5

Meditation as a Self-Regulation Strategy: The Empirical Literature

5.1 *Self-Control and Self-Regulation Strategy: Toward a Working Definition*

IN A PREVIOUS WORK, I defined self-control as "the ability to decide what one wants to do, and the skills to follow through with that decision" (Shapiro, 1978b, p. 246). In order to decide what one wants to do, one must first learn to become aware of when one is acting by habit and reflex (i.e. nonconscious decisions). Second, one must have the skills to perceive increased alternatives, new ways of perceiving and acting in the world. Third, one needs the skills to carry the decision through.

A self-control or self-regulation technique, therefore, is a cognitive or behavioral activity generated by an organism and maintained over time in order to facilitate the attainment of certain goals that the organism defined as desirable.*

*The process by which this definition was arrived at and comparison with other definitions of self-control is not included here as it is outside the primary scope of this book. It is discussed in detail, however, in my forthcoming book, *The Psychology of Self-Control.*

"ROUND-ONE STUDIES"

Almost without exception the studies viewing meditation as self-regulation strategy have focused on its relaxation (stress reduction) component. This is true in the stress studies, therapy studies, the majority of the addiction studies, and the hypertension research.

The "first-round" of studies viewing meditation as a self-regulation strategy helped establish interest in the field. These early studies suggested that meditation may be quite promising for a variety of clinical problems.

Generally these "first-round" studies consisted of anecdotal case reports, intensive design studies containing "non-specific variables," and/or combining techniques for treatment and/or comparing meditation to control groups, but not to other, similar techniques. Because this "first-round" literature has been reviewed at length elsewhere (including both clinical/therapeutic effects [Smith, 1975; Shapiro & Giber, 1978] and physiological effects [Woolfolk, 1975; Davidson, 1976]), only a brief summary is provided here. As this first-round literature is generally quite flawed methodologically, I have confined myself to general comments on methodological issues. Specific criticisms of individual studies may be found in the tables accompanying the discussion. The clinical tables (5.1-5.3), based on Shapiro and Giber (1978), have been updated by David Giber; the physiological tables (5.4-5.6), based on Woolfolk (1975), have been updated by Roger Walsh. Tables 5.1-5.3 are particularly addressed to descriptions of independent variables such as therapist contact, length of training, description of techniques; method of subject selection; descriptions of dependent variables for clinical problems; methods of data collection, the nature of data collected, be it physiological, behavioral, subjective, overt-concurrent; types of follow-up; and the quality of control procedures. Tables 5.4-5.6 give a systematic basis for 1) comparing physiological changes such as oxygen consumption, skin response, blood pressure, heart rate, EEG resulting from different independent variables like yoga, Zen, transcendental meditation (TM); and 2) looking at methodological issues within each study: experience of meditators, type of design, and quality of control procedure.

5.2 Stress and Stress Disorders: Round-One Fears, Phobias, Stress and Tension Management

THERE HAVE BEEN twenty round-one studies concerned with the reduction of fears and phobias and stress and tension management.* These studies suggest that meditation may be a promising clinical intervention technique for several stress-related dependent variables. All studies reported successful outcomes on dependent variables ranging from fear of enclosed places, examinations, elevators, being alone (Boudreau, 1972) to "generalized anxiety" (Shapiro, 1976), anxiety neurosis (Girodo, 1974), pain due to bullet wounds, back pain (French & Tupin, 1974) and fear of heart attack (French & Tupin, 1974), rehabilitation after myocardial infarct (Tulpule, 1971), and bronchial asthma (Honsberger, 1973). Many of these studies involved within-subject design (Boudreau, 1972; Shapiro, 1976; Girodo, 1974; French & Tupin, 1974) and a combination of meditation and other techniques, with meditation sometimes first (Girodo, 1974), sometimes second (Boudreau, 1972), sometimes concurrent (Daniels, 1975; Shapiro, 1976) with other modes; the data were gathered by subjective measures (patient verbal self-report). Girodo (1974) also used an anxiety symptom questionnaire and Shapiro (1976) had the patient monitor daily feelings of anxiety using a wrist counter.

The study by Vahia et al., (1972), the first to use control groups, reported a consistent and greater reduction in anxiety for the treatment group. The control group consisted of a "pseudo-yogic treatment" with only superficial use of postures and breathing exercises. Data were gathered from patient notebooks, from Taylor's Manifest Anxiety Scale, and from relatives, friends, and colleagues. Its conclusions will be discussed in greater detail in the following section: Meditation and Psychotherapy.

*Lazar et al., 1977; Berwick & Oziel, 1973; Otis, 1974; Boudreau, 1972; Shapiro, 1976; Girodo, 1974; Vahia, Doongaji, & Jeste, 1972; Vahia, Doongaji, & Jeste, 1973; Smith, 1976; Goleman & Schwartz, 1976; Hjelle, 1974; Linden, 1973; Woolfolk, Carr-Kaffashan, McNulty, 1976; Tulpule, 1971; French & Tupin, 1974; Dillbeck, 1977; Daniels, 1975; Berwick & Oziel, 1973; Honsberger, 1973.

TABLE 5.1 Studies on Fears and Phobias, Stress and Tension Management

Investigator(s)	Clinical Problem	S's (N; age, sex, prior experience)	INDEPENDENT VARIABLE: Type and Length of Treatment/Training	INDEPENDENT VARIABLE: Frequency of Therapist (E) Contact	DEPENDENT VARIABLE: Subjective Effects	DEPENDENT VARIABLE: Behavioral	DEPENDENT VARIABLE: Physiological	DEPENDENT VARIABLE: Overt, Concurrent (e.g., medical)	Follow-up	Type of Design, Quality of Control, Methodological Problems
Boudreau 1972	Case One: fear of enclosed places, examinations, elevators, being alone. Duration of problem: 5 years.	N=1, 18 yrs., male, not stated specifically, "adept at TM"	Systematic desensitization and massed desens. first (3 days x 3 hrs.); then since no improvement Transcendental Mediation (one month). TM practiced both non-contingently, and contingent upon imagining phobic scenes	Sys. dens. and massed desens. done with tape recorder	Self-reported tension decrease	Avoidance behavoir had disappeared.	None	None	None	N=1 case report, an in-vivo assessment pre and post of fears would have been useful.
	Case Two: excessive perspiration. Duration of problem: 35 years.	N=1, 40 yrs., female, took summer course in Yoga	Intervention #1: Relaxation practice w/paired anxiety/arousing imagery (6 months) provided partial symptom alleviation. Intervention #2: Yoga practice (3 mos. x ½ hr. daily) plus additional practice during tense moments.	Not stated	Not reported	None	None	Daily Perspiration: mild/excessive. Intervention #1 mild perspiration decreased from 12 hrs. to 5 hrs. on average, excessive from 3 to 1 hr. Intervention #2: excessive disappeared; mild is below 1 hr. per day.	6 months: perspiration maintained at below 1 hr. daily	N=1 case report, relative effects of relaxation and Yoga not clear. Operationalizing of mild and excessive prespiration good and follow-up admirable.
French and Tupin 1974	Case One: esophagitis. Duration of problem: 20 years.	N=1, 65 yrs., male, not stated	3 phases: (1) slowed breathing and (2) muscle relaxation followed by (3) focusing on pleasant images. (In this case for 10-15 min.)	Not stated	Self-reported decrease in pain and relief of sleep disturbance	None	None	None	Patient reported successful use of method for 6 months	N=1, within subj. case report, pre and post ratings of pain severity and sleep disturbance would have been useful.
	Case Two: severe pain due to bullet wounds, anxiety and depression during 3 mos. hospitalization, poor eating weight loss.	N=1, 22 yrs., male, not stated	Same method as above (in this case, used for 30 min. according to patient self report)	Not stated	Self-report of improved ability to manage pain and sleep, also improvement in general mood and eating.	None	None	None	None	Same as above
	Case Three: widely disseminated oatcell carcinoma of the lung, sleep disturbance, pain, relief through narcotic use.	N=1, 53 yrs., male, not stated	Same method as above	Not stated	Found focusing technique "frightening and distressing", used only muscle relaxation, if pain controlled by relaxation, patient could sleep without use of hypnotic.	None	None	None	None	Same as above
	Case Four: referred for psychiatric sucs., panic, neurotic fear of heart attack, used 120 mg. diazepam per day, severe sleep disturbance.	N=1, 50 yrs., male, not stated	Same method as above	Not stated	Used method to monitor heart beat and control fear of heart attack, however, fear resumed after other patient's died of myocardial infarction. patient returned to use of technique 10 min./daily for "relaxing", no soporific effect	None	None	None	None	Pre and post ratings of fear would have been useful.
	Case Five: hospitalized for chronic back pain.	N=1, 45 yrs., male, failed at hypnotic induction	Same method as above	Not stated	Method unsuccessful in inducing relaxation, subsequent surgery revealed herniated disc at 14-5	None	None	None	None	Case report.
Vahia, et al 1972-1973	Psychoneurosis and psychosomatic disorders that failed to respond to conventional treatment.	Stage One: N=165 Stage Two: N=37 Stage Three: treatment: N=21, controls: N=18, age range for all S's 15-50 yrs., experience not stated	Nine year study Stage One: psychophysiologic therapy based on concepts of Patanjali (yoga); (1) postures, (2) breathing exercises, (3) withdrawal from senses, (4) concentration on object, (5) identification with object) practiced one hr., 6 days/week for 6 weeks Stage Two: treatment compared with controls receives similar pseudotreatment with "superficial" postures, breathing exercises, and no interpretation or insight for steps 3-5 practiced one hr. each weekday for 4-6 weeks	Not stated	Stage One: blind clinical assessment at 3 and 6 weeks for target relief symptom (final) 70% of patients rated for anxiety depression, hysteria and bronchial asthma showed improvement. Stage Two: patients self-reported intrusive thoughts during treatment. Taylor's Anxiety Rating Scale given pretreatment, and at 3 and 6 weeks showed greater and consistent anxiety reduction for treatment group. MMPI and	Self-reported increase in work efficiency on the job and objective global improvement reported by patient's as friends, spouse, other relations, and colleagues.	None	Bronchial asthma assessed	None	Double blind used, stage two groups matched for age, sex, diagnosis and duration of illness. Same therapist used for total treatment and pseudotreatment introducing possible experimenter effect (Smith, 1975).

TABLE 5.1 Studies on Fears and Phobias, Stress and Tension Management (cont'd.)

Investigator(s)	Clinical Problem	S's (N, age, sex, prior experience)	INDEPENDENT VARIABLE: Type and Length of Treatment/Training	INDEPENDENT VARIABLE: Frequency of Therapist (E) Contact	DEPENDENT VARIABLE: Subjective Effects	DEPENDENT VARIABLE: Behavioral	DEPENDENT VARIABLE: Physiological	DEPENDENT VARIABLE: Overt, Concurrent (e.g., medical)	Follow-up	Type of Design, Quality of Control, Methodological Problems
(Vahia et al., 1972-1973 continued)			both groups given placebo tablets, support and reassurance. Stage Three: treatment compared with controls using anxiolytic and antidepressant drugs (e.g. Amitriptyline and chlordiazepoxide).		Rorschach tests given pre- and post-treatment, 73% of S's in total therapy showed improvement of at least 50% on basis of clinical assessment, while 42% of S's in "pseudo-treatment" showed significant improvement. MMPI showed greater overall improvement for total therapy group. Those who showed greater ability to meditate to total therapy group displayed more clinical improvement than those who did not. Stage Three: pre-treatment, 3 and 6 week assessment with Taylor's Anxiety Rating Scale, Hamilton's Depression Rating Scale, and Bell's Social Adjustment Scale. treatments equally effective on depression rating; psychophysiologic therapy showed greater reduction than drug therapy on anxiety scale; and psychophysiologic therapy patients showed reduction on social adjustment scale.					
Girodo 1974	Patients diagnosed as "anxious," "neurotic," length of illness: 5-71 months.	N=9, 7 male, 2 female, ages 18-42 years, not stated	"TM like" meditation on mantric sound used 20 min., twice per day used for all patients; combined with imaginal flooding procedure and relaxation for 4 patients who failed to show anxiety decrement after 8 sessions with meditation alone (total length of treatment: 6-8 months)	Patients seen every 7-14 days	Anxiety-symptom questionnaire (administered every 2 weeks) showed reduction in anxiety symptomatology by 8th session of meditation. 4 patients found meditation unbeneficial, but experienced relief of symptoms with flooding. Note: later analysis showed difference in group successful with meditation treatment (mean group duration of symptoms—14.2 months and mean "cognitive" symptom severity of 9.5) and group successful with flooding (mean group duration of symptoms—44.2 months and mean "cognitive" symptom severity of 16.4)	None	Degrees of somatic symptoms reported in questionnaire	None	6 month mailed follow-up questionnaire	Patients as own controls, patients told to expect "calm relaxation", etc. from technique introducing expectation effect, no control group.
Shapiro 1976	Complaining of "free-floating anxiety."	N=1, female college student, no prior experience	(1) 2 weeks: monitoring of anxiety with counter; (2) weekend Zen workshop teaching anxiety contingent Zen breath meditation plus (3) 3 weeks with instructions to meditate 10 min., 2x per day, to continue anxiety monitoring and practice informal breath meditation when anxious	Therapist (E) did not contact patient during 3 week meditation period. covert self modeling	Significant decrease in feelings of anxiety during intervention phase (3 weeks) and positive self perception change on semantic differential	Wrist counter used as anxiety monitor	None	None	None	N=1 design, relative effect of formal vs. informal meditation in relief of anxiety not clear, also possible reactive effect from initial self monitoring.
Smith 1976	Anxiety (Isolating effect of TM from expectation of relief and daily sitting.)	Exp. 1: N=139, college students, mean age 22 yrs., 70 male, 69 female, no prior meditation experience	Exp. 1: 1) Pretreatment: Elaborate placebo procedure with control treatment. Rationale given: Assessment included STAI A-Trait Inventory, Epstein-Fenz Manifest Anxiety Scale, and other supplementary measures including test of skin conductance reactivity. 2) Random assignment of S's to: 1) Standar " TM training (N=49) 2) Control treatment called (PSI) "Periodic Somatic Inactivity" (sitting, eyes closed) (N=51) 3) No treatment - (waiting list) (N=39)	Exp. 1: Placebo treatment matched with TM procedure for similar amount of therapist contact and treatment credibility.	Subjective Exp. 1: TM and PSI groups did not differ significantly on (trait anxiety) scores; symptoms of autonomic arousal (Epstein-Fenz Manifest anxiety scale). Both TM and PSI post-test means significantly lower than No Treatment on all dep. var.	None	None	None	Exp. 1: No treatment S's post-tested at 3.5 mos.; TM and PSI S's post-tested at 6 mos., including assessment on drug use, and subjective reponses to treatment.	Useful study is beginning to isolate aspects of treatment variance.
		Exp. 2: N=54, college students, mean age 21.5 yrs., 27 male, 27 female.	Exp. 2: 1) No treatment controls, Exp. 1 (N=24) and others (N=30) given similar pretreatment assessment (cf. Exp. 1) placebo procedure 2) Random assignt. of S's to: 1) TM-like meditation called "Cortically Mediated Stabilization" 2) "Anti-meditation" exercise involving sitting with eyes closed, actively generating pos. thoughts	Exp. 2: Both treatments taught in similar fashion by experimentor with elaborate treatment rationales given.	Exp. 2: Groups did not differ significantly on dep. var. measures. T-test of within group differences reveal significant impact, on STAI-A Trait and symptoms of autonomic arousal for both groups.				Exp. 2: Same post-tests (Exp. 1) given at 11 weeks.	

TABLE 5.1 Studies on Fears and Phobias, Stress and Tension Management (cont'd.)

Investigator(s)	Clinical Problem	S's (N, age, sex, prior experience)	DEPENDENT VARIABLE Type and Length of Treatment/Training	Frequency of Therapist (E) Contact	INDEPENDENT VARIABLE Subjective Effects	Behavioral	Physiological	Overt, Concurrent (e.g., medical)	Follow-up	Type of Design, Quality of Control, Methodological Problems
Goleman and Schwartz 1976	Ability to reduce stress in lab situation in response to stressful film.	Group One: N=30, avg. age approx. 25 yrs., more than 2 years TM experience. Group Two: N=30, avg. age approx. 23 yrs., non-meditators interested in TM or Yoga. Note: Difference in "life-style" found; meditators reported reduced usage of licit and illicit drugs, alcohol, cigarettes and coffee, and dietary changes (e.g., less meat and candy)	Experimental Procedure - Note: S's assigned serially to 1 of 3 experimental conditions 1) 4 min. baseline 2) 20 min. treatment - 3 conditions a) Meditation: eyes closed (not using mantra) b) Relaxation: eyes open c) Relaxation: eyes closed 3) 5 min. rest 4) 12 min. exposure to stressful film		Pre and post treatment testing on State-Trait Anxiety Inventory A State Form (Spielberger, 1970) showed meditators reported less state and trait anxiety before and after treatment. Affective Adjective Checklist (Zuckerman, 1960) showed meditators reported feeling more positive upon entering lab and throughout treatment. Activity Preference questionnaire (Lykken & Katzenmeyer, 1960) administered post treatment found S's in meditation condition were less anxiety prone after leaving lab though no between group differences. Post treatment testing on Eysenck Personality Inventory showed meditators significantly less neurotic and more stable than non-meditators.	None	Physiological Meditators heart rate less than controls during treatment, increase heart rate more in response to anticipation of stress or impact, then recover more quickly post impact. On phasic skin conductance—all groups decrease equally in response frequency during treatment; meditators increase more in anticipatory minute prior to stressor impact and decrease more during post impact minute. Meditators compared to controls had higher skin conductance response freq. peaks and lower troughs.	None	None	Treatment conditions randomized and controlled; eyes open/closed factor. "Life-style" differences between groups suggest importance of other factors besides meditation in stress response.
Linden 1973	Test anxiety, field independence, and reading ability	N=15 male and 15 female randomly assigned to each treatment condition. S's drawn from upper half (in reading ability) of third grade classes of school in disadvantaged urban areas.	Group One: Taught Zen breath meditation (Maupin, 1965) and visual fixation task (Deikman, 1963); practiced 2x per week x 13 weeks for 20-25 min. Group Two: Given guidance counseling focusing on improving study skills; met 45 min. per week for 18 weeks in 3 groups of 10 S's. Controls: Controlled for by guidance condition.		Pre and Post Treatment Test Results: Meditating group showed gain in field independence (Children's Embedded Figures Test) and decrease in test anxiety (Test Anxiety Scale for Children over controls. There was no effect on reading achievement.	Never	None	None	Follow-up to be reported.	Well designed study; between groups design.
Lazar, Farwell and Farrow 1977	Anxiety	Group A: N=12, 7 male, 5 female, mean age 23.66 yrs. 4 weeks meditation experience. Group B: N=11, 5 male, 6 female, mean age 24.10, prospective meditators.	Standard TM training	Same as above	IPAT anxiety scale questionnaire administered pre and post—(after 2 weeks) meditation instruction found mean group average reduction from 80th to 66th pop. percentile (Group B). Mean postest score of Group A (50th percentile) was significantly lower than pretest score of Group B and insignificantly different from their postest score.	None	None	None	None reported	Employed recurrent Institutional Design (Campbell & Stanley, 1963).
Woolfolk, et al., 1976	Chronic insomnia	N=24, mean age approx. 44.3 yrs., 6 male, 18 female. Avg. duration of trouble with insomnia — 14.1 yrs.	All S's suspended sleep medication. Group One: N=8, Taught meditation technique involving immobility, closed eyes and a passive focus on breathing. Breathing focus shifted (session 2) to mantra and then to focus on a specific image (session 3). Group Two: N=8, Taught in 4 weekly 1 hr. sessions in groups S's instructed to practice 30 min./2x daily at home. Group Three: Waiting list controls, asked to keep records of sleep patterns for 4 more weeks with promise of treatment at end of experiment.	4 wks. x 1 hr. treatment	S's retrospective rating initial belief in potential effectiveness of treatments revealed no significant differences in treatment groups. College students asked to rate credibility of treatment procedures and rationale on same scale showed no significant differences between treatments.	Behavioral Treatments reported on— (1) Latency of Sleep Onset Means (in minutes) Pretest / Post-test / Follow-up Meditation: 74.08 / 34.19 / 24.51 Progressive Relaxation: 65.01 / 29.20 / 26.73 Control: 67.21 / 66.61 / — Treatments equally effective. Both meditation and Progressive Relaxation groups showed significant improvement over pretreatment, while pretreatment and follow up means for control group did not differ. (2) Rated Difficulty of Falling Asleep (10 — extremely difficult) Pretest / Post-test / Follow up Meditation: 5.92 / 2.91 / 2.94 Progressive Relaxation: 6.35 / 3.48 / 3.28 Control: 5.38 / 5.79 / —		None	6 month in form of 1 week of daily sleep records	Techniques called "self-control" skills protecting against meditation placebo effect. Excellent study.
Tupule, et al., 1971	Isachemic Heart disease Group One: all but 2 patients with history of myocardial infarct. Period from infarction to time of study ranged from 1 to 10 yrs., avg. 3.9 yrs. no relief from antianginal drugs. Group Two: recent myocardial infarct.	Group One: N=23, avg. age=48.5 yrs., male, "all of high economic class with sedentary habits except 1 farmer." Group Two: N=21, avg. age=32.4 yrs., 19 male, 2 female, "all except 1 belonged to a sedentary occupation."	11 Hatha Yogic positions (asana) practiced until patient was symptom free (e.g., stable heart rate, and blood pressure, and absence of complications of E.C.G.) Positions practiced daily.	Not stated specifically	Group One: Patients who performed exercises regularly expressed "feeling of physical well-being" and ability to work without fatigue. Group Two: Similar subjective feelings reported. Ambulation achieved during 2nd week in 10 cases and 3rd week in 10 cases. Rehabilitation effected during 5th week in 8 cases and before 9th week in others.	None	Physiological Group Two: 150 observations made before & after exercise on heart rate, B.P. & respiration. Behavioral Group One: Report states: "Patients unable to return to their full occupation, even after a year from infarct, could be rehabilitated after about a month of starting these exercises.	None	One month to 7 years	Patients in group one had been treated by one of experimenters in past; measure of "well-being" not reported, no controls, no statistical data reported.
Honsberger and Wilson 1973	Bronchial asthma	N=22, no prior experience with TM	Treatment Group: (N=11) Practiced Transcendental Meditation for 3 months Control Group: (N=11) read related material daily x 3 months	Not reported	74% of patients reported TM has benefitted their asthma; 69% thought it had helped their general health; 63% reported TM assisted their emotional life. None reported worsening on these parameters.	None Reported	Pulmonary function data obtained at baseline, 3, & 6 months. GSR showed 79% of patients effectively meditated. 94% of patients had improved airway resistance after TM in comparison to control values.	Physicians asked to compare pre and post treatment periods. Reported 55% of patients better with TM, 27% worse. No large changes in medication but severity of symptoms reduced in TM group (according to daily diaries kept).	At 6 months 80% of patients still meditating; only 60% thought it was helping their asthma.	Parameters of "general health" and emotional assistance from TM vague.

Other studies, using control-group designs, have also reported a consistent reduction in anxiety for the meditating treatment group. The data have been gathered primarily by pre-test and post-test questionnaires, including Speigelberger's State-Trait Anxiety Inventory (Smith, 1976; Goleman & Schwartz, 1976; Davidson, Goleman & Schwartz, 1976; Ferguson & Gowan, 1976; Dillbeck, 1977), the IPAT anxiety questionnaire (Lazar et al., 1977; Ferguson & Gowan, 1976) the Bendig anxiety scale (Hjelle, 1974), and the Test Anxiety Scale for Children (Linden, 1973). Other data measuring anxiety-related behaviors include heart rate and phasic skin conductance (meditators recovered more quickly after viewing a stressful film [Goleman & Schwartz, 1976]) and insomnia (meditators showed substantial improvement on variables of sleep onset and rated difficulty of falling asleep [Woolfolk, Carr-Kaffashan & McNulty, 1976]).

5.2A Meditation and Psychotherapy

THIS MATERIAL FOLLOWS the section on stress because the two "control group" studies researching meditation and psychotherapy have focused on the stress-reduction aspect of meditation. Further, it should be noted that most of the studies detailing meditation's potential psychotherapeutic stress-reduction effects have been done with normal subjects. Although the results are provocative, generalization to clinical populations must proceed cautiously. In addition to the anecdotal case reports (e.g., Kondo, 1958; Boudreau, 1972; Girodo, 1974; Deathridge, 1975), there have been two "control" group designs to assess meditation's effectiveness as psychotherapy (Vahia et al., 1973) and as an aid to psychotherapy (Glueck & Stroebel, 1975). As noted above, the theoretical rationale for the use of meditation in both of these studies involves the role of stress as a mediating variable. Vahia et al. (1973) noted that the exercises of Patañjali teach one to develop internal standards and to rely less on the views and standards of others. He noted that as long as the individual is vulnerable to external standards or internalized "conscience" standards, he will be vulnerable to stress. Therefore, stress is seen as the mediating variable which these exercises correct. Similarly, Glueck and Stroebel (1975) suggested that many psychiatric patients activate the emergency response

system, (Cannon's [1932] fight or flight; Selye, [1956]), at inappropriate times and with inappropriate or misperceived stimuli. They suggest that training in self-regulation techniques like meditation may help in dealing with those problems.

The Vahia study (1973) was done with patients diagnosed with psychoneuroses or psychosomatic disorders. The treatment was based on the concepts of Patañjali. The techniques were a graduated series of five Yoga meditation exercises beginning with attempts to gain voluntary control over the musculature (asana exercises—selected postures for relaxation); followed by attempts to gain voluntary control over the autonomic nervous system (prānāyāma—breathing exercises); to restrain the senses by voluntary withdrawal from the external environment (pratyahara); and still later a gaining of control over thought processes themselves (e.g., four, dhāranā—selection of an object for concentration). Finally, development of total concentration on the selected object and eventually union—dhyana—was sought. There was significant improvement on psychological tests, such as MMPI, Taylor's Manifest Anxiety Scale, and Rorschach, for individuals who practiced the complete series of meditation exercises, compared to a control group, matched for age, sex, and diagnosis, who practiced only the first three exercises.

A second study, more elaborate in scope, was done by Glueck and Stroebel (1975). Initially, they had three groups of psychiatric in-patients: an autogenic training group, a biofeedback group, and a TM group. The initial two control groups dropped out of the study, so a comparison group matched for age, sex, and level and kind of psychopathology, as measured by the MMPI at the time of admission, was used. Diagnoses included schizophrenia, neurosis, personality disorder, alcoholism, drug dependence, adjustment reaction. Patients practicing TM showed a statistically significant greater degree of improvement upon discharge (based on the report of the treating psychiatrist) than that of the hospital's other patients and also a significantly better level of improvement than their comparison twins.

5.3 *Addiction and Drug Use*

THERE HAVE BEEN eight first-round studies evaluating meditation's effectiveness in treating various types

of addictions and drug use.* The research design of these studies falls into two categories: retrospective polling and longitudinal design. Seven of these studies indicate that meditation may be a promising preventive and/or rehabilitative strategy in decreasing the use of addictive substances. In the one study showing negative results (Anderson, 1977), it was noted, that motivation and adherence to treatment seem to be an important variable in determining the success of treatment. It is hard to make more definite claims for meditation's effectiveness at this point because of a number of methodological problems. For example, the retrospective questionnaires in the first group of studies (Benson, 1969; Benson & Wallace, 1972b; Shafii, Lavely, & Jaffe, 1975) are subject to several criticisms. Subjects were asked to recall daily drug use patterns as far back as two years. There are three possible problems with this type of questionnaire: 1) A subject's report on a paper and pencil questionnaire may be inadvertently inaccurate; we may not be aware of how we in fact act, 2) A subject's memory of two years ago may be faulty (Benson & Wallace, 1972b), and 3) Subjects may try to deceive the experimenters to gain experimenter approval—i.e. demand characteristics.

With regard to demand characteristics, the most experienced meditators noted that they had "strong positive feelings about the experience of meditation" (Shafii, Lavely, & Jaffe, 1974). This positive feeling about meditation, coupled with the instructions in the TM initiation that drug use adversely affects TM performance, may have contributed to an exaggeration on the retrospective questionnaire about the decrease in drug use and the magnitude of prior drug-use patterns. As Shafii, Lavely, and Jaffe (1974) noted, meditators retrospectively reported using twice as much marijuana prior to their TM initiation as non-meditators.

A second problem with the retrospective questionnaires is one of sample bias (Marcus, 1975). In the above studies, the questionnaire was only given to long-term meditators. The TM initiates who stopped meditating (thirty percent of the original sample) were not considered (Shafii, Lavely, & Jaffe, 1974). Therefore, there may have been a subject selection bias in that the surveyed

*Benson, 1969; Benson & Wallace, 1972b; Shafii, Lavely, & Jaffe, 1974, 1975; Shapiro & Zifferblatt, 1976; Lazar, Farwell & Farrow, 1977; Brautigam, 1971; Anderson, 1977.

group had a commitment to meditation.

Finally, the earliest two studies (Benson, 1969; Benson & Wallace, 1972b) had no control group. Shafii, Lavely and Jaffe's (1974; 1975) studies on marijuana and alcohol abuse added a control group; TM meditators provided their own matched control. However, the control group does not effectively control for possible variance of treatment due to subject's motivation and/or expectations.

Because of the methodological problems inherent in retrospective sampling, the more recent drug studies have employed prospective longitudinal designs (Shapiro & Zifferblatt, 1976; Lazar, Farwell & Farrow, 1977; Brautigam, 1971). In these studies, self-report of drug use was obtained on a daily, ongoing basis. Although there is still the possibility of deception in two of the studies (Lazar, Farwell & Farrow, 1977; Brautigam, 1971), the possibilities of inadvertent inaccurate reporting and of memory lapses are minimized. The most effective means of data gathering thus far have combined drug-use information from self-report with the concurrent validity of random urinalysis checks (Shapiro & Zifferblatt, 1976a). Thus, these longitudinal within-subject (Shapiro & Zifferblatt, 1976a) and group designs (Lazar, Farwell & Farrow, 1977; Brautigam, 1971) improve on previous studies, though not definitive because of their own methodological problems including self-report without concurrent validity (Lazar, Farwell & Farrow, 1977; Brautigam, 1971); combination treatments (Shapiro & Zifferblatt, 1976); and lack of control for demand, expectation effects, and subject motivation (Shapiro & Zifferblatt, 1976; Lazar, Farwell & Farrow, 1977; Brautigam, 1971).

Further, all seven studies suffer from the lack of a clear theoretical rationale linking their independent and dependent variables. For example, Brautigam (1971) divided the dependent variable into two groupings: light drugs (hashish) and heavy drugs (LSD, amphetamines, opiates), though lumping LSD, amphetamines, and opiates together clouds several issues. First, amphetamines and LSD do not produce physical addiction, whereas opiates do. Second, possible reasons for using LSD and amphetamines—e.g., self-knowledge, creativeness, spiritual enlightenment and expansion of consciousness (Cohen, 1969)—could be quite different from the reasons for opiate use such as

TABLE 5.2 Studies on Addictions: Drugs/Cigarettes/Alcohol

		INDEPENDENT VARIABLE			DEPENDENT VARIABLE		
Investigator(s)	Clinical Problem	S's (N, age, sex, prior experience)	Type and Length of Treatment/Training	Frequency of Therapist (E) Contact	Subjective Effects (unless otherwise noted)	Follow-up	Type of Design, Quality of Controls, Methodological Problems
Benson, 1969	Drug abuse	N=20, male, age 21-38	Standard TM training	None; study done by retrospective survey	19 claimed to have stopped drug abuse ranging from marijuana to LSD, heroin, amphetamines, and barbituates. S's reported drug induced feelings became "extremely distasteful" compared with those during TM	None reported	No control group; subject self selection bias: subject were only those who had continued to meditate more than 3 months, and were motivated to attend a one-month training session; no concurrent validity; retrospective questionnaire
Benson and Wallace, 1972b	Drug abuse, alcohol and cigarette consumption	N=1950 (original sample) N=1862 (final no. of respondents). 50% between 19-23 yrs., 1080 men, 781 women. Avg. experience: 20 months. Minimum: 3 months	Standard TM training. S's were attending one month TM teacher training course	Same as above	With three mos. TM, S's reported marked decrease in abuse of all categories of drugs (marijuana, LSD, narcotics, amphetamines, tobacco and liquor). With continued TM, S's report progressive decrease of drug use. After 21 mos. most S's completely stopped using drugs. In 6-mo. period pre-TM 80% of S's reported marijuana use, 28% heavy use (once a day or more). After 6 mos. TM, 37% reported marijuana use, 6.8% heavy use. Marked decreases in LSD and narcotic abuse. Also S's reported stopping former drug-selling and discouraging others from drug use, after TM. Most S's felt TM important in curbing their drug abuse	None reported	Same as above
Brautigam 1971	Drug abuse, pathological behavior and anxiety	N=20; 6 light drug users (e.g., hashish) and 4 heavy drug users (e.g., amphetamines, LSD, opiates) in each group; no prior meditation experience	Group One: N=10, TM instruction 2 hrs. per day x 4 days. Checking one a week for first month Group Two: N=10; controls group counseling 4 hrs. per week	Not stated specifically	Hashish use dropped from approx. 20x/mo to 3x/mo. among experimental group and 18.2x/mo. among controls. After 3 mo., hard drug usage decreased among meditators, increased with controls. Reduction in pathological behaviors and anxiety self-reported by meditators. Behavioral Data Tension-restlessness, flaccidity, psychomotor retardation reported improved by outside observers. Ratings and S's self-estimate.	None reported	Possible expectation effect: S's informed of probable subjective benefits; effect of motivation. In experimental group, only 6 S's meditated regularly. Dependent variables lumped together: hashish, LSD, and opiates. These should be treated as separates. Other effects—e.g., "meeting a new group of non-drug using peers" may be part of treatment variance.
Shafii, Lavely and Jaffe 1974	Marijuana use	S's provided their own matched control N=90, S's placed in 5 groups according to length of TM practice (range from 1-39 mos.) N=125 (original sample) N=115 (final no. respondents)	Standard TM training	None; study done by retrospective survey	1) 92% of meditators (2 yrs. or more exp.) reported significant decreased marijuana use, 77% reported stopping of usage. 2) In above group, 69% reported stopping marijuana use during first 3 mos. post TM in contrast to 15% stoppage among controls. 3) In Group I (1-3 mos. TM) a 46% decrease and a 23% stoppage reported in marijuana use during first 3 mos. post TM instruction. Controls reported 15% stoppage. 4) In Groups II (4-6 mos. TM), III (7-12 mos. TM) and IV (13-24 mos. TM) reported significant decrease and stoppage marijuana use during first 3 mos. post TM instruction. 5) The longer group practiced meditation, the more they reported a decrease or discontinuation of marijuana use. 6) Mean frequency marijuana use per month for meditators pre TM was 7.3. The control group's mean was 3.6. Following TM, mean of the meditators dropped to 2.8 whereas the control group's mean stayed the same.	None reported	Control group does not control for possible variance of treatment due to S's motivation. Margin same.
Shafii, Lavely and Jaffe 1975	Alcohol abuse	Same as above	Standard TM training	Same as above	No control S's reported discontinuation of beer and wine use. 40% of S's meditating for more than 2 yrs. reported discontinuation of wine and beer use within first 6 mos. After 25-34 mos. of meditation, 60% reported discontinuation, with 54% discontinuing hard liquor use. 6-20% of S reported discontinuation of beer and wine in first 3 mos. 11-40% of S reported discontinuation of beer and wine in second 3 mos.	None reported	Control group picked by the meditators. This control group, however, does not control for possible variance of treatment due to S's motivation. Also, dependent variables gathered by retrospective questionnaire.
Lazar, Farwell and Farrow 1975	Anxiety, drug abuse, cigarette smoking, and alcohol consumption	Study Two: Group 1: N=24, 8 male, 16 female, mean age 25.29 yrs., (S.D. 7.37) Controls Meditators Group 2: N=13, 9 male, 4 female, mean age 20.85 yrs., (S.D. 4.41)	Group 3: N=9, 2 male, 7 female, mean age 29.11 yrs., (S.D. 10.75) Group 4: N=14, 6 male, 8 female, mean age 23.5 yrs., (S.D. 7.88)		Study Two: IPAT anxiety scale and questionnaire concerning drug abuse, cigarette and alcohol consumption. Group one controls administered a few days prior to TM instruction, and 4 weeks (group 2), eight weeks (group 3), or twelve weeks (group 4) after instruction. Showed progressive decreases in anxiety among meditators and use of drugs, cigarettes and alcohol: drug use showed initial rapid decrement then continuing gradual decline.		
Shapiro and Zifferblatt 1976	Methadone addiction	N=2 Case One: 25 yrs., male no prior experience Case Two: 29 yrs., male no prior experience	Clients taught behavioral functional analysis to monitor drug abuse, covert behavioral rehearsal and formal Zen breath meditation. Practiced one month	Not stated specifically	Overt, Concurrent Case One: Drop in dosage from 30 milligrams methadone to complete detoxification Case Two: Drop in dosage from 40 milligrams methadone to complete detoxification Concurrent validity random urinalysis to monitor possible drug use	Case One: 2 yrs.: S's self-report free of all opioid use Case Two: 6 mos. + 2 yrs. S's self-report: free of all opioid use	Within subject design relative effects of varying treatments unclear

social pressure, rebellion against authority, primary reinforcement, escape from social and emotional problems, and relief of withdrawal symptoms (Shapiro & Zifferblatt, 1976). As Brautigam's (1971) report now stands, it is impossible to tell who stopped taking which "heavy drugs" for what reasons.

5.4 *Hypertension*

SEVEN FIRST-ROUND studies have involved the use of meditation in reducing blood pressure (Benson & Wallace, 1972a; Benson et al., 1974a; 1974b; Patel, 1973; Patel, 1975a; 1975b; Stone & DeLeo, 1976; Datey, et al., 1969). Certainly, from a research standpoint, blood pressure is one of the "cleanest" dependent variables to measure. These studies consistently indicate a reduction in blood pressure in the treatment group (Benson & Wallace, 1972a; Benson et al., 1974a, 1974b; Patel, 1973; Patel, 1975a, 1975b; Stone & DeLeo, 1976; Datey et al., 1969), in the use of hypertensive medication (Patel, 1973; Datey et al., 1969), and in reports of somatic symptoms (Datey et al., 1969). Follow-up data have shown that treatment gains were maintained during a twelve-month period (Patel, 1975b).

Although the treatment effect seems relatively clear, there are still several unanswered questions as to what is causing that effect. The treatment interventions have ranged from a combination of Yoga breathing, concentration, and muscle relaxation (Datey et al., 1969), the "Relaxation Response" technique (Benson & Wallace, 1972a; Benson et al., 1974a; 1974b), a combination of Yoga, breath meditation, muscle relaxation, concentration, and biofeedback (Patel, 1973), to a Buddhist meditation procedure (Stone & DeLeo, 1976). Future research should attempt to isolate the variance of treatment success due to different aspects of the intervention. Further research should also determine whether the results are maintained. For example, Pollack et al. (1977) found that changes in blood pressure had disappeared after six months. For a more detailed discussion of possible variables influencing treatment outcome, readers are referred to an excellent review of the literature by Jacob, Kraemer and Agras (1977).

TABLE 5.3 Studies on Hypertension

Investigator(s)	Clinical Problem	S's (N, age, sex, prior experience)	INDEPENDENT VARIABLE Type and Length of Treatment/Training	Frequency of Therapist (E) Contact	Subjective Effects	DEPENDENT VARIABLE Physiological (Note: BP measures given systolic/diastolic unless otherwise noted)	Follow-up	Type of Design, Quality of Controls, Methodological Problems
Benson and Wallace, 1972a	Hypertension	N=22, no prior experience	Standard TM training by Student's International Society—8½ hrs. S's instructed practice technique 2x20 min/daily	Not stated	None reported	Found decreased resting systemic arterial blood pressure levels Mean BP levels prior to meditation—150±17/94±9mmHg (mean ± one S.D.) Mean BP levels post meditation—141±11/87±7mmHg (mean ± one S.D.)	4-63 weeks	N=1, S's as own control pre, during, and post meditation
Benson et al., 1974a	Borderline hypertension with S's not using anti-hypertensive drugs	N=22, avg. age approx. 43.1 + 12.9 yr. (mean 1 one S.D.) 10 male, 12 female, volunteers from introductory TM lecture group	Same as above	Not stated	None reported	Found decreased resting blood pressure levels Mean BP levels prior to meditation—146.5±13.7/61±6.96mmHg Mean BP levels post meditation—139.5±12.61/90.75± 8.76mmHg	Post meditation instruction measurement every 2-3 weeks x 25 weeks	N=1, S's as own control 6 weeks prior to meditation instruction baseline measurement
Benson et al., 1974b	Hypertension with S's using anti hypertensive drugs	N=14, avg. age approx. 53.3 yrs. (S.D. 9.19) 6 males, 8 females, no prior experience, volunteers from introductory TM lecture.	Same as above	Not stated	None reported	Found decreased resting blood pressure levels Mean BP levels prior to meditation—145.6±7.38/91.9± 11.9mmHg Mean BP levels post meditation—135.0±8.32/87.0±11.34mmHg S's diet and antihypertensive drug use (mean 1 one S.D.) monitored by questionnaire	Post instruction measurement 10 days x 20 weeks	1 x 6 weeks prior to meditation instruction measurements taken, study unbiased in regard to alterations in antihypertensive agents or significantly altered diet
Patel 1973, 1975a follow-up	Hypertension with S's using anti-hypertensive drugs. Duration of hypertension from 1-20 years (avg. 6.8 years) Symptomatology ± tiredness (14 patients), headache (13), dyspnoea on exertion (11), dizziness (a), irritability (8), chest pain (6), angina (2), palpitation (6), and nervousness and depression in (5).	Group One: N=20, avg. age 57.35 yrs., 9 males, 11 females Group Two: N=20, controls matched for age and sex	Patients instructed to practice Yoga, breath meditation, muscle relaxation, and concentration meditation on an idea; also biofeedback of GSR through audio signal of "relaxometer" given continuously. Patients also told pre and post session BP levels.	3x per week x 3 months for ½ hr relaxation training	Report stated "patients responded favourably," criteria of subjective effects not stated.	1) Alteration in BP over 3 months of Relaxation Training "Pretrial" BP Treatment Group 159.1±15.9/100.1±12.8 Control Group 163.1±20.9/9.99±12.8 "End of trial" BP Treatment Group 138.7±16.0/85.9±8.7 Control Group 162.6±24.4/97.0±12.0 2) Follow-up Results End of trial arrival BP Treatment Group 144.6±11.0/86.0±5.74 Control Group 167.7±9.73/97.1±6.54 Final follow-up measured BP Treatment Group 144.4±9.83/86.7±3.33 Control Group 163.6±9.42/98.1±7.83 (12 month)/(9 month)	3, 6, 9 and 12 months with 42% drop in total drug requirement among patients. 5 patients ended use of drugs, of four patients who did not control BP one achieved control of migraine and stopped antidepressant drug therapy. BP, respiration rates recorded and given to patient pre and post session; also biofeedback of GSR, given continuously during treatment	Variance of treatment effect attributable to Yoga, biofeedback and role of therapist not clear
Patel 1975b	Hypertension with S's using anti hypertensive drugs	Phase One: (N=34) Group One: (treatment) N+17, mean age 59.5 yrs., 6 male, 11 female Group Two: (control) N+17, mean age 58.6 yrs., 7 male, 10 female Phase Two: former control group (2) given treatment	Treatment procedure (2 sessions per week x 6 weeks) 1) Educational discussion about hypertension, physiology of relaxation, etc. 2) Instruction in methodical (yogic) relaxation and slowed breathing 3) After mastery of step 2, "Transcendental meditation-like" technique taught 4) Biofeedback (e.g., audio signal of GSR level) given continuously by "relaxometer" during steps 2 and 3 5) S's urged to practice informal relaxation and meditation outside of treatment when tense. (e.g., each patient had a red disc on his watch as a reminder to relax when he looked at the time	Extensive doctor patient interaction between doctor and patients	None reported	1) BP before trial Treatment Group 167.5±23.6/99.6±9.3mmHg Control Group 168.9±20.0/100.6±11.4mmHg 2) Mean Final BP: Phase 1 Treatment Group 141.4/84.4mmHg Control Group 160.0/96.4mmHg 3) Mean BP Phase 2 Mean initial BP Treatment (formerly control) 176.6/104.3 Control (formerly treatment) 148.81/87.8 Mean final BP Treatment (formerly control) 148.6/89.3 Control (formerly treatment) 146.21/86.2	2 wks. x 3 months after phase one, then 2 month interval prior to phase two. Phase two, single used follow-up examination	Same criticism as above
Datey et al., 1969	Hypertension with chronic hypertensive (essential hypertension — 32 patients, renal — 12, arteriosclerotic — 3) Symptomatology, Giddiness (30 patients), headache (28), chest pain in 12 (angina 7), palpitation in 12, breathlessness on exertion in 10, exhaustion in 10, insomnia in 8, irritability and nervousness in 8.	N=47, avg. age 46 yrs., 37 male, 10 female Group One: N=10, not using antihypertensive drugs Group Two: N=22, BP well controlled with antihypertensive drugs. Group Three: N+15, BP inadequately controlled with antihypertensive drugs.	"Shavāsana" Yogic breathing concentration and muscle relaxation done 30 min. daily for approx. 30 weeks. EMG feedback of frontalis muscle tension used as check of muscle relaxation	Not stated specifically "experienced supervisor" checks exercising patients for correctness in breathing exercise.	Report states: "patients experienced a sense of well-being after exercise. Improvement reported among almost all patients in somatic symptoms (e.g., headaches, giddiness, nervousness, irritability, and insomnia)	Decreases in avg. mean blood pressure Group One: 134mmHg to 107mmHg (reduction 27mmHg) Group Two: 102-100mmHg unchanged (since patient's BP well controlled by drugs, therapy aimed at reducing drug dosages: for 13 S's (59%), avg. drug requirement was reduced to 32% of original dosage, for 9 patients, dosage could not be reduced, however, 6 of these S's performed Yogic exercise irregularly. Group Three: 120mmHg to 110mmHg, drug requirement reduced to 29% of original in 6 patients (40%), dosage unchanged in 7 patients (of these, 2 were irregular and 2 could not perform exercise correctly), does had to be increased in 2 patients (regular with exercise). Essential (62.5%), Renal (42%), not statistically significant, arteriosclerotic (not favorable response)	to 40 weeks	Placebo tablets given S's not using anti-hypertensive drugs one month prior to treatment, data substantiating report of improvement in somatic symptoms needed, also follow-up needed.
Stone and DeLeo 1976	Mild or moderate hypertension (defined as mean arterial BP greater than 105mmHg during at least 50% of 14 pretreatment examination) with S's who had never received antihypertensive therapy	N=19, Group One (controls): N=5, avg. age 28, all male Group Two (treatment): N=14, avg. age 28, (±1 yrs.) (mean ± s.e.m.) Baseline BP for both groups similar	"Buddhist" meditation taught (e.g., counting breaths) in five 20 min. training sessions S's told to repeat technique 2x daily for 10-15 min.	Not stated specifically	None reported	Effect of Physiologic Relaxation on Arterial-Blood Pressure (mean ± Standard error mean systolic/diastolic BP in mmHg) Group One (controls) Baseline—Supine 144±6/90±2 Upright 147±7/93±2 6 mos.—Supine 145±7/92±3 Upright 145±3/93±2 Group Two (treatment) Baseline—Supine 141±3/90±3 Upright 132±3/82±2 6 mos.—Supine 146±/95±3 Upright 131±4/85±2 Found lowered mean (by 12mmHg) BP for treatment group over controls. Changes in dopamine betahydroxylase activity in blood plasma elevated; showed decrease among treatment group which correlated with BP reduction. Also reduction in furosemide-stimulated renin activity (PRA) uncorrelated with BP changes. No significant changes in blood [illegible]	6 months	Effect of possible dietary salt restriction assessed by measuring urinary sodium excretion, controls nonrandomized with small N, reduction in adrenergic activity (DPH) may be statistically significant but not a physiologically important alteration.

5.5 *Physiological Changes*

THE STUDIES discussed in 5.1-5.3 suggest that meditation may be a promising therapeutic intervention strategy for several different clinical areas. One hypothesis that attempts to explain meditation's effectiveness in these clinical areas is that meditation helps relax an individual. There seems general agreement that meditation does, in fact, produce a state of relaxation (Smith, 1975; Benson, Beary, & Carol, 1974), variously described as an activity (effortless breathing, [Shapiro & Zifferblatt, 1976b]); a "state" (the hypometabolic state, [Wallace, Benson, & Wilson, 1971]); and a response (the relaxation response, [Benson, Beary, & Carol, 1974]). This relaxation, as a mediating mechanism, is discussed in Chapter Nine.

I would like here to briefly review the round-one physiological changes evidenced during the act of meditation itself: *reduced heart rate*, decreased oxygen consumption**, decreased blood pressure†, increased skin resistance‡, and increased percent time, regularity and amplitude of alpha activity§.* These results, summarized by type of meditation technique, are presented in tables 5.4-5.6.

*Wallace, 1970; Wenger & Bagchi, 1961; Goyeche, Chihara, & Shimizu, 1972; Karambelkar, Vinekar, & Bhole, 1968; Anand, Chinna, & Singh, 1961a; Das & Gastaut, 1955; Bagchi & Wenger, 1957.

**Wallace, Benson, & Wilson, 1971; Wallace, 1970; Wenger & Bagchi, 1961; Goyeche, Chihara, & Shimizu, 1972; Karambelkar, Vinekar & Bhole, 1968; Sugi & Akutsu, 1968; Watanabe, Shapiro & Schwartz, 1972; Allison, 1970; Treichel, Clinch & Cran, 1973; Hirai, 1974.

†Wallace, Benson & Wilson, 1971; Wenger & Bagchi, 1961; Karmabelkar, Vinekar & Bhole, 1968; Bagchi & Wenger, 1957.

‡Wallace, Benson & Wilson, 1971; Wallace, 1970; Wenger & Bagchi, 1961; Karambelkar, Vinekar & Bhole, 1968; Bagchi & Wenger, 1957; Akishige, 1970; Orme-Johnson, 1973.

§Wallace, Benson & Wilson, 1971; Wallace, 1970; Anand, China & Singh, 1961a; Das & Gastaut, 1955; Bagchi & Wenger, 1957; Watanabe, Shapiro & Schwartz, 1972; Hirai, 1974; Akishige, 1970; Kasamatsu & Hirai, 1966; Banquet, 1972; Banquet, 1973; Williams & West, 1975.

TABLE 5.4 Summary of Indian Yogic Meditation Based Partially on Woolfolk (1975)

References	Experience of Meditators	Changes During Meditation	Type of Design	Quality of Control Procedures
Das & Gastaut, 1955	Highly experienced	Faster EEG, increase in HR	Within-subject	Poor, measurements taken in field under highly variable conditions
Anand, Chinna & Singh, 1961a	Highly experienced	Faster EEG, decrease in O_2 consumption, decrease in HR	Within-subject	Excellent, laboratory study
Bagchi & Wenger, 1957	Highly experienced	No change in EEG, increased in SR level, no change in HR, no change in BP	Within-subject	Poor, measurements taken in field under highly variable conditions
Kasamatsu et al., 1957	Highly experienced	Slower EEG	Within-subject	Adequate, laboratory study, meditation period too short
Anand, Chinna & Singh, 1961a	Highly experienced	Slower EEG	Within-subject	Excellent laboratory conditions
Wenger & Bagchi, 1961	Moderately experienced	Decrease in SR level, decrease in respiration rate, increase in HR, increase in BP	Within-subject	Poor, initial readings not comparable before meditation and relaxation periods
Karambelkar, Vinekar & Bhole, 1968	Moderately experienced	No change in SR level, increase in O_2 consumption, no change in HR, no change in BP	Between-subjects	Poor, no control over duration of meditation, sketchy reporting
Corby et al., 1978	—Novice —Intermediate 2.1 years for 3 hours per day —Expert, 4.4 years for 3.4 hours per day	Novices showed autonomic relaxation while meditators showed activation. Meditators showed ↑ alpha and theta power and minimal evidence of EEG defined sleep. One meditator showed sudden EEG activation concurrent with the experience of approaching the Yogic estatic state of intense concentration.	Within & between subjects	Good
Elson, Hauri & Cunis, 1977	9-54 months	↑ basal skin resistance ↓ respiratory rate ↓ EEG evidence of sleep ↑ alpha and theta EEG activity	Between-subjects	Adequate

TABLE 5.5 Summary of Studies of Transcendental Meditation Based Partially on Woolfolk (1975)

References	Experience of Meditators	Changes During Meditation	Type of Design	Quality of Control Procedures
Jevning, et al., 1977	4 months & 3-5 years	↓ serum cortisol in long term meditators probably consistent with complete suppression of cortisol secretion during meditation. No change in serum testosterone. Equivalent amounts of stage 1 sleep between groups. No correlation with cortisol secretion.	Within & between subjects	Good use of same subjects before and after learning TM plus a long term practice group.
Jevning, Wilson & Smith, 1977	4 months & 3-5 years	Serum phenylalanine changes in long term meditators. No change in 12 other amino acids.	Within & between subjects	Good use of same subjects before and after learning TM plus a long term practice group.
Jevning, Wilson & Vanderlaan, 1978	4 months & 3-5 years	Plasma prolactin rose in the post meditation period. No effect on growth hormone.	Within & between subjects	Good use of same subjects before and after learning TM plus a long term practice group.
Jevning, Wilson, Smith & Morton, 1976	Average of 1 year	Slight ↑ in cardiac output and blood flow during meditation. Sharp ↓ in renal blood flow in both controls and meditators. Slight ↓ in arterial lactate in meditators.	Within & between subjects	Good use of same subjects before and after learning TM plus a long term practice group.
Younger, Adrianne & Berger, 1975	Average of 3 years	EEG records were rated as showing % time during meditation as: alert −12.7%, predominant alpha −45.9%, asleep −41.4%.	Within-subject	Adequate. Randomized blind scoring.
Pagano, Rose, Stivers & Warrenburg, 1976	Average of 2.5 years	EEG records were rated as showing % time during meditation: wakefulness −39%, state 1 sleep 19%, state 2 sleep −23%, stages 3 or 4, 17%.	Within-subject	Unclear whether EEG records were scored blind.
Bennett & Trinder, 1977	Intermediate	Evidence of shift in hemispheric lateralility to the right.	Within-subject	Adequate
Wallace, 1970	Moderately experienced	Slower EEG, increase in SR level, decrease in O_2 consumption, decrease in HR	Within-subject	*Excellent, laboratory study, statistical comparisons made.*
Wallace, Benson & Wilson, 1971	Moderately experienced	Slower EEG, increase in SR level, decrease in O_2 consumption, decrease in BP	*Within-subject*	*Excellent, laboratory study, statistical comparisons made.*

TABLE 5.5 Summary of Studies of Transcendental Meditation Based Partially on Woolfolk (1975) (cont'd.)

References	Experience of Meditators	Changes During Meditation	Type of Design	Quality of Control Procedures
Schwartz, 1973	Moderately experienced	Slower EEG, increase in SR level (these changes not significantly different from those found in controls)	Between-subjects	Excellent, laboratory study, statistical comparisons made appropriate control group.
Banquet, 1973	Moderately experienced	Slower EEG (stages I & II), in some individuals, faster EEG observed during third stage.	Within-subject	Excellent, laboratory study, statistical comparisons made.
Orme-Johnson, 1973	Moderately experienced	Galvanic skin response more stable	Between-subjects	Excellent, laboratory study, statistical comparisons made appropriate control group.
Allison, 1970	Not reported	Decrease in rate of respiration	Within-subject	Adequate, laboratory study, sketchy reporting.
Williams & West, 1975	Average — 31 months	Earlier and more frequent alpha induction. EEG response to intermittant photic stimulation shows alpha blocking.	Between-subjects	Adequate
Fenwick, et al., 1977	Novice	EEG evidence of maintenance of stage "onset" sleep. O_2 consumption & CO_2 production which were accountable for in terms of traditional physiological mechanisms without resorting to hypotheses of a special hypometabolic state.	Between-subjects	Good design. Excellent use of multivariate statistical analysis.
Pagano & Frumkin, 1977	Novice & experienced (1.4-3 years)	Seashore Tonal Memory Test of right hemisphere function showed improved performance in experienced but not novice meditators both before and after a meditation session. There were no differences between before and after sessions.	Between-subjects	Adequate

TABLE 5.6 Summary of Studies of Zen Meditation Based Partially on Woolfolk (1975)

Reference	Experience of Meditators	Changes During Meditation	Type of Design	Quality of Control Procedure
Kasamatsu et al., 1957	Highly experienced	Slower EEG	Within-subject	Adequate, laboratory study, meditation period too short
Kasamatsu & Hirai, 1969	Moderately experienced & highly recommended	Slower EEG	Within-subject	Excellent, laboratory conditions
Akishige, 1968	Highly experienced	Slower EEG, galvanic skin response more stable, decrease in O_2 consumption, decrease in respiration rate	Within-subject	Excellent, laboratory conditions
Hirai, 1960	Highly experienced	Slower EEG, decrease in respiration rate	Within-subject	Adequate, laboratory conditions
Sugi & Akutsu, 1968	Highly experienced	Decrease in O_2 consumption	Within-subject	Excellent, laboratory conditions
Goyeche, Chihara & Shimizu, 1972	Minimally experienced	Decrease in respiration rate, decrease in HR	Within-subject	Excellent, laboratory conditions, order of meditation and control periods randomized
Malec & Sipprelle, 1977	Novices 1 trial only	↓ Respiration, EMG and transient heart rate; no effect of expectation	Between-subjects	Good control for expectation

5.6 *Comparisons with Other Self-Regulation Strategies: Physiological, Metabolic, EEG Patterns*

THERE WAS INITIAL enthusiasm that meditation might be a unique strategy (Muchlman, 1977), different from all other self-regulation strategies. It was suggested, on the basis of certain first-round studies that this uniqueness could be measured by the physiological parameters noted in section 5.5. However, Benson (1975, 1977) suggested that this physiological response pattern is not particularly unique to meditation *per se* but is common to any passive relaxation procedure. This view has been supported and replicated by a number of studies which suggest no physiological difference between meditation and other self-regulation strategies, and often no differences between meditation and a "just sit" control group. For example, earlier studies suggested that skin resistance significantly increased within subjects (Wallace et al., 1971; Wallace, 1970) and in a TM group versus a control group (Orme-Johnson, 1973). Recent studies, however,* show no significant difference on galvanic skin response (GSR) between meditation and other self-regulation strategies, including self-hypnosis, Progressive Relaxation, and other instructional "relaxation" control groups. Further, the above studies also show no difference between meditation and other self-regulation strategies on heart rate or respiration decrease.

Curtis and Wessberg (1976) tested differences between a meditation group, a deep muscle relaxation group, and non-experienced individuals and found no difference either between groups or between trials on GSR, heart rate, or respiration. They noted that there was high subject variability, with some subjects "actually increasing their rate of functioning," and that the few measurements approaching statistical significance were in the control group and not in the meditators or relaxers.

In their short report, Cauthen and Prymak (1977) tested five different groups (N=7): experienced meditators (subjects

*Morse et al., 1977; Walrath & Hamilton, 1975; Cauthen & Prymak, 1977; Curtis & Wessberg, 1976; Boswell & Murray, 1979.

averaging five years experience), moderately experienced meditators (fourteen months), novice meditators (seven days), a relaxation group (five days), and a pseudo-TM group that thought about a word. These groups were compared on measures of respiration, GSR, temperature, and heart rate. The authors note that there was no significant difference for any group before, after, or during the experimental period for GSR or respiration, a finding which, as noted, goes counter to previous studies. The Cauthen and Prymak study (1977) does not seem to tease out any particularly unique physiological changes as a result of meditation, even when long-term meditators are tested.

In a related study, Travis et al. (1976) compared subjects who had meditated an average of five to thirty months with a control group which simply relaxed. After a two-minute base line, experimental subjects meditated for twenty minutes and then had a ten-minute post-meditation follow-up. There was no significant change in the meditating group in heart-rate decrease, electromyogram (EMG) decrease, or increase in occipital alpha. The only significant changes were in the control group on decrease in occipital alpha, decrease in heart rate, and decrease in frontal EMG. The authors note that most striking was the lack of changes in alpha and EMG occurring during Transcendental Meditation, compared with those previously reported (Wallace, 1970; Wallace et al., 1971). The changes in the control subjects, the authors note, seem most likely to be the result of sleep or sleep onset that occurred in thirteen of the sixteen control subjects.

In an interesting and complex study, Morse et al., (1977) looked at four experimental groups (trained in TM but not hypnosis, trained in auto-hypnosis but not TM, trained in both, trained in neither). Each of these four groups were monitored under six conditions: alert state, relaxation, heterohypnosis relaxation, heterohypnosis task, autohypnosis relaxation, and meditation. During the meditation session, those who had not practiced TM were given one of the following words: one, om, flower, garden, river, sail. There were four different orders in which the four groups underwent the six conditions. There was significant condition effect between the alert state and the experimental condition, but not among the experimental conditions, according to GSR. There was interhemispheric EEG synchronicity in all experimental conditions: That is, when synchronization of slow

alpha occurred, it was not unique to TM but found in all the relaxation conditions. Neither respiration rate, pulse rate, nor systolic and diastolic blood pressure differentiated experimental conditions. The authors noted that the physiological responses of TM and simple word meditation were similar, and concluded that, "It appears that relaxation, meditation, and relaxation hypnosis yield similar physiological responses suggestive of deep relaxation."

The Morse study (1977), in addition to supporting the literature suggesting a lack of uniqueness of meditation on measures of GSR and heart rate, also calls into question its uniqueness in terms of EEG pattern—the synchronization of slow alpha (cf. Glueck & Stroebel, 1975). Further, the above studies suggest that there is not a unique respiratory effect as a result of meditation. This lack of unique respiratory effect has also been replicated by Pagano (Note 14), who found no difference between meditation and a Progressive Relaxation group, and Fenwick et al. (1977), who found no difference between meditation and listening to music. Fenwick et al. (1977) noted that subjects who were tense to begin with showed a greater relaxation effect than subjects who were not, and suggested that the findings of Wallace et al. (1971) may have been due to high initial levels of metabolism and tension. Regarding metabolic change, Fenwick et al. (1977) noted that subjects in the fasting meditation group, a control group used to reduce the level of tension and metabolism to the lowest possible level, "showed that under these circumstances meditation failed to produce any significant change in the metabolic rate."

A similar lack of metabolic uniqueness has also been found by other investigators. Michaels, Huber and McCann (1976) attempted to differentiate meditators from resting controls biochemically. Since stress increases blood catacholamines, the experimenters looked at plasma epinephrine and norepinephrine as well as lactate. Twelve experienced meditators (more than twelve months experience) were compared with controls matched for sex and age who rested instead of meditating. There were no significant fluctuations of plasma epinephrine during meditation. Neither were significant differences observed between controls and meditators. The same held true for plasma lactic acid concentration, thus failing to replicate the earlier findings on TM (Wallace, 1970).

More recent studies further call into question the uniqueness of meditation's effects. In an earlier study, Goleman and Schwartz (1976) showed increased responsiveness of meditators to an upcoming stressful event on a film and their quicker recovery time as compared to a relaxing control group. However, from a cognitive standpoint, in terms of number of post-stress intrusive thoughts, significant differences between meditators and controls have not been detected (Kanas & Horowitz, 1977). Further, earlier theories which suggested that TM was unrelated to sleep have recently been called into question by Pagano et al. (1976) and Young and Berger (1975) who note that at least beginning meditators may spend an appreciable part of their time in sleep stages two, three, and four.

Thus it appears that the original belief that meditation would be able to be discriminated as a unique physiological state has not been confirmed—either on an autonomic or metabolic level, or in terms of EEG pattern. Although it does seem clear that meditation can bring about a generalized reduction in multiple physiological systems, thereby creating a state of relaxation in the individual (Davidson, 1976; Shapiro & Giber, 1978), it is not yet clear from the available data that this state is differentiated from relaxation effects of other techniques, whether they be hypnosis (Walrath & Hamilton, 1977) or deep muscle relaxation (Curtis & Wessberg, 1976; Cauthen & Prymak, 1977; Travis, Kondo & Knott, 1975; Morse et al., 1977, etc.). The constellation of changes is, in most studies, significantly different between meditation and placebo control groups, but not between self-regulation treatment groups.

In conclusion, it should be noted that not everyone would agree with the above interpretation of the findings (e.g., Jevning & O'Halloran, 1980 in press); the results are not unequivocal. For example, Elson, Hauri and Cunis (1977) compared meditation with a "wakefully relaxed" group and a group of ĀnandaMārga meditators. They noted that "meditation was characterized by a marked increase in basal skin resistance and by a decrease in respiratory rate, changes which were not observed in the controls. Further, six of the eleven controls fell asleep, while none of the meditators fell asleep—rather meditators remained in a relatively stable state at alpha and theta EEG activity." Also, Jevning and O'Halloran (in press, 1980) suggest blood flow as a metabolic measure unique to meditation. They believe that

TABLE 5.7 Summary of Studies Comparing Meditation with Other Self-Regulation Strategies: Physiological Measures
Roger N. Walsh

Reference	Type of Meditation	Amount of Meditation	Changes During Meditation	Type of Design	Quality of Control Procedures
Walrath & Hamilton, 1975	TM	> 6 months practice	Meditators, autohypnotizers and controls all showed decreases in heart and respiration rates and GSR activity but did not differ between groups.	Between-subjects	Adequate except for equal amounts of practice for meditators and hypnosis subjects.
Curtis & Wessburg, 1975/76	TM	~ 2 years practice	No effects across trials or between meditation, progressive relaxation and controls, in GSR, heart or respiration rate.	Between-subjects	Adequate.
Cauthen & Prymak, 1977	TM	7 days, 14 months, or 5 years	2 more experienced groups of meditators showed ↓ heart rate during meditation. Relaxers and least experienced meditators showed ↑ skin temperature.	Between-subjects	Adequate. Controls focused on a word.
Travis, Kondo, & Knott, 1977	TM	5-30 months	No differences between meditators and relaxation controls on EEG, alpha, heart rate and frontal EMG. Both groups showed ↓ alpha activity. Meditators showed less EEG sleep patterns than relaxation controls.	Between-subjects	Adequate.
Morse et al., 1977	TM	2 months - 8 years	Measures of pulse rate, respiratory rate, blood pressure, GSR, EEG and muscle activity all suggested significantly greater relaxation in experimental subjects trained in TM, self-hypnosis or both, than in controls. However experimental groups did not differ between themselves except for lower muscle activity in TM.	Between-subjects	Good design and statistical analysis.
Pagano et al., (Note 14)	TM	Experienced average = 3.4 years	Both TM and progressive muscle relaxation subjects showed similar small (2-5%) decrements in O$_2$ consumption from a resting baseline, which did not differ from eyes closed controls.	Between-subjects	Adequate. Good statistical analysis.

TABLE 5.7 Summary of Studies Comparing Meditation with Other Self-Regulation Strategies: Physiological Measures (cont'd.)
Roger N. Walsh

Reference	Type of Meditation	Amount of Meditation	Changes During Meditation	Type of Design	Quality of Control Procedures
Glueck & Stroebel, 1977	TM	Intermediate	Showed heart and respiration rates ↑ GSR, ↑ EEG alpha. Intrahemispheric alpha and theta synchrony even in inexperienced meditators. Greater intrahemispheric synchrony in thermal and EMG biofeedback subjects than in TM or relaxation response subjects. Evidence of interhemispheric synchrony in TM and relaxation response subjects but not in biofeedback subjects.	Between and within subjects	Adequate.
Boswell & Murray, 1979	Zen	2 weeks	No significant differences between groups in Spiegelberger Trait-State Anxiety inventory, GSR, skin conductance, and heart rate.	Between-subjects	Good. Three control groups: Relaxation, placebo, and no treatment.
Beiman et al., 1980	TM	Seven 1½ hour sessions	No significant differences in effectiveness of TM, behavior therapy, or self relaxation, were detected for self report measures (locus of control, regression sensitization, autonomic perception, trait anxiety, or fear survey schedule), or physiological measures (skin resistance, skin response, pulse rate, EMG). Locus of control accounted for a major proportion of variance in the response to TM.	Between-subjects	Adequate. Good use of multivariate analyses, especially multiple regression to determine amounts of variance accounted for by subject variables.

additional unique physiological response patterns will be found, and that current findings do not reflect this simply because we do not yet have sensitive enough physiological measures to ferret out the unique aspects of meditation patterns as compared to other self-regulation strategies.

5.7 Comparison with Other Self-Regulation Strategies: Clinical

SIMILAR FINDINGS are also now being reported on a clinical level. Meditation appears to be equally but no more effective than other self-regulation strategies for dependent variables ranging from anxiety (Beiman et al., in press 1980; Goldman, Domitor & Murray, 1979; Kirsch & Henry, 1979; Boswell & Murray, 1979; Zuroff & Schwartz, 1978; Smith, 1976; Thomas & Abbas, 1978), anxiety in alcoholics (Parker et al., 1978), to alcohol consumption (Marlatt et al., in press, 1980), insomnia (Woolfolk et al., 1976) and borderline hypertension (Surwit, Shapiro, Good, 1978). Self-regulation strategies compared include Progressive Relaxation (Woolfolk et al., 1976; Marlatt et al., 1979; Beiman et al., 1979; Boswell & Murray, 1979; Thomas & Abbas, 1978), Benson's Relaxation Response (Marlatt et al., in press, 1980; Beiman et al., in press, 1980), a pseudo-meditation treatment (Smith, 1976), anti-meditation treatments (Goldman et al., 1979; Boswell & Murray, 1979; Smith, 1976), self-administered systematic desensitization (Kirsch & Henry, 1979) and cardiovascular and neuromuscular biofeedback (Surwit, Shapiro & Good, 1978; Hager & Surwit, 1978).

As examples of these types of studies involving clinical comparison of self-regulation techniques, let me describe two that seem representative: One on alcohol consumption (Marlatt et al., in press, 1980) and one on anxiety (Kirsch & Henry, 1979).

Marlatt et al. describe a nicely designed study which took heavy social drinkers through a two week pretreatment baseline phase, a six week treatment phase, and seven week follow-up. There were four groups, a meditation group (Benson's method), a Progressive Relaxation group, an attention placebo group practicing bibliotherapy, and a no-treatment control group that was monitored and took all the tests. This study is one of the first in

TABLE 5.8 Summary of Studies Comparing Meditation with Other Self-Regulation Strategies: Clinical Measures
Roger N. Walsh

Reference	Type of Meditation	Amount of Meditation	Changes During Meditation	Type of Design	Quality of Control Procedures
Zuroff & Schwartz, 1978	TM	9 weeks	Only significant difference between TM and relaxation was greater RM reduction in trait anxiety measured by the S-R Inventory of Anxiousness. Another self report measure, the Adjective Check List, and a behavioral anxiety measure did not differentiate between meditators, relaxers or no treatment controls. Similarly there were no treatment effects for psychological maladjustment measured by Rotter's Incomplete Sentence Test, locus of control, or reported alcohol or marijuana use. In subjective reports of benefits in life areas, meditators reported improved academic performance.	Between-subjects	Good—random assignment of subjects. Attempts to equalize expectancies for TM and relaxation.
Goldman, Domitor, & Murray, 1978	Zen	5 days	Meditators reported more altered states of consciousness and relaxation. No significant differences on measures of anxiety (Spielberger's State-Trait Anxiety Inventory, or the Epstein-Fenz Anxiety Scale) or of perception (Holtzman Inkblot and the Embedded Figures Tests). Locus of control did not interact with treatment but volunteer versus course requirement status did, with volunteers reporting greater Zen induced altered states and increasing proficiency across days.	Between-subjects	Very short training period but otherwise good. Employed two control groups, no treatment and placebo. Also controlled and tested for locus of control and volunteers versus subjects fulfilling course requirements.
Kirsh & Henry, 1979	TM like	Unclear	The three experimental treatments (systematic desensitization with meditation replacing progressive relaxation, and meditation only) all effected significant reductions in public speaking anxiety on self report and behavioral measures. Significant reductions in anticipatory pulse rate occurred only in the desensitization relaxation groups. Subjects who perceived treatments as highly credible showed greater improvement on both subjective anxiety and pulse rate than did subjects who perceived treatments as less credible.	Between-subjects	Good. Four groups matched according to level of performance.
Marlatt et al., 1980	Benson	6 weeks	As opposed to the no treatment control group, meditation, progressive relaxation, and the bibliotherapy attention control groups all showed significant reductions in alcohol consumption and increases in internal locus of control. However these three groups did not differ significantly. All *three treatment groups reported significant increases in ratings of daily relaxation, with the greatest effect in meditators. At seven week follow-up alcohol consumption in the three treatment groups remained less than pretreatment levels but not significantly so. Most subjects ceased practicing their treatment during the seven week follow up. No significant effect of expectations was found on treatment outcome.*	Between-subjects	Good. Subjects matched for baseline alcohol consumption. Attempted control of expectation.

which there was a specific, clearly spelled out theoretical rationale between the independent variables (relaxation procedures) and the dependent variable (decrease in alcohol consumption). Results suggested that the relaxation training, whether it be meditation, Progressive Relaxation or attention placebo had a significant effect on the consumption of ethanol compared to the no-treatment group. However, there were no significant differences between the three different relaxation training procedures.

Kirsch and Henry (1979) assigned thirty-eight "highly motivated" and highly speech-anxious subjects to four groups: 1) a desensitization relaxation group (including Progressive Relaxation, hierarchy construction, imagery relaxation pairing instructions on how to generalize relaxation and coping skill instructions) 2) a desensitization meditation group (identical to group one except meditation instructions similar to Benson's replaced Progressive Relaxation; 3) meditation only, which included meditation plus the coping-skill instruction, but without instructions for hierarchy construction and imagery relaxation pairing; and 4) a no-treatment group. It appears that the treatment phase (conditions one through three) lasted three weeks. Pre- and post-treatment assessment of pulse rate and performance anxiety were taken. Results showed that improvement occurred in all three treatment conditions on self-report and behavioral measures, and that this improvement was significantly greater than the no-treatment control group. However, there were no significant differences in improvement between the three treatment conditions (see Table 5.8).

5.8 Summary and Future Directions

WHAT ARE THE implications of these studies? First, the data from these studies indicate that meditation does not appear to be any more effective than other self-regulation strategies on a wide variety of clinically relevant dependent variables. It should be noted, however, that my interpretation of the data is not without its critics. The critics point to studies of Vahia et al. (1972; 1973) and Glueck and Stroebel (1975) in which meditation was more effective than a pseudo-yoga group (Vahia et al., 1972; 1973) and than a biofeedback group (Glueck & Stroebel, 1975). However, I believe it could be

argued that therapists' belief in treatment of credibility may have been a critical confounding factor in Vahia's studies (cf. Smith, 1975). Further the fact that Glueck and Stroebel's study was conducted at the Institute for Living, where a great deal of TM research was being conducted, could have caused strong confounding demand characteristics, possibly accounting for subjects' continuing to adhere to the TM program, while dropping out of the biofeedback treatment group.

What future directions might clinically oriented research profitably pursue? Let me suggest four different approaches, each of which is covered in more detail in subsequent sections of the book. The first involves a *refinement of the independent variable.* What are the active components of meditation (Chapter Eight)? Might these components be profitably combined with other self-regulation strategies (Chapter Six, also Woolfolk, 1979, Kirsch & Henry, 1979; Shapiro & Zifferblatt, 1976a; 1976b; Shapiro, 1978b)?

The second involves a refinement of the dependent variable. For example, Davidson and Schwartz (1976) have suggested that anxiety actually has both a cognitive and somatic component, and meditation may be more effective for reducing cognitive anxiety while doing relatively little for somatic anxiety.

A third approach (Chapter One), involves examining subject variables (Smith, 1978; Beiman et al., 1980, in press). This approach attempts, based on certain pre-test indicators, to develop a subject profile of those for whom meditation is likely to provide a successful clinical intervention.

The above three refinements would enable us to become more precise in choosing the correct clinical intervention (or combination of interventions) for a specific individual with a specific clinical problem.

A fourth suggested approach, not necessarily negating the others, involves looking at the phenomenology of meditation. This approach, valued by the Eastern tradition for centuries, is just beginning to gain favor within psychology. Despite certain problems, researchers are beginning to note its importance. For example, Morse et al. (1977) notes that physiological responses failed to show significant differences between the three relaxation states, but subject evaluation *did* show significance (cf. also Gilbert & Parker, 1975). Therefore, they cite and agree with Tart's remark that "In subject's own estimate of his behavior, an internal state is a rich and promising source of data which some experimenters tend to ignore in their passionate search for objectivity." (Tart, cited in Morse et al., 1977). Similarly, Curtis and Wessberg (1976) noted that there were more positive subjective changes in the meditation group than in the control "relaxation group" even though there was no difference on physiological measures. They noted that if meditation has a unique effect, it seems one which is different from a visceral or neuromuscular effect.

If meditation is a unique technique, its uniqueness may not be as a self-regulation strategy and therefore it will not be seen as different from other self-regulation strategies on either a clinical or physiological basis, but may be seen to be unique in the way the individual experiences it. The literature on phenomenological or subjective experiences during meditation—meditation as altered state of consciousness will be discussed in Chapter Seven.

Chapter Five: Further Readings

REVIEWS OF THE LITERATURE

Clinical

Smith, J. Meditation as psychotherapy: A review of the literature. *Psychological Bulletin,* 1975, *82,* (4,) 553-564. (Reprinted in D.H. Shapiro & R.N. Walsh. [Eds.], *The science of meditation.* New York: Aldine, 1980).

Shapiro, D.H. & Giber, D. Meditation and psychotherapeutic effects. *Archives of General Psychiatry,* 1978, *35,* 294-302. (Reprinted in D.H. Shapiro & R.N. Walsh [Eds.], *The science of meditation,* New York: Aldine, 1980).

Physiological

Woolfolk, R. Physiological correlates of meditation. *Archives of General Psychiatry,* 1975, *32,* 1323-1326. (Reprinted in D.H. Shapiro & R.N. Walsh [Eds.], *The science of meditation.* New York: Aldine, 1980).

Davidson, J. Physiology of meditation and mystical states of consciousness, *Perspectives in Biology and Medicine,* 1976, *19,*

345-380. (Reprinted in D.H. Shapiro & R.N. Walsh [Eds.], *The science of meditation.* New York: Aldine, 1980).

Comparison with Other Self-Regulation Strategies

RESEARCH

Physiological

Walrath, L. & Hamilton, D.W. Autonomic correlates of meditation and hypnosis, *American Journal of Clinical Hypnosis,* 1975, *17,* (3), 190-197. (Reprinted in D.H. Shapiro & R.N. Walsh [Eds.], *The science of meditation.* New York: Aldine, 1980).

Morse, D.R. et al., A physiological and subjective evaluation of meditation, hypnosis and relaxation. *Psychosomatic Medicine,* 1977, *39,* (5), 304-324. (Reprinted in D.H. Shapiro & R.N. Walsh [Eds.], *The science of meditation.* New York: Aldine, 1980).

Clinical

Marlatt, G.A. et al., Effect of meditation and relaxation training upon alcohol use in male social drinkers. In D.H. Shapiro & R.N. Walsh, [Eds.], *The science of meditation.* New York: Aldine, 1980.

Kirsch, I. & Henry, I. Self-desensitization and meditation in the reduction of public speaking anxiety. *Journal of Consulting and Clinical Psychology,* 1979, *47,* (3), 536-541.

Adverse Effects

Otis, L. Adverse effects of transcendental meditation. In D.H. Shapiro and R.N. Walsh [Eds.], *The science of meditation.* New York: Aldine, 1980, in press.

Lazarus, A.A. Psychiatric problems precipitated by transcendental meditation. *Psychological Reports,* 1976, *10,* 601-602.

Refining the Dependent Variable

Schwartz, G., Davidson, R., Goleman, D. Patterning of cognitive and somatic processes in the self-regulation of anxiety: Effects of meditation versus exercise. *Psychosomatic Medicine,* 1978, *40,* 321-8. (Reprinted in D.H. Shapiro & R.N. Walsh [Eds.], *The science of meditation.* New York: Aldine, 1980, in press).