An eight-week program in stress-reduction based on training in mindfulness meditation:

*Effects on psychological symptomatology,*
*sense of control,* and *spiritual experiences*

Published in *Psychotherapy and Psychosomatics* (1997), 66(2), 97-106

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INTRODUCTION

It has been estimated that 50% of all medical patients seen in general practice are suffering from stress-related problems (Manuso, 1978). The Public Health Service’s 1979 report entitled “Healthy People” similarly concluded that excessive stress was a serious public health concern for Americans (Dept. of Health, Education & Welfare, 1979). Research suggests that stress may exacerbate or be a significant etiological factor in hypertension (Shapiro & Goldstein, 1982; Fredrickson & Matthews, 1990), heart disease (Treiber et al., 1993) alcohol/drug abuse (Baer, Garmezy, McLaughlin, Pokorny, & Wernick, 1987; Brennan & Moos, 1990) anxiety (Jacobson, 1978), depression (McGonagle & Kessler, 1990), and gastrointestinal disorders (Whitehead, 1992). These conditions may be symptomatic of excessive psychophysiological stress or represent maladaptive attempts to cope with the challenges and stresses of life (Everly, 1989).

Correspondingly, when one considers the tremendous cost of treating these conditions (e.g. with anxiolytics, anti-depressants, drug and alcohol rehabilitation programs, psychotherapy, over-the-counter products for G.I. disturbances, anti-hypertensive medications, etc.), stress-reduction/management techniques emerge not only as potentially important preventive medicine tools but also as invaluable aids in reducing our nation’s enormous health care bill. It has been estimated, for example, that stress-related disorders account for as much as $17 billion a year in lost productivity at the workplace (Taylor, 1995).

The potential health and economic benefits of stress-reduction programs are in fact now being realized by several large insurance companies that have begun offering reimbursement for two more notable programs, Dr. Deane Ornish’s (Ornish, 1990) “Program for Reversing Heart Disease” and “The Stress-Reduction and Relaxation Program” developed by Jon Kabat-Zinn (1982) at the University of Massachusetts (Matsumoto, 1994; Miller, 1994).

It is important that further clinical research be conducted in order to test the relative effectiveness of these and other stress-reduction programs. The degree to which such programs are perceived as effective and legitimate health care strategies in the eyes of practitioners, insurers and the general public will depend, in part, on whether with well-controlled outcome studies these initially promising findings concerning their efficacy can be replicated.
The present study represents such an attempt. It was designed to further test the potential health benefits of an eight-week program in stress-management modeled very closely after Kabat-Zinn’s “Stress-Reduction and Relaxation Program” (SR&RP) (Kabat-Zinn, 1982). Despite the serious methodological limitations of using self-selected samples and not having adequate comparison or control groups, previous findings suggest this eight-week intervention may be effective both in terms of reducing psychological symptomatology and helping individuals suffering from various forms of chronic pain to cope more effectively with its disabling psychological and physical effects (Kabat-Zinn, Lipworth, & Burney, 1985; Kabat-Zinn et al., 1992).

For example, Kabat-Zinn et al. (1992) studied the effects of the this intervention on twenty-two patients who met the DSM-III-R diagnosis of generalized anxiety disorder or panic disorder with or without agoraphobia. Twenty of these patients showed marked improvement in both anxiety and depression following participation in the eight-week outpatient stress reduction program. This improvement was maintained at a three-month follow-up (both in terms of patients’ self-ratings and clinical interviewers’ ratings). In addition, these researchers reported a significant linear decrease in the number of patients reporting panic attacks between pre, post and follow-up assessments. Further analysis conducted with 18 of the 22 participants found that after three years, the lower levels of both anxiety and depression found in the initial three-month follow-up had been maintained (Kabat-Zinn et al., 1992).

Kabat-Zinn et al. (1985) also studied the effects of the mindfulness stress-reduction program on ninety chronic pain patients. When compared to a population undergoing treatment in the hospital’s outpatient pain clinic (traditional methods included nerve blocks, TENS, physical therapy, analgesics and antidepressants), their subjects showed significant reductions in pain-related symptomatology. These reductions were reflected in lowered scores on the Melzak Pain Rating Index, the Body Parts Problem Assessment Scale (Kabat-Zinn, 1982) and a measure assessing the degree to which pain interfered with daily life activities. Significant reductions were also observed in psychological symptomatology as measured by the General Severity Index of the Hopkins Symptom Checklist. Additionally, of the patients who were using drugs to control their pain (N=39), 72% reported decreasing or eliminating their medications altogether. These researchers extended the follow-up on the aforementioned 90 patients from 15 months to 4 years,
adding an additional 135 experimental subjects to their study sample (Kabat-Zinn, Lipworth, Burney, & Sellers, 1987). The significant improvements in negative body image and psychological symptomatology observed post-intervention were maintained for up to four years.

Kutz et al. (1985) examined the effects of a ten-week program (modeled specifically after Kabat-Zinn's mindfulness-based stress reduction program) as an adjunct to psychotherapy. This descriptive outcome study explored the clinical usefulness of training in mindfulness meditation techniques in twenty patients undergoing long-term psychotherapy (presenting problems ranged from severe personality disorders to anxiety and obsessive neuroses with psychotic patients being excluded). Significant decreases in psychological symptomatology (as measured by the SCL-90-R and the Profile of Mood States) were observed both post-intervention and at six month follow-up. The largest decreases were observed in anxiety and depression, although significant changes were found on all nine scales of the Hopkins Symptom Checklist except for Paranoid Ideation and Psychoticism. The reductions in SCL-90-R scores were similar to those observed in a recent study examining the effects of short-term psychotherapy (lasting approximately 40 weeks) for personality disorders (Winston et al., 1994).

The changes in SCL-90R scores observed by Kutz et al. (1985) were also consistent with therapists' clinical ratings, both post-intervention and at follow-up. They rated a majority of these subjects as showing moderate to great improvement in a number of areas including overall intensity of current problems, overall psychic distress, anxiety, depression, self-assertion and insight. They reported little change in 60-90% of patients in the areas of hostility, interpersonal relationships, family adjustment, sexual adjustment, and emotional inhibition.

However, as with the previous cited studies examining the clinical usefulness of the Kabat-Zinn stress program, this study also has some serious methodological limitations, principally the absence of any type of comparison group. For example, it is unclear whether the observed changes in symptomatology were the result of subjects' involvement in the meditation intervention, their participation in individual psychotherapy, or some combination of or interaction between the two.

In terms of reductions in symptomatology as measured by the SCL-90-R, Kabat-Zinn and colleagues (1982) observed mean decreases in General Severity Index (GSI) Scores of 34-38%. These findings are comparable to other research on both meditation and a variety of biobehavioral techniques. For example, Lehrer, Woolfolk, Rooney, McCann, & Carrington, (1983) observed a
25% reduction on GSI scores following involvement in a five-week program of meditation using Carrington’s (1977) “Clinically Standardized Meditation,” while subjects trained in progressive relaxation evidenced a 47% reduction in GSI scores (subjects in both conditions were compared with waiting-list controls). Using standardized scores, Andrews & Hall (1990) observed a decrease in GSI scores from the 84th to the 50th percentile in a group of patients suffering from aphthous stomatitis who were trained in hypnosis-like relaxation and imagery. Other studies, however, have shown much more modest reductions on SCL-90-R scores using biobehavioral techniques. For example, Kuile et al., (1994) observed no reductions in GSI scores in a group of headache sufferers practicing cognitive self-hypnosis compared with a small yet still non-significant decrease of 5% in headache patients practicing autogenic training. Finally, the symptom reductions observed by Kabat-Zinn in his work are similar to those reported by Kaplan, Goldenberg, & Galvin-Nadeau, (1983) who examined the efficacy of using the SR &RP program with patients suffering from fibromyalgia and found a mean decrease in GSI scores of 37%.

Despite the encouraging findings on the SR&RP cited above, both Kabat-Zinn et al. (1985) and Kutz et al. (1985) point out that further research is needed to test the effectiveness of this meditation-based intervention using better controlled, experimental designs. In an effort to control for the confounding factors, history, maturation, and testing effects (Campbell & Stanley, 1963), the present study used an experimental design in which subjects were randomized into either the eight-week stress reduction program or a non-intervention control group. The present study also attempted to test whether the previously reported positive changes resulting from this program might generalize to a non-clinical population.

Along with testing, in a more controlled setting, the effectiveness of this intervention in reducing psychological symptomatology, the present study also examines the impact of this eight-week program on subjects' sense of control using the Shapiro Control Inventory (Shapiro, 1994) as well as spiritual experiences using the Index of Core Spiritual Experiences (Kass, Friedman, Lesserman, Zuttermeister, & Benson, 1991).

**Sense of Control**

Research suggests that having a sense of control over one’s cognitive, affective and behavioral experiences and expression is associated with greater mental health, and that a common
goal of most psychotherapies is to enhance patients’ feelings of control (Strupp, 1970; Frank, 1982; Shapiro, Schwartz & Astin, 1995). Although a large body of research suggests the relationship between control and both physical and mental health is a linear one (i.e. greater perceived or actual control leads to healthier outcomes), findings from a number of studies suggest that seeking and having control can negatively impact health (cf. Shapiro et al., 1995).

Because of its hypothesized links to a number of health outcomes, the present study examines the impact of the stress-reduction program on subjects’ sense of control (in both general and specific domains) using a multidimensional measure of control developed by Shapiro (1994). This measure will also enable us to assess “desire (or motivation) for control,” “agency (or source) of control,” and “mode of control.”

Figure 1 below depicts the four modes or customary ways of exercising control assessed by the Shapiro Control Inventory (SCI). In an effort to address the possible negative consequences of seeking and gaining control discussed above, the SCI also includes two subscales that assess negative modes of exercising or gaining control. This model also attempts to go beyond previous operationalizations of control which have focused primarily on active, instrumental efforts to gain control by including an accepting or positive yielding mode of control. Shapiro (1994) has suggested that psychological health is reflected in both higher scores on as well as a balance between positive assertive and positive yielding/accepting modes of control (Quadrants I and II in Figure 1) and lower scores on negative assertive and negative yielding modes (Quadrants III and IV).

Inclusion of the Shapiro Control Inventory as an outcome measure in the present study comes out of previous research (Easterline, 1992; Shapiro, 1992) suggesting that meditation practice may increase positive yielding control scores and that participation in a stress reduction program aimed at reducing Type A behavior can improve subjects’ overall sense of control as well as scores on both positive assertive and positive yielding modes of control (Shapiro, Friedman & Piaget, 1991).
Spirituality

Several recent studies have emerged suggesting that spiritual factors may be significant, both in terms of predicting various health outcomes (Oxman et al., 1995; Levin, 1994), and as important though frequently overlooked components of general health and well-being (Hawks, Hull, Thalman, & Richins, 1995; Kass et al., 1991). In terms of the latter, a recent review of the health promotion literature singled out the Kabat-Zinn stress-reduction program as one of three model interventions which seemed, along with fostering greater psychophysical health and well-being, to promote spiritual health and well-being as well. In their article, Hawks et al. (1995) defined “spiritual health” as:

“A high level of faith, hope and commitment in relation to a well-defined world-view or belief system that provides a sense of meaning and purpose to existence in general, and that offers an ethical path to personal fulfillment which includes connectedness with self, others, and a higher power or larger reality (p. 373 ).”

In order to better study “spirituality,” these researchers note the importance of developing more precise methods for measuring the various subcomponents of this construct. One such effort can be seen in the work of Kass et al. (1991) who, in an attempt to quantify aspects of spirituality or spiritual experiences, developed a seven-item scale termed the INSPIRIT (Index of Core Spiritual Experiences). Preliminary tests of this measure have shown it to be positively correlated with decreased frequency of medical symptoms (Kass et al., 1991). The inclusion of this measure in the present study represents a further attempt to examine the relationship of the variable “spirituality” to health and well-being.
Overview of the Stress-Reduction Program

The Stress-Reduction & Relaxation program (SR&RP) developed by Kabat-Zinn (1982) is centered around the principles of mindfulness meditation (for a more complete description of the program see Method section). Mindfulness meditation has its roots in the tradition of Theravada Buddhism (it is also referred to in the literature as “satipatana vipassana” or insight meditation). Although it presupposes concentrated awareness, it differs in part from the well-known forms of concentrative meditation such as T.M. and its derivatives (Benson, 1975; Carrington, Collings, & Benson, 1980) in that, rather than restricting attention to one single object or focal device, it emphasizes the detached observation or witnessing of perceptions, sensations, cognitions, and emotions as they arise moment to moment in the field of awareness. In mindfulness practice, no event (e.g. the wandering of the mind) is considered a distraction; rather, it is simply another object to be observed or witnessed. The emphasis is placed on attending to any and all thoughts, sensations, etc. (developing “bare attention”) in the field of consciousness without judgment or interpretation, or to simply notice when these have occurred.

One of the central purposes of these meditation practices, both in their original religious/spiritual context and their more modern applications in behavioral medicine, is “to become a detached observer of one’s own mental activity, so that one thereby may identify its habits and distortions (Kutz et al., 1985).” As contrasted with many cognitive-behavioral techniques, meditation involves the regulation of attention rather than (control of) belief or other cognitive processes (Goleman & Schwartz, 1976).

Mindfulness meditation, both as it is traditionally taught (Nyanaponika, 1962) and as it is learned in Kabat-Zinn’s stress-reduction program contains elements of both concentrative meditation (e.g. stabilizing attention on a specific object such as the breath) and non-focal or “opening up” meditation (Shapiro, 1980). Emphasis is also placed on cultivating this mindful awareness more informally, making conscious attention to one’s internal and external environment as much a way of life as a formal technique practiced once or twice daily.
Hypotheses To Be Tested

Based on the research findings cited above, participation in the present study’s eight-week stress-reduction program based on training in mindfulness meditation is hypothesized to: (1) reduce overall psychological symptomatology as measured by the General Severity Index of the Symptom Checklist 90-Revised--SCL-90-R). Reductions will be observed on the SCL-90’s scales which reflect somatic (e.g. “somatization” scale) as well as psychological (e.g. “anxiety,” “depression” scales) components; (2) positively affect individuals’ mode of control (customary ways of exercising control in their lives), as evidenced by higher scores on positive assertive and positive yielding modes on the Shapiro Control Inventory--SCI-- and/or lower scores in negative assertive, negative yielding following the intervention; (3) positively affect individuals’ overall sense of control in both the general and specific domains on the SCI; and (4) contribute to an increase in spiritual experiences/feelings as measured by the INSPIRIT.

METHOD

Twenty-eight undergraduate students in an upper division Behavioral Medicine class volunteered to participate in this study. Following the administration of a series of pre-intervention measures (see below), fourteen of these students were randomly selected for the intervention group with the remaining fourteen serving as non-intervention controls. These control subjects were told that they would be administered a second set of measures in eight weeks and also that they would be notified of the next available stress-reduction program being offered. There was no other contact between the researcher and the control subjects following the period of initial testing and prior to administering the post-intervention measures. Of the fourteen individuals who received the intervention, twelve completed the entire eight-week program and were administered the set of post-measures. There were 11 females and 1 male.

Seven of the fourteen individuals serving as non-intervention controls responded to our request to take the series of post-intervention measures. There were no males among the controls.
**Measures:**

The following measures served as the principal quantitative dependent variables in the study:

1) **Hopkins Symptom Checklist 90 (Revised)**--SCL-90-R (Derogatis, 1977): A ninety item instrument consisting of the following nine sub scales: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism, and an “additional items” scale comprised of seven questions, five of which relate to disturbances in sleeping and eating. The SCL-90-R provides one with a measure of overall psychological distress, calculated as the “General Severity Index.”

2) **Shapiro Control Inventory**--SCI (Shapiro, 1994): An 187-item instrument that provides information in four major areas: a) one’s perceptions of or sense of control, both in the general domain and in seven specific domains [body, mind, relationships, self, career, environment, and “other” (consisting of items on alcohol, drugs, gambling, smoking, violence, and time-management)]; b) one’s mode of control, describing individuals’ characteristic cognitive/behavioral style of responding to control related issues along four different quadrants: positive assertive, positive yielding, negative assertive, negative yielding; c) motivation for control which includes information on one’s desire for control, over control issues, and preferred ways of dealing with specific parameters that are of concern; and d) information on one’s agency of control which identifies the sources of one’s sense of control (e.g. internal and/or external).

3) **Index of Core Spiritual Experiences**--INSPIRIT (Kass et al., 1991), a seven-item scale designed to assess two characteristic elements of core spiritual experiences: 1) “a distinct event and a cognitive appraisal of that event which resulted in a personal conviction of God’s existence (or of some form of Higher Power as defined by the person” and 2) “the perception of a highly internalized relationship between God and the person (i.e. God dwells within and a corresponding feeling of closeness to God) (Kass et al., 1991).”

In addition to the above measures, participants in the intervention were asked to complete compliance diaries where they would record daily, which stress-reduction techniques were practiced and for how long. Following the eight-week program, they were also asked to rate the relative effectiveness of the intervention’s different components as well as provide qualitative, open-ended feedback regarding any benefits they may have received.
**Structure of the Stress-Reduction Program:**

Participants attended weekly two hour meetings held at the University of California, Irvine. During these group meetings they received training in the following meditative practices (adapted from Kabat-Zinn (1982): 1) “Body Scan,” a gradual “sweeping” or movement of attention through the body from feet to head, focusing on proprioception, with periodic suggestions of breath awareness and relaxation, practiced in the supine position; 2) “Sitting Meditation” involving mindfulness of breath and other perceptions,” practiced primarily in the sitting position on a cushion or chair (see instructions below); and 3) “Hatha Yoga” which involved simple stretches and postures designed to strengthen and relax musculoskeletal system and develop mindfulness (greater awareness) during movement.

In learning meditation, subjects were instructed to first bring their attention to the primary object of observation (e.g. the breath, sound, thoughts, bodily sensations) and simply be aware of it from moment to moment. Whenever the attention wanders or drifts into thoughts, memory, fantasy, etc., they were told to simply notice, without evaluation or judgment, that it has wandered and return to the present moment observation of the primary object.

In addition, when a strong feeling or emotion arises (e.g. a fear, anxiety, pain), they were instructed to direct their attention to the feeling as it occurs, simply being with it, observing it. When it subsides, they should return to the object of attention. They were asked to try and distinguish between observation of the experience itself and thoughts about or interpretations of the experience.

Finally, they were instructed to observe the thinking process itself without becoming involved in the content of individual thoughts. They were asked to observe thoughts as impermanent mind events and not necessarily accurate, treating all thoughts as equal in value without pursuing or rejecting them.

The use of a variety of objects of attention in the meditation practices was designed to help subjects bring mindfulness or awareness to the varied experiences and circumstances (whether “stressful” or not) encountered in life.

The weekly group meetings also included didactic presentations and discussions on the psychology and physiology of the stress response and the practical application of these meditative
techniques for coping with stress. At the meetings, participants also received cassette tapes containing further instructions on the stress-reduction techniques and were asked to practice with them at home for 45 minutes per day, five days a week. They were asked to keep a daily diary in which they recorded the amount of time and which exercises were practiced.

The eight-week program described above was facilitated by this researcher. Although modeled closely after the SR&RP at the University of Massachusetts, the present program was slightly modified in two respects. First, participants were asked to practice five times per week as contrasted with six times in the SR&RP program. Second, participation in the program at UMass Medical Center includes one all-day (eight hour) retreat/group meeting devoted to practicing the stress-reduction techniques. This all day meeting was not included in the present study. It was felt that these two modifications to the program would be more appropriate for a non-clinical population in which motivation to practice might not be as great.

**Statistical Analyses:**

Analysis of covariance was performed using as the dependent variable the difference between pre and post scores (e.g. post SCL-90-R total score minus pre SCL-90-R score = change variable) and using the baseline level of that variable as a covariant (all ANCOVA results that follow similarly used baseline levels of the dependent variable as covariants). The stress-reduction treatment served as the independent variable (coded as dummy variable of treatment or no treatment).

**RESULTS**

To check on the efficacy of the random assignment process, intervention and control groups were compared by analysis of variance on their pre-treatment General Severity Index levels. Results showed no significant differences between the two groups on this measure, $F(2, 16) = .39, p = .55$. The groups also did not differ significantly on pre-levels of Overall Sense of Control, INSPiRIT, or in terms of age.
SCL 90-R:

Significant effects for the stress-reduction intervention were observed on the General Severity Index, $F(2,16) = 15.87, p < .002$ and on the following subscales (see Table 1): Depression, $F(2,16) = 12.34, p < .005$; Anxiety, $F(2,16) = 7.05, p < .02$; Obsessive-Compulsive, $F(2,16) = 9.55, p < .01$; Somatization, $F(2,16) = 16.73, p < .005$; Interpersonal Sensitivity, $F(2,16) = 7.94, p < .05$; Psychoticism, $F(2,16) = 9.27, p < .01$; and Paranoid Ideation, $F(2,16) = 9.87, p < .01$. Observed changes in the control group scores from pre to post were analyzed with separate t-tests. Results indicated that these changes were non-significant for all dependent measures with the exception of scores on the INSPIRIT (see below).

--------------------------------- INSERT TABLE 1 ABOUT HERE ---------------------------------

The mean decrease in the GSI of 64% (see Figure 2) following participation in the stress-reduction program is even larger than the changes observed in previous research on this program. Kabat-Zinn (1982), for example, reported mean changes of 34-38% on this measure of psychological symptomatology (see discussion section).

--------------------------------- INSERT FIGURE 2 ABOUT HERE ---------------------------------
Shapiro Control Inventory (SCI):

Sense of Control--ANOVA revealed that those who participated in the stress-reduction program, compared to the controls, showed significantly greater change in overall sense of control in the specific domains $F(2,16) = 7.29$, $p < .02$. Among these experimental subjects, increases in the overall sense of control in the general domain, though in the expected direction were not significant ($p < .20$). Of the seven specific domains that are assessed by the SCI, significantly greater changes in sense of control were observed in the areas of “career,” $F(2,16) = 7.29$, $p < .02$ and “other,” $F(2,16) = 8.06$, $p < .02$. Changes in the five other specific domains were all in the expected direction with the area of “relationships” approaching significance ($p < .08$).

Further analysis of the “other” domain (which assesses control in the areas of drug and alcohol use, smoking, violent behavior, gambling, and time management) revealed that significant change was evidenced in the area of time management, $F(2,16) = 5.59$, $p < .04$.

Mode of Control--ANOVA results indicated a positive effect of the treatment in quadrant two (“positive yielding or accepting” mode of control), $F(2,16) = 6.2$, $p < .03$ (see Table 3). Although not statistically significant, differential changes in the other modes were also in the expected direction following the intervention [i.e. higher scores in quadrant one (“positive assertive”), lower scores on quadrants three and four (negative assertive and negative yielding)].

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INSERT FIGURE 3 ABOUT HERE

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Motivation for Control--ANOVA revealed that the experimental group showed a greater increase in overall mode satisfaction, $F(2,16) = 7.30$, $p < .02$ (this is a measure of the degree to which individuals would prefer to stay the same or change in terms of the different words/phrases--e.g. “assertive,” “trusting”-- reflecting the four modes of control).

The SCI also assesses the degree to which people are satisfied with or concerned about their control in the seven specific domains (body, mind, relationships, career, self, environment, and other). If a parameter is of concern they are asked whether they would like to use active change to alter the area or gain “greater acceptance of what is.” Although not statistically significant, there
was a larger decrease in the degree of parameter satisfaction for those who received the intervention, whereas controls showed a slight increase. ANCOVA, however, indicated a significantly greater increase in acceptance as the preferred response mode for those who received the stress-reduction intervention, $F(2,16) = 5.02$, $p < .04$.

Agency of Control—This scale on the SCI attempts to identify the sources of a person’s sense of control. Compared to controls, participants in the intervention evidenced a significantly greater increase on the measure of “self as source of control,” $F(2,16) = 9.30$, $p < .008$. These individuals also tended to show an increase on the measure of “other as source of control” but this finding was not significant ($p = .18$).

Index of Core Spiritual Experiences (INSPIRIT)

Scores calculated for this measure can range from 1-4. ANCOVA revealed a significant increase for those individuals participating in the stress program, $F(2,16) = 6.6$, $p < .03$, with mean scores from pre to post increasing from 2.78 to 2.94. As cited earlier, a t-test was performed which revealed that changes from pre to post were significant ($p < .04$), with the mean score in this group decreasing from 2.87 to 2.73.

However, in contrast with previous findings discussed earlier (Kass et al., 1991), in the present study’s sample, higher scores on the INSPIRIT did not correlate significantly with decreased symptomatology as measured by the SCL-90-R.

Compliance

Participants were asked to keep diaries and record which specific stress-reduction techniques they practiced each week and for how long. The amount of practice and the degree of change in SCL-90-R scores on the General Severity Index were found to be unrelated.

Results from participants’ compliance diaries indicated that on average, subjects practiced the stress-reduction techniques 30 minutes per day, three and one-half days a week, over the course of the eight-week program (they were instructed to practice for 40-45 minutes, five days a week).
Participants were also asked to rate the relative importance of several components of the stress program. Following is a list of each component with its mean ranking in parentheses (1 = greatest importance): *Awareness of breath in daily life* (1.1), *facilitator* (2.4), *yoga* (2.9), *sitting meditation* (2.9), *group support/feedback* (3.0), and *body scan* (3.7).

In an effort to test whether the positive effects of the intervention were simply the product of attention from the facilitator or the group, correlations were obtained which revealed no significant relationship between how individuals ranked the relative importance of the group and the facilitator and the degree to which their scores on the SCL-90-R improved.

*Results from Qualitative Measures*

Immediately following the eight week program, participants were asked to respond to the following question: “On a scale of 1-10, rate how true this sentence is for you: ‘I feel I received something of lasting value and importance from this stress-reduction program.’” Mean ratings were 9.3. They were then asked to comment on what specifically they felt they received as a result of their participation. The following is a sampling of feedback from participants.

“[I feel] less paralyzed by difficult emotions.”

“Realized that I need to take a step back and enjoy what’s going on in the moment and not get caught up in the ‘rat-race.’”

“I now have a sense of direction and am not afraid to pursue it despite the obstacles. I have more self-confidence and self-esteem. I am a happier individual...”

“Nothing is as bad as it seems...I am in control of my body’s reactions to things...Think before you act.”

“...appreciating and being aware of the intricate goings-on of our environment.”

“...breathing, stepping back and looking at the stressful situation differently.”

Several participants also reported some noticeable behavioral changes. One woman reported fewer tension headaches, another a reduction in low back pain and two reported sleeping better.

*Follow-Up Analyses*

Follow-up questionnaires were obtained from five of the twelve experimental subjects (we were unable to obtain follow-up information on control subjects). The completed measures were
received from six to nine months following their completion of the program. Follow-up General Severity Index scores from the SCL-90R were compared with both pre and post levels of this measure. Paired t-tests revealed that there was no significant difference between post GSI scores (mean = .13) and follow-up scores (mean = .28) for these five subjects. However, the decrease from pre (mean = .50) to follow-up GSI levels for these five subjects was not significant.

DISCUSSION

Major findings of this study suggest that participation in this eight-week meditation-based stress-reduction program was effective in terms of: 1) reducing overall psychological symptomatology, with significant improvements seen on the following subscales of the SCL-90-R: Depression, Anxiety, Obsessive-Compulsive, Somatization, Interpersonal Sensitivity, Psychoticism, and Paranoid Ideation; 2) increasing participants' overall, domain specific sense of control (with specific changes observed in the "career" and "time management" components of this subscale); 3) increasing the degree to which participants utilized a positive yielding, or accepting mode of control as well as greater overall satisfaction with their modes of control; 4) contributing to positive changes in participants sense of self as agency or source of control; 5) increasing scores on a measure of spiritual experiences.

The observed reductions in psychological symptomatology are consistent with the findings of other researchers who have been studying this stress-reduction program (Kabat-Zinn et al., 1987, 1992; Kutz et al., 1985). Participants showed a mean pre-post reduction of 64% in SCL-90R General Severity Index scores. These positive changes were further supported by participants' qualitative feedback that the program was of considerable value and usefulness to them in their personal lives.

Based on the work of Shapiro (Shapiro, Potkin, Jin, Brown, & Carreon, 1993; Shapiro, 1994), the observed increases in scores on the positive yielding mode of control suggests movement in the direction of greater psychological health following participation in the stress
program. These findings are consistent with previous research that showed positive changes in individuals’ control profile following participation in an intervention aimed at reducing Type A behaviors (Shapiro et al., 1991) and in an intensive meditation retreat (Easterline, 1992; Shapiro, 1992). These changes suggest that mindfulness meditation’s emphasis on accepting and trusting one’s present moment cognitive, affective and bodily experiences (rather than trying to alter them) may have positive carry-over effects in terms of how one relates to or copes with life experiences in general.

Shapiro’s research which suggests that a positive sense of control can serve as an indicator of psychological “healthiness” was supported in this sample in that baseline levels of overall sense of control correlated negatively (r = -.63; p < .01) with baseline levels of the SCL-90-R, General Severity Index.

Changes in scores on the INSPIRIT, though statistically significant, are difficult to interpret given their relatively small size. However, the observed changes suggest the importance of incorporating into this type of research measures that assess the spiritual dimension of individuals’ experience. This seems especially important given both the significance of these issues in people’s lives (cf. Hawks et al., 1995) and the research suggesting spiritual well-being may be an important predictor of psychophysical health (Kass et al., 1991; Kass et al., 1991a; Levin, 1994). It is interesting to note that two of the three programs which emerged in the Hawks et al. (1995) review utilized as a central component, meditation techniques which were not originally conceived of as relaxation exercises but rather as contemplative practices specifically designed to foster spiritual growth and understanding.

The present study represents an attempt to test the stress-reduction program’s effectiveness controlling for testing, history and/or maturation effects (Campbell & Stanley, 1963). Although the use of a randomized, non-intervention control group enabled us to control for these confound factors, several rival hypotheses were not eliminated by the present study’s design, most notably the possibility of a placebo effect, which could explain the observed reductions in symptomatology (see further discussion on this point below).

The results also suggest that stress-reduction is potentially quite effective in reducing levels of psychological distress in a non-clinical population and at least for a subset of the sample, these positive changes appear to have been maintained for between six to nine months following their
participation in the stress program. Follow-up results, however, need to be interpreted with caution since data was obtained from only five of the twelve experimental subjects.

Generalizability of the study's overall findings, however, are limited by the relatively homogeneous nature of the sample in terms of gender (only one male in the study) and age. The sample was fairly heterogeneous in terms of ethnicity (58% Caucasian, 25% Hispanic, 16% Asian), however, the small numbers precluded any analysis of interaction effects between race and treatment effects.

Limitations and Suggestions for Future Research

A number of questions remain to be answered in future research. First, as discussed earlier, a larger sample size that includes more males would make it possible to analyze possible treatment interactions with gender (e.g. women characteristically report more symptomatology and distress than men which could in turn influence findings from studies such as these).

Second, while the current study shows the positive effects of this type of intervention reported in earlier studies can be replicated with a different facilitator working with a different client population, the possibility remains that experimenter effects could account, in part, for the fairly dramatic reductions in symptomatology that were observed post-intervention. This seems especially plausible given the close, personal contact between the experimenter, who also served as group facilitator, and the subjects.

Third, as discussed earlier, an oft cited limitation of clinical designs such as the present study's is the failure to adequately control for the possibility of placebo effects. Previous research efforts to control for this factor in studies examining the effects of meditation, have been both small in number (Lehrer & Woolfolk, 1993) and somewhat problematic (Smith, 1976). For example, in one frequently cited article (Smith, 1976), the researcher attempted to create a control treatment that matched transcendental meditation in "every respect that might foster expectation of relief," and found that the anxiety-reducing effects of T.M. were, in fact, comparable in this control condition, suggesting that it was this expectancy of relief and not something specific to the T.M. technique which led to the observed improvements. A significant flaw in their design, however, was that these "control" subjects were instructed to sit still and simply allow the mind to "do whatever it wants." It is quite plausible that some of these subjects were, without realizing it, practicing a form
of meditation which (rather than or in addition to any placebo effects) might have been a significant therapeutic component.

Regarding efforts to control for placebo effects in clinically oriented research efforts such as the present study’s, it is questionable whether this is always desirable since expectancy of relief may be a critical component in many if not most health-related interventions and therefore not something one necessarily wants to eliminate if s/he is interested in a study’s being ecologically or externally valid. In addition, unlike pharmacologically oriented interventions in which one can simply administer a sugar pill as the placebo treatment, in more psychologically-oriented interventions such as the present study’s, it may be unrealistic (and potentially unethical) to think that one can give subjects the impression they are receiving something therapeutic when in fact they are not (i.e. there may not be a psychological or biobehavioral corollary to the “sugar pill”).

Fourth, it is important to assess the long-term benefits of participating in such a program and the effects of incorporating these stress-reduction/relaxation strategies into one’s life over a period of time. This is supported by research demonstrating that individuals continue practicing these techniques and maintaining positive health benefits from them for up to four years following the intervention (Kabat-Zinn, 1992).

Fifth, although this was not within the scope of the present study, it would be important to direct future research efforts toward demonstrating whether or not programs such as the SR&RP offer significant economic benefits. For example, as was discussed in the introduction, it would be important for longitudinal studies to be conducted that could assess the extent to which participants in these stress-reduction programs become less likely to utilize traditional health care services.

Lastly, it is essential that future research be designed to offer more definitive explanations as to the mechanisms that may underlie the positive effects of this program. Two strategies that could be employed in future studies would be to: 1) assess whether or not there are changes in psychophysiological (e.g. cardiovascular) reactivity to either stresses in either the laboratory or field following the intervention, and 2) conduct detailed, face to face interviews with participants following the study in an effort to determine what they believe to be the possible reasons/mechanisms behind their observed changes in levels of distress.

In terms of possible mechanisms, several promising hypotheses merit further investigation and research. For example, based on the work of Kabat-Zinn and others, as well as the present
researcher, the observed effectiveness of mindfulness meditation as a stress-reduction technique or self-regulatory coping strategy might, in part, be explained by the following:

First, the essence of mindfulness meditation training is to simply attend to sensations, perceptions and cognitions as they arise moment to moment in the field of awareness. Through the practice of these techniques one begins to: 1) observe the ways in which awareness (the mind) typically becomes involved in or preoccupied with various memories, opinions, judgments, and desires and 2) recognize the effects this persistent, though oftentimes unconscious, internal dialogue has upon our lives, our relationships, etc. According to Schwartz's (1990) system's model of "disregulation" (which states that stress-related disorders may result when individuals dis-attend to critical cognitive/emotional or physiological feedback, resulting in a breakdown in communication between the organism's various subsystems), one might hypothesize that mindfulness meditation would serve to increase the amount of communication in the "system" thereby leading to greater psychophysiological regulation and balance.

Second, although not its specific goal or emphasis, a physiological state of hypoarousal often accompanies this and other forms of meditative practice. This attenuation of sympathetic arousal (elicitation of what Benson refers to as the "relaxation response" [Benson, 1975]) has been shown to be an effective treatment for a wide variety of stress-related disorders. In addition to the formal meditation techniques, participants in this eight-week program also receive training in specific relaxation exercises which may serve as an additional aid in countering the effects of excessive psychophysiological arousal.

Finally, based on the theory that it is our cognitive-emotional interpretation or appraisal of life events that gives rise to (or at least compounds) the stress we experience in life (cf. Ellis, 1962; Beck, 1976), the techniques of mindfulness meditation, with their emphasis on developing detached observation and awareness of the contents of consciousness, may represent a powerful cognitive-behavioral coping strategy for transforming the ways in which we respond to life events since we must first become aware of the nature and existence of these maladaptive cognitive appraisals before we can effectively alter them.
REFERENCES


Levin, J. S. (1994). Religion and health: Is there an association, is it valid, and is it causal? Social Science and Medicine, 38, 1475-1482.


### Figure 1*

<table>
<thead>
<tr>
<th>QUADRANT ONE</th>
<th>QUADRANT TWO</th>
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<tbody>
<tr>
<td>POSITIVE ASSERTIVE</td>
<td>POSITIVE YIELDING</td>
</tr>
<tr>
<td>Altering, Change</td>
<td>Accepting, Yielding</td>
</tr>
<tr>
<td>Mode of Control</td>
<td>Mode of Control</td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>QUADRANT THREE</td>
<td>QUADRANT FOUR</td>
</tr>
<tr>
<td>NEGATIVE ASSERTIVE</td>
<td>NEGATIVE YIELDING</td>
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<tr>
<td>Over control</td>
<td>Too little control</td>
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</table>

*adapted from Shapiro (1994)*
Table 1
Change in Scores on Symptom Checklist 90-Revised (SCL-90-R), Before and After Treatment
(N = 12 Experimental Subjects)

<table>
<thead>
<tr>
<th>Scale—SCL 90-R</th>
<th>Mean Reduction (%)</th>
<th>F</th>
<th>ANCOVA (p)</th>
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<tr>
<td>General Severity Index</td>
<td>64</td>
<td>15.87</td>
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<tr>
<td>Depression</td>
<td>59</td>
<td>12.34</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>Anxiety</td>
<td>60</td>
<td>7.05</td>
<td>&lt;.02</td>
</tr>
<tr>
<td>Obsessive-Compulsive</td>
<td>59</td>
<td>9.55</td>
<td>&lt;.01</td>
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<tr>
<td>Somatization</td>
<td>73</td>
<td>16.73</td>
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<tr>
<td>Interpersonal Sensitivity</td>
<td>59</td>
<td>7.94</td>
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</tr>
<tr>
<td>Psychoticism</td>
<td>76</td>
<td>9.27</td>
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</tr>
<tr>
<td>Paranoid Ideation</td>
<td>73</td>
<td>9.87</td>
<td>&lt;.01</td>
</tr>
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<td>Additional Items *</td>
<td>73</td>
<td>32.28</td>
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<td>Hostility</td>
<td>32</td>
<td>1.70</td>
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<tr>
<td>Phobic Anxiety</td>
<td>58</td>
<td>1.13</td>
<td>&lt;.31</td>
</tr>
</tbody>
</table>

* Seven items dealing with poor appetite, overeating, sleep disturbances, and feelings of guilt
FIGURE 2. SCL-90-R: GENERAL SEVERITY INDEX

Control Group (N = 7)

Experimental Group (N = 12)
FIGURE 3. POSITIVE YIELDING MODE OF CONTROL

![Bar chart showing mean scores for Control Group (N = 7) and Experimental Group (N = 12).](image-url)

- **Control Group:**
  - Pre-level: 2.56
  - Post-level: 2.36

- **Experimental Group:**
  - Pre-level: 2.93
  - Post-level: 3.1

Legend:
- **Dark bar** represents Pre Level.
- **Light bar** represents Post Level.