0.47)	.023 ^c	0.13 (0.45)	.50 ^c	.025 ^c	
	3		0.41 (0.47)	.15 ^c	-0.40 (0.45)	.77 ^c	.07 ^c	
Pre-1900	2&3	0.73 (0.85)	0.61 (0.40)	.04 ^c	-0.13 (0.39)	.63 ^c	.07 ^c	
	2		0.08 (0.31)	.34 ^c	0.00 (0.30)	.44 ^c	.42 ^c	
Post-1900	3		0.66 (0.31)	.047 ^c	0.20 (0.30)	.28 ^c	.09 ^c	
	2&3	0.86 (0.85)	0.37 (0.27)	.15 ^c	0.10 (0.27)	.26 ^c	.34 ^c	
	2		0.04 (0.41)	.45 ^c	-0.73 (0.40)	.96 ^c	.06 ^c	
	3		0.28 (0.41)	.15 ^c	-0.40 (0.40)	.67 ^c	.03 ^c	
Pre- & post-1900	2&3	1.59 (1.45)	0.16 (0.35)	.25 ^c	-0.57 (0.34)	.89 ^c	.052 ^c	
	2		0.12 (0.61)	.48 ^c	-0.73 (0.59)	.87 ^c	.16 ^c	
	3		0.95 (0.61)	.09 ^c	-0.20 (0.59)	.60 ^c	.03 ^c	
	2&3		0.54 (0.52)	.22 ^c	-0.47 (0.51)	.70 ^c	.11 ^c	

Note. Exam 2 is post-test, Exam 3 is 8 week follow-up, PM = Passage Meditation, MBSR = Mindfulness Based Stress Reduction, Cx = Control group.

^aAlpha reliability at Exam 1 ($N = 44$).

^b*P*-values from one-tailed tests for group differences in mean change since pretest, from hierarchical linear models.

^c*P*-values from one-tailed nonparametric tests for group difference in changes since pretest.

negative religious coping ($d = -0.88$, $p_2 = .007$ for PM, and $d = -0.71$, $p_2 = .03$ for MBSR; $d = -0.80$ for combined model estimate).

God-images

There were no significant changes in views of God as loving. However, participants demonstrated large and significant reductions in views of God as controlling. Compared to the control group, the PM group showed reductions at Exam 2 of 3.72 ($d = -0.65$, $p_2 = .06$), and at Exam 3 of 4.26 ($d = -0.74$, $p_2 = .03$), while the MBSR group showed reductions of 4.23 ($d = -0.74$, $p_2 = .03$) and 4.40 ($d = -.77$, $p_2 = .02$). In time-constant models, each treatment again showed independently significant beneficial effects ($d = -0.70$, $p_2 = .02$ for PM, and $d = -0.75$, $p_2 = .009$ for MBSR; $d = -0.73$ for combined model estimate).

Aspirations

Participants in the PM group showed significant gains in nonmaterialistic aspirations in comparison to the control group. These gains were marginally significant in two-tailed tests at Exam 2 (1.69, $d = 0.43$, $p_2 = .097$), and fully significant at Exam 3 (2.54, $d = 0.65$, $p_2 = .03$). No significant changes were observed in the MBSR group or in materialistic aspirations.

Hypothesis tests

The main results from tests of our hypotheses are presented in Table 4. For spiritual modeling variables, the PM group showed gains as expected. However, except for the reported influence of spiritual models (Hypothesis 2), PM group gains were only clearly evident at 8 week follow-up. Overall, Hypotheses 1 and 3 received almost no support at posttest (Exam 2) but a great deal of support at 8 week follow-up (Exam 3), when strong gains were evident for almost all outcomes.

Self-efficacy

Self-efficacy changes strikingly illustrate the increases in benefit from posttest to follow-up. For self-efficacy in learning from all models *combined*, compared to the control group, the PM group had gained only 2.02 (directional one-tailed p value [p_1] = .38) at Exam 2. But at Exam 3, the PM group had gained an extra 15.27 ($p_1 = .011$), a “large” increase of nearly a full baseline *SD* ($d = .92$). These PM Exam 3 gains were not only larger than the Exam 2 gains by the PM group ($p_2 = .0503$), but were significantly larger than the Exam 3 gains by the MBSR group ($p_1 = .02$). These results at 8 week follow-up support Hypothesis 1a (PM gains in all models).

Underlying these PM group gains in overall self-efficacy at Exam 3 were self-efficacy gains for famous models alone of 18.39 ($p_1 = .02$, $d = 0.92$), and for community models alone of 12.02 ($p_1 = .025$, $d = 0.66$). These results support Hypotheses 1b and 1c (PM gains in community and famous models). Furthermore, compared to the MBSR group, Exam 3 PM group self-efficacy gains for famous spiritual models and all models combined were significantly larger ($p_1 < .05$), whereas gains for community spiritual models were marginally larger ($p_1 = .055$). These results largely support Hypothesis 1d (larger PM gains compared to MBSR).

Influence of famous spiritual models

As noted earlier, gains versus controls in influence of famous spiritual models were evident in the PM group at posttest ($d = .81$, $p_1 = .02$). These gains were no longer significant at follow-up ($p_1 = .15$), mostly due to gains in the control group between Exams 2 and 3. Pooled across Exams 2 and 3, PM gains were larger than those in the control group ($p_1 = .04$), and marginally larger than the MBSR group ($p_1 = .07$). These results support Hypotheses 2a and 2b (larger PM gains compared to controls and MBSR).

Numbers of famous spiritual models

Gains in numbers of reported famous spiritual models for the PM group were also larger and more significant at Exam 3. Compared to the control group, PM group participants at Exam 3 had gained in Pre-1900 spiritual models by an average of 0.66 ($p_1 = .047$, $d = 0.78$), and in total famous spiritual models by an average of 0.95 ($p_1 = .09$, $d = 0.66$). PM group gains in Post-1900 spiritual models were not statistically significant in comparison to the control group ($p_1 = .15$). These Exam 3 findings support Hypothesis 3b (pre-1900), fail to support Hypothesis 3c (post-1900), and offer marginal support for Hypothesis 3a (all models). Finally, compared to the MBSR group, Exam 3 PM group gains were significantly larger ($p_1 < .05$) for post-1900 famous models and for all famous models combined. By supporting two of its three components, these results largely support Hypothesis 3d (larger PM gains compared to MBSR).

Table 5 summarizes findings for all research questions and hypotheses.

Moderators of effects

Socially desirable responding was uncorrelated with changes from pretest at either Exam 2, Exam 3, or the median of the two exams ($p > .10$), with one exception: PM group Exam 1 to 3 changes in pre-1900 models were marginally associated with socially desirable responding (Spearman correlation $r_s = .55$, $p_2 = .054$). Measures of spirituality, religion, and previous experience of meditation did not significantly moderate effects on any outcomes (all $ps > .10$).

Discussion

This study revealed important similarities as well as differences in effects on college students from two meditation-based interventions. Immediate, favorable, enduring, and remarkably similar impacts of these programs were found on measures of religious coping and on God images. Each program was associated with large reductions in negative religious coping and negative God images, mostly sustained at 8 week follow-up. No changes were seen in positive religious coping or positive God images. As expected, the Passage Meditation intervention showed stronger patterns of gain on several primarily cognitive measures of knowledge and capacity to learn from spiritual models. Most of these spiritual modeling gains were statistically imperceptible at posttest, but emerged clearly at 8 week follow-up.

This study makes several novel contributions to research literatures on meditation and spiritually focused interventions. First, it is one of the very few intervention studies of any type of outcome to examine more than one method of meditation (others have included Alexander, Langer, Newman, Chandler, & Davies, 1989; Dunn, Hartigan, & Mikulas, 1999; Wachholtz & Pargament, 2005). Second, this is one of the few meditation studies to examine

Table 5 Summary of findings on effects of interventions

	Question or hypothesis	Summary of major findings	
		Finding	Exam
Exploratory questions (Q)			
Q1a	Effects on positive religious coping	No changes	any
Q1b	Effects on negative religious coping	Large reduction in each Tx vs Cx ($d = -.88$ for PM, $p_2 < .01$ $d = -.71$ for MBSR, $p_2 < .05$)	2 & 3
Q2a	Effects on God as loving	No changes	any
Q2b	Effects on God as controlling	Large reduction in each Tx vs Cx ($d = -.70$ for PM, $d = -.75$ for MBSR, each $p_2 < .05$)	2 & 3
Q3a	Effects on intrinsic aspiration	PM gained more at FUp than Cx ($d = .65$, $p_2 < .05$) (Follow-up only)	3
Q3b	Effects on extrinsic aspiration	No significant changes	any
Apriori hypotheses (H)			
H1a	Effects for PM on total spiritual modeling self-efficacy (SMSE)	Supported: PM gained more at FUp than Cx ($d = .92$, $p_1 < .025$) (Follow-up only)	3
H1b	Effects for PM on community SMSE	Supported: PM gained more at FUp than Cx ($d = .66$, $p_1 < .05$) (Follow-up only)	3
H1c	Effects for PM on famous SMSE	Supported: PM gained more at FUp than Cx ($d = .92$, $p_1 < .025$) (Follow-up only)	3
H1d	Larger effects for PM than MBSR on SMSE (each type)	Largely supported ($p_1 < .05$ for famous, all combined; $p_1 < .10$ for community models)	3
H2a	Effects for PM on influence of famous spiritual models	Supported: PM gained more at Posttest than Cx ($d = .81$, $p_1 < .025$)	2
H2b	Larger effects for PM than MBSR on influence of famous spiritual models	Largely supported: PM gained more than MBSR at Posttest ($p_1 < .05$), FUp ($p_1 < .10$)	2 & 3
H3a	Effects for PM vs. Cx on total famous spiritual models	Marginally supported: PM gained more at FUp than Cx ($d = .66$, $p_1 < .10$)	3
H3b	Effects for PM on pre-1900 famous models	Supported: PM gained more at FUp than Cx ($d = .78$, $p_1 < .05$)	3
H3c	Effects for PM on post-1900 famous models	Not supported	any
H3d	Larger effects for PM than MBSR on famous spiritual models (each type)	Largely supported at FUp ($p_1 < .05$ for post-1900 and all models combined)	3

Note. Exam 2 & 3 refers to combined analyses of Exams 2 and 3, Exam 2 = post-test, Exam 3 = 8 week follow-up, PM = Passage Meditation, MBSR = Mindfulness Based Stress Reduction, Cx = Control group, Tx = treatment, p_1 = one-tailed p -value, p_2 = two-tailed p -value, d is Cohen's (1988) d -statistic for change in units of pretest standard deviation.

effects on spiritual outcomes; and it surpassed most previous studies by using several multi-item spiritual outcomes rather than a single measure. Third, it is the first study of intervention effects on spiritual modeling, a major concern of traditional religion (Oman & Thoresen, 2003). Fourth, it reveals clear patterns of similarities and theoretically expected differences between two previously studied nonsectarian methods of meditation.

Patterns of change in religious coping and God images were very similar between PM and MBSR, suggesting that these changes may reflect strongly similar components, perhaps most prominently meditation and its effects on the “retraining of attention” (Goleman, 1988, p. 169). Reductions in negative religious coping and views of God as controlling are thought to be healthy and adaptive (Benson & Spilka, 1973; Pargament, Koenig, & Perez, 2000). Precisely how meditation might produce such changes remains unclear. Earlier studies of this cohort suggested that meditation reduces rumination, a maladaptive form of self-focused attention (Oman et al., *in press*). Meditation may also enhance more adaptive forms of self-focused attention that enable overall shifts in styles of self-regulation, cognitive appraisal, and coping (Hamilton & Ingram, 2001). Such changes in coping styles may facilitate and be supported by changes in God images. More specifically, according to major theories of the coping process, appraisal and coping styles are shaped by and in turn shape a person’s “order beliefs” about the nature of the self and the world (Park & Folkman, 1997). Such overall coping benefits are consistent with findings of stress reduction from meditation in this cohort as well as many other populations of all ages (Oman et al., *in press*).

Findings that the PM group gained in spiritual modeling measures in comparison to the other group were expected, due to its explicit support of spiritual modeling processes (Oman & Beddoe, 2005). One of these effects could be in part an artifact of socially desirable responding, but other spiritual modeling effects appear valid. Larger PM group gains at follow-up in nonmaterialistic aspirations, if not due to chance, might also be explainable by greater exposure to models of nonmaterialistic aspirations. Less clear is why so few spiritual modeling differences were significant at posttest. Such “lags” in the appearance of effects from Passage Meditation have been noted before, however. In a randomized study of health professionals, Oman et al. (*in press*) noted substantially stronger effects at 8 week follow-up than at posttest on several well-being measures. Benefits from many lifestyle practices (e.g., physical exercise, diet, meditation) are commonly theorized to accumulate over time. Accumulation over time of benefits from PM practice might explain the observed lags in gains in spiritual modeling measures.

Practical implications

Findings of salutary changes in religious coping and God image, if replicated, suggest that the PM and the MBSR programs may foster not only mental health but also spiritual benefit. Such benefits might also be hypothesized for other forms of meditation or contemplative prayer (Goleman, 1988; Keating, 1986/1997; Main, 1999). The present findings in a college cohort are most directly relevant to pastors or health professionals working with college populations, but are also informative for those working with more general populations, since broadly similar processes and benefits may occur in all adult age groups.

We do not know the long-term significance of the spiritual modeling advantages for the PM group. Our 8 week follow-up period did not allow us to examine whether the MBSR group might obtain spiritual models from other sources over longer time periods (Oman & Beddoe, 2005). This is plausible in part because the attention-training process *itself* might foster enhanced spiritual interest (Benson & Stark, 1997). Attentional transformations from meditation may naturally lead meditators over time to seek out beneficial connections to

spiritual models. If such practice-induced transformations outweigh initial spiritual modeling exposure, then the observed PM advantages in spiritual models may have little long-term importance.

On the other hand, initial measured advantages in spiritual modeling might also plausibly translate into steadier and more sustained spiritual growth over time, a possibility consistent with modern psychological theory (Bandura, 2003).

Perhaps the clearest implication of these findings is that much can still be learned about how modern religious professionals and their congregations can most fully benefit from meditation and contemplative prayer. Findings suggest that spiritual gain might come through either PM or MBSR, as well as other forms of systematic meditation and contemplative prayer (Keating, 1986/1997; Main, 1999).

One possibility is that different methods of meditation meeting certain threshold criteria (e.g., those in Table 1) may engender similar long-term effects on spiritual, mental and physical well-being. If so, a key practical issue may be optimally *matching* individuals or congregations with the most compatible method of contemplative prayer or meditation. While evidence remains limited, empirical studies have supported using a prognostic personal difference variable to match individuals with different substance abuse treatments (Project MATCH Research Group, 1998). Similarly, perhaps some devotionally oriented individuals might find Passage Meditation most congenial and motivating, because it allows them to immerse their mind in cherished religious texts and narratives. Those not especially drawn to texts may find the MBSR program an inspiringly simple way of gaining greater awareness of divine forces within and around them. Depending on factors such as theological orientation, size, and availability of skilled instructors, pastors might seek to foster strong congregational cultures of spiritual practice by systematically introducing one or many methods of meditation, while emphasizing the potential benefits of personal commitment to a single integrated method (rather than a shifting eclecticism: see Wuthnow, 1998 on differences between a spirituality of “seeking” compared to one of “practice”; also Driskill, 1999). The phenomenon that many paths can lead to the same goal has long been recognized in some spiritual traditions, is termed “equifinality” in general systems theory, and is drawing increasing interest in modern psychology (Curtis & Cicchetti, 2003; Tarakeshwar, Pargament, & Mahoney, 2003; von Bertalanffy, 1968).

Generalizability

Most participants were female, white, and first-year, so it is unclear whether results fully apply to males, nonwhites, and older students, or to students at universities that are not Roman Catholic. More broadly, the present results appear most likely to generalize to other populations that are similarly self-selected, and may not apply to any campus as a whole. Yet as Deckro and colleagues noted about training in stress management, “unless such programs become an integral part of student orientation or are otherwise made compulsory, participants will always be self-selected” (Deckro et al., 2002, p. 286).

Limitations

Aside from constraints on generalizability, other limitations of this study include its relatively small sample size and correspondingly reduced statistical power for assessing precise changes over time. Furthermore, prior to the first meeting, some participants changed between the PM and MBSR group, perhaps biasing estimates of differences between the effects of the two treatments. Many of the psychometric properties of our spiritual measures are not presently

known. Finally, the absence of an active control group treatment, to adjust for generalized benefits of participating in a group, leaves open what specifically accounted for the observed changes in religious coping and God images.

Strengths and future directions

Despite these limitations, this study had several strengths. We used a randomized design that included a diverse group of multi-item spiritual assessments at multiple time points following the intervention. We examined two interventions. Our post-randomization dropout rate of $3/47 = 6\%$ was low in comparison with many other meditation studies in college populations (e.g., 17% by Tloczynski & Tantriella, 1998, and 39% by Astin, 1997), thereby allowing far less scope for biases from differential attrition.

The present results greatly extend earlier college student meditation studies in which spiritual benefits were suggested by changes in single measures. Tasks of future research include testing the replicability and generalizability of the present results, as noted earlier. Other forms of meditation or contemplative prayer that foster learning from spiritual exemplars also merit study, using broader arrays of spiritual measures. Larger sample sizes could permit systematic exploration of prognostic variables for “matching” approaches at the level of the individual or congregation (Project MATCH Research Group, 1998).

Conclusion

“When religions are sifted” for their best qualities, writes eminent scholar Huston Smith (1991), “they begin to look like data banks that house the winnowed wisdom of the human race” (p. 5). Our findings are consistent with longstanding teachings that this wisdom includes not only beliefs about the nature of spiritual realities, but also spiritual practices such as meditation and contemplative prayer. A third precious element in these “data banks,” we suggest, is exemplary spiritual *lives*—more specifically, information about the words, deeds, attitudes and experiences of spiritual models.

We do not know the long-term implications of enhanced ability to learn from spiritual models, but the considerations brought forward here suggest the topic merits attention. Our empirical findings suggest that both programs under study here have captured potent elements of spiritual wisdom traditions that may powerfully influence spirituality and well-being outcomes. These and similar programs of meditation and contemplative prayer merit continued study of their specific and joint potential contributions to physical, mental, and spiritual health and development.

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Appendix

Effects of interventions on the 13 outcome variables were analyzed in 13 separate hierarchical linear regression models (Raudenbush & Bryk, 2002). Hierarchical linear models (HLMs) are increasingly a tool of choice for analyzing longitudinal data, and are sometimes

known, especially among physical scientists, as linear mixed models (Singer, 1998). Compared to more conventional methods such as ANOVA, HLM allows improved handling of unbalanced designs and missing data, and more flexible analyses of data gathered at multiple timepoints. In HLM terminology (Raudenbush & Bryk, 2002), our regressions used the following model:

$$Y_{k(i),t} = c_0 + \beta^{(PM)} I^{(PM)}_{k,t} + \beta^{(MBSR)} I^{(MBSR)}_{k,t} + R_{k(i)} + G_k + T_t + e_{k(i),t}$$

In this formula, $Y_{k(i),t}$ represents the outcome for the i th individual within the k th treatment condition ($k = 1, 2$ or 3) at exam t ($t = 1, 2$ or 3). The treatment effect for PM (in this “time-constant” treatment effect model) is represented by $\beta^{(PM)}$, which is the coefficient of $I^{(PM)}_{k,t}$, a “Level 1” predictor that is 1 for the PM group at Exams 2 and 3, and 0 otherwise. Thus $I^{(PM)}_{k,t}$ represents whether an individual at time t has received the PM intervention, but the magnitude of benefit ($\beta^{(PM)}$) does not vary between timepoints. Similarly, $\beta^{(MBSR)}$ represents the treatment effect for MBSR, and $I^{(MBSR)}_{k,t}$ is the corresponding indicator. The other terms in the model represent adjustments and an error term. Adjustment for preexisting individual differences in outcome level is included as a “Level 2” random effect, represented by $R_{k(i)}$. Adjustment for group assignment (e.g., baseline group differences, despite their lack of statistical significance) is included as a Level 2 fixed effect, represented by G_k . Adjustment for temporal trends that affect all participants equally is included as a Level 1 fixed effect, represented by T_t . Residual error, the discrepancy between the observed and expected outcome of individual $k(i)$ at exam t , is represented by the Level 2 random effect $e_{k(i),t}$, assumed to be independent and normally distributed with mean of zero and a variance of σ^2 . The global intercept is represented by c_0 .

To explore whether the treatment effects might change or decay over time, initial regression models permitted each treatment effect to vary between Exams 2 and 3 (“time-varying” treatment effect model). These time-varying models replaced $\beta^{(PM)} I^{(PM)}_{k,t}$ in the above formula with $\beta^{(PM)}_2 I^{(PM,2)}_k + \beta^{(PM)}_3 I^{(PM,3)}_k$ where $\beta^{(PM)}_t$ is treatment effect at Exam t , and each $I^{(PM,t)}_k$ (for $t = 2$ or 3) is a Level 2 predictor variable equal to 1 at Exam t for PM group participants, and zero otherwise. Similarly, $\beta^{(MBSR)} I^{(MBSR)}_{k,t}$ was replaced with $\beta^{(MBSR)}_2 I^{(MBSR,2)}_k + \beta^{(MBSR)}_3 I^{(MBSR,3)}_k$.

We also conducted combined analyses that were based on the assumption of equal effects for the two interventions. These models replaced terms specific to PM ($\beta^{(PM)} I^{(PM)}_{k,t}$) and MBSR ($\beta^{(MBSR)} I^{(MBSR)}_{k,t}$) with generic intervention terms ($\beta^{(Tx)} I^{(Tx)}_{k,t}$).

All regression analyses were implemented using SAS Proc Mixed (Singer, 1998).

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