


Meditation as an Altered State of Consciousness


 THOSE INVOLVED with the psychology of religion (Smith, 1965; Stace, 1960) and those who have studied spontaneous religious experiences (e.g., William James, 1901) note that often during times of meditation there are powerful subjective experiences which individuals claim have radically altered their lives, given them a new sense of meaning and purpose, new values, and a new relationship not only with themselves, but with other people and the world around them. In Eastern traditions some of these are referred to as *satori*, *kensho*, *samadhi*.

These experiences, although of high salience for the individual, are sometimes spoken of as ineffable. Those who experience them have difficulty communicating these experiences to others (Frank, 1977), which presents a dilemma to the researcher who needs some kind of verbal or symbolic representation to help quantify, label, and describe them. Often the task of experimentally validating these experiences has seemed so difficult that some researchers have dismissed the experiences themselves as epiphenomena at best or at worst artificial schizophrenia with complete withdrawal of libidinal interest from the outside world (e.g., Alexander, 1931; GAP Report, 1977). Dismissing the experiences as epiphenomena is based not only on the difficulty of describing the phenomena, but also involves a paradigm clash (as discussed in Section 1.3) between the Western

model of physicalistic science and the internal, experiential nature of the altered state phenomena. As Tart has noted (1975), "The philosophy of physicalism is a belief system stating that physical reality exists independent of our perception of it, and is the ultimate reality—physical data are the only data that are ultimately 'real.' Therefore, internal or experiential phenomena, being inherently unreliable and unreal, must be reduced to physiological data to become reliable. If they cannot be so reduced, they are generally ignored" (p. 21, p. 24-25).

The second attitude—that these experiences are like psychotic episodes or schizophrenia—can again be a function of a paradigm clash, overlaying a Western paradigm on an experience within a different context and value system. Just as it may be a mistake to assume *a priori* that all altered state of consciousness (ASC) experiences are unilaterally examples of higher or enlightened consciousness, it may similarly be a mistake to dismiss them *a priori* as delusional. What truly is needed is a precise study of these so-called altered-state phenomena. Again, as Tart noted (1975), "Given the great complexity of spiritual phenomena and discrete altered states of consciousness phenomena and their significance, the need for replication by trained observers to form a data base for future research is of exceptional importance (p. 21)." How might we go about this? First, we need a definition.

7.1 Altered State: Toward a Working Definition; Problems in Studying; Approaches Available

 AS A BASIS for our discussion, we will use the general definition of altered states proposed by Tart (1975). He suggested that

Our ordinary discrete state of consciousness is a *construction* built up in accordance with biological and cultural imperatives for the purpose of dealing with our physical, intrapersonal, and interpersonal environments. A discrete altered state of consciousness is a radically different way of handling information from the physical, intrapersonal, and interpersonal environments, yet the discrete altered state of consciousness may be as arbitrary as our ordinary discrete state of consciousness (p. 24).

Note that this definition is value free. It allows us to study a discrete altered state of consciousness without *a priori* judgment.

At this point, further clarification should be made about my use of the phrase "altered state of consciousness." There are some problems with this phrase which merit comment. First, the problem of defining meditation by its effects needs to be considered. As noted in a previous work (Shapiro & Giber, 1978), we need to distinguish whether meditation as an altered state is conceptualized as an independent variable (causing certain subsequent behavioral changes in a person) or a dependent variable: (i.e. what are the altered-state effects of meditation.) The phrase "meditation as an altered state" does not make that distinction.

Second, the phrase seems to imply a uniform "altered state" unique to meditation. Although there may be certain experiences common to meditation practice (Osis et al., 1973; Kohr, 1977), there are certainly many different types of altered-state experiences which may occur as a result of a specific meditation technique, as well as across different techniques. Further, there are many different methods to attain ASC experiences similar to those which occur in meditation. I have tried to be as precise as possible in discussing these issues throughout the text. As noted earlier (Chapter One, 1.7) the phrase "meditation as an altered state of consciousness" is intended primarily to help researchers differentiate what aspect of meditation they are studying—i.e. its self-regulation qualities, or altered-state qualities.

Given the above definition and discussion, how might we go about studying these altered state phenomena? What are the problems inherent in its undertaking? Tart's comments on this issue are the best to date and are summarized here. The first two problems relate to the nature of the state itself: its ineffability and the problem of state-dependent learning. Another problem is that the person doing the investigation must often be subject, observer, and experimenter.

The first problem, as noted above, is the fact that many of the experiences of an ASC are described as ineffable and therefore beyond conceptualization. Second, there is a problem, seldom mentioned in the literature, of the generalizability of an ASC. We know from research on the state-dependent learning that what is learned in one state, say inebriation (Fischer, 1971), *is not always recalled in the uninebriated state* although it may be *stored* and recallable when once again drunk; learning

therefore does not necessarily generalize to other states of consciousness. Again, as Tart noted, for reasons we know almost nothing about, the experiences of discrete altered states of consciousness eventually may be transferable to a different state of consciousness.

So some people may have a spiritual experience occurring only in a particular discrete altered state of consciousness for a while, but then find it becomes part of their ordinary discrete state of consciousness. We know almost nothing scientifically about the degree to which such transfer can take place, the conditions favoring or hindering it, or the fullness of the transfer. (1975, p. 25).

Here we may need to look to the social learning theorist for the laws of generalization and discrimination training (Bandura, 1977).

Additional problems derive from the need for individuals to sometimes be subject, observer, and experimenter. Tart suggested that this requires special training in order to develop a true phenomenology of the spiritual experience. Even such trained observers need to be cautious of experimenter bias (Rosenthal, 1962). They need to be aware of the demand characteristics of the training experimental situation (Orne, 1962). Further, Tart noted that the "individual who follows a spiritual path or tries to reach truth in a discrete altered state of consciousness may settle for the feeling of certainty rather than pressing on with his investigations" (1975, p. 48). In other words, the person may feel that they have an obvious perception of the truth and therefore not want to question that perception.* In fact, as Tart noted, the individual may be building fantasy worlds that seem real to that person, and therefore they create a reality which they believe to be a truthful *a priori* reality, without questioning the belief systems they brought to the situation.

In summary, Tart noted that state-specific sciences are possible, though difficult. These state-specific sciences would involve, in the true scientific tradition, a) observing, b) making public the

*It should be noted that this phenomenon is not at all unique to altered-state-of-consciousness research.

nature of the observation: consensual validation, c) forming logical hypotheses based on the material, d) testability: the looking for testable consequences.

Given these problems, as well as the importance of the phenomena, what approaches might be available to us?

7.2 Subjective Experiences During Meditation

ONE APPROACH to gaining information about subjective experiences during meditation involves only slight variations on the traditional scientific experiment in which the experimenter tries to gather information from the subjects. The first group of these studies to be completed are interesting primarily from a heuristic standpoint.

Maupin (1965) had ordinary subjects focus on breathing for nine sessions. These subjects' meditation experiences were rated on a five-point scale by "blind" judges. Based on their self-report data, described after each session, six of the twenty-eight subjects were rated as high experiencers. A high experiencer was one who reported at least one Type Five experience (concentration and detachment). Ten subjects were rated as having moderate responses to meditation: i.e. no Type Five experience but at least one Type Three or Type Four experience (pleasant body sensations or vivid breathing). Twelve subjects were rated "low response" because they reported nothing more than relaxation (Stage Two) or dizziness (Stage One). Maupin (1965, p. 145) notes that his five-point response scale does not register all observed responses.

"Subjectively felt benefits similar to those resulting from relaxation therapies were reported by several subjects. Subjects in the high and moderate response group occasionally mentioned the emergence of very specific and vivid effects other than anxiety while they were practicing. These included hallucinoid feelings, muscle tension, sexual excitement, and intense sadness."
(1965, p. 145)

Lesh (1970) also had subjects practice Zen breath meditation; he adapted Maupin's five-point scale slightly but found essentially the same results.

In a study using external concentration, Deikman (1966) had subjects focus on a blue vase, and he also found strong subjective changes in ordinary subjects' phenomenological perceptions. Every subject noted an alteration in perception of the vase, a shift to a deeper and more intense blue: brighter, more vivid, luminous. Further, subjects noted instability in the vase's shape or size: a loss of the third dimension, a diffusion or loss of perceptual boundaries. One subject noted feelings of merging with the vase, as though "it were almost part of me." Another subject noted complete loss of body feelings (Deikman, 1966).

Kanas and Horowitz (1977) used a content analysis questionnaire devised by Horowitz (1969, 1970) to gain information about subjective experiences during meditation. Subjects were shown a stress film and then asked to estimate the percentage of time spent thinking about the stress film, the experimental task, life issues, fantasies, mantra (where appropriate), other thoughts, and no thoughts, during the ten minutes they meditated or rested.

Kornfield (1979) gathered extensive data from meditators at five two-week and one three-month retreats for intensive insight meditation (Vipassana). Kornfield's data came from reports which the meditators gave their teachers every two or three days and from answers to a series of three questions about 1) sleep/food intake; 2) changes in clarity of perception, concentration, mindfulness; 3) what was currently predominant in meditation experience; any unusual experiences. Although Kornfield's study generated an enormous amount of rich information, the interpretation of these data must be tentative, since the coding instrument was made *post hoc* as a way of sorting the data, rather than prior to the experiment to test the hypotheses. However, this type of heuristic study is necessary initially to give us information about the phenomenology of meditation experience.

These five studies involve having subjects report on their experiences at the completion of the meditation session or in Kornfield's case, at intervals. In Deikman's (1966) and Kornfield's (1979) studies the reports were made directly to the experimenters/teachers, who grouped and reported the data; in the Maupin (1965) and Lesh (1970) studies, raters coded the experiences on a five-part scale, a methodological improvement, *after* sufficient heuristic information has been accumulated via previous studies.

A second group of studies to obtain reports of meditators'

experiences involved having subjects push buttons *during* the meditation session whenever certain thoughts or feelings occurred (Van Nuys, 1973; Banquet, 1973; Kubose, 1976).

Van Nuys had subjects push a button every time they became aware of an intrusive thought. The nature of intrusions reported by subjects in the post-meditation interview included: itches, aches, and other bodily feelings of discomfort; thoughts about the nature and purpose of the experiment; and thoughts about roommates, girlfriends, courses and other current concerns. In addition, many subjects reported such subjective responses as vivid visual experiences, feelings of paranoia, feelings of being "turned on," dreamlike experiences; temporary loss of orientation in time or space, primary-process perceptual distortions (Van Nuys, 1973, p. 67).

Kubose (1976) debriefed meditators after their experience with a questionnaire asking them to divide the thoughts they had into the following categories: a) thoughts about bodily sensations; b) thoughts relating themselves to the present situation; c) thoughts relating themselves to past events; d) thoughts about the future; e) thoughts about ideas and things that did not have a strong time component. His data revealed that subjects in the meditation group categorized most of their thoughts along a present-time dimension, whereas subjects in the control group categorized their thoughts as past and future. As Kubose noted, meditation seemed to minimize the intrusion of distracting thoughts, and relative to a control group, when thoughts did occur, they tended to be categorized as oriented toward the present rather than the past or future.

Banquet (1973) had individuals push buttons to signal thoughts or feelings. He refined the technique of Kubose and had five different buttons for the individuals to push, depending on the category of events during the meditation experience: bodily sensations, involuntary movement, visual images, deep meditation, and transcendence (deepest part of meditation). However, as with any intrusive procedure, there may be difficulties in having a person push a button while in a state of transcendence and attempting to maintain that state.

Finally, two other studies, still within the same scientific tradition of an experimenter trying to gain information from subjects, was undertaken by Osis et al., (1973) and later replicated by Kohr (1977). These studies involved asking meditators to respond to a questionnaire after their sessions, and then performing a

factor analysis. Osis et al.'s (1973) research is described in some detail here because it is an interesting application of multivariate statistical analysis to the issue of meditation experience. He gave subjects a premeditation mood questionnaire and a post-meditation questionnaire before and after four different sittings. Both questionnaires were used in the same factor analysis to determine how closely the subjects' meditation and premeditation states were related. Subjects came from a variety of different religious traditions, including Unitarian, Zen, Raja Yoga, Hassidic Judaism, Catholicism. There was an attempt to determine the extent to which meditation experience would cut across different disciplines and different orientations. Osis posited that in most religions the central concept is a belief in a spiritual reality felt to be larger and more valuable than (and often inclusive of) the personal self. The issue of self-selection was mentioned and even maximized; then experimenters tried to select subjects "to whom meditation was a kind of quest for meaning and growth in their lives," (Osis et al., 1973, p. 113). It was found in both the Osis and later the Kohr studies that there was almost no correlation between initial mood and meditation experience, suggesting that meditation did produce a state of consciousness different from the state of consciousness which the person brought to the practice of meditation.

Six factors were replicated in at least three of the meditation experiences: self-transcendence and openness; mood brought to the session (both appeared in all four experiments); intensification and change of consciousness; meaning dimension; forceful exclusion of images; and general success of meditation. Self-transcendence and openness involved the following core items: a feeling of merging with others, unity with the group, oneness with the external. For mood brought to the session the core items were elation, freedom from anxiety, content with self, and greater vitality. The next factor, intensification and change of consciousness, seemed to be the most central and complex. Thirteen core items, half of the items in the post-session questionnaire, are contained in this factor. They include: intensification of consciousness, ways of experiencing change, love and joy, perceptual enrichment, refreshment after session, depth of insight, unity with group, and the feeling that it was a good session. There often seemed to be an organismic arousal during this intensification and change of consciousness. Another factor, the

meaning dimension, included core items such as relevant visual images, relevant thoughts, deep insights, alertness, and sense of presence. The next factor, what Osis called "forceful exclusion of images," included negative items. As the authors stated, "The predominant note is one of tension: negative loadings on relaxation, serenity, and affirmation of the external" (Osis et al., 1973, p. 122)." In the fourth experiment, they introduced a negative experience factor. It expresses "the opposites of affirmation and deep acceptance of self and others. It appears to express the feeling that the meditation was interfered with" (p. 130).

In the Kohr experiment (1977), which tried to extend and replicate the Osis experiment, again there was strong bias in the subjects selected: a sampling from members of the Association for Research and Enlightenment agreeing to participate in meditation research and answer questionnaires. Some of the refinements that occurred in the questionnaire were breaking the subjects into various subgroups of high and low categories on five variables: anxiety level as measured by the IPAT Anxiety Scale Questionnaire; incidents of perceived personal problems as indicated by the total score on the Mooney Problem Check List, (Mooney & Gordon, 1951); the length of time previously spent engaged in meditation on a fairly regular basis; the amount of previous meditation experience combined with whether a consistent schedule had been maintained in the month prior to the study, and the degree to which the participants adhered to the procedures. (Low anxiety, high anxiety, low problems, high problems, low regular schedule, high regular schedule, low prior experience, high prior experience, low adherence, high adherence.)

The meditators in Kohr's study meditated alone, based on a manual, whereas the subjects in the Osis experiment meditated and discussed their experiences in a small group context. The major factor was intensification and change of consciousness. Kohr found, "This factor conveys the impression of a heightened sense of fullness, deep positive emotion, and intensification of awareness, perceptual change and enhancement, a presence of religious significance and a sense of satisfaction with the session" (1977, p. 200). The authors noted that this factor seemed a blend of the factors of self-transcendence and openness as well as the intensification factor. The "psychological state prior to session" was also a consistent factor, similar to Osis's mood-brought-to-session factor. Importantly, this factor was indepen-

dent of the other factors except for the tendency for the freedom-from-anxiety item to load with the "negative experience factor" in a majority of the subgroup analysis. This suggests that anxiety can often impair the meditation experience unless one is successful in reducing its effects prior to the session. Kohr noted, "Overall, the cohesiveness of this factor suggests that one's mood and functioning during the day represented a different state of consciousness than the altered state as measured by the post-session questionnaire" (1977, p. 200). The negative experience factor was based on those items added in Osis's fourth experiment plus some additional items. These included sessions characterized by an inability to relax, compounded by the intrusion of unwanted thoughts, some of them anxious residues from the day's experience or anticipations of future events. The mental clarity factor, reflecting retention of awareness and sense of alertness was not observed in the Osis experiment. The physical effects factor—including various physical sensations like an increase in bodily warmth and sensations around the "seven spiritual centers" of Oriental and occult religions—was also weak.

The independence of the psychological-state-prior-to-session factor seems important, in both the Kohr and Osis experiments. As Osis (1973, p. 130) noted, "The items of everyday mood as measured in the pre-meditation questionnaire did not appreciably load on any other factors of the meditation experience and formed a strong common compact factor by themselves. The subjects' free comments support the view that successful meditation leads to altered states of consciousness" (1973, p. 130). Similarly, in the Kohr experiment, the independence of states arises from the fact that "Good sessions frequently occurred regardless of feeling tired or depressed prior to the session. In these sessions there seemed to be an ability to let go of a negative emotion or to move beyond fatigue" (1977, p. 202). The only area where a prior psychological state demonstrated leakage into a meditation period was anxiety associated with having negative experiences. The author noted, "negative experience is not uncommon among individuals who resolve to meditate on a daily basis, especially the novice," a finding already discussed in Chapters One and Two.

As noted, the above studies involve only a slight variation on the traditional scientific experiment in which an experimenter

gathers information from subjects. But there is also a different approach to gathering information on the phenomenology of meditation—one in which the subject and experimenter are the same person. The roots of this approach go back to the classical texts, such as the *Adhidhamma* (Goleman, 1972, 1977) and the classical texts of the Mahamudra tradition (Brown, 1977). These texts attempt to develop a scientific phenomenology of meditation, a cartography of the “inner voyage.” The scientists are the meditators who use themselves as subjects and through a process of introspective psychology try to chart which experiences and thoughts are helpful in moving toward enlightened experiences, and which are harmful. Their texts provide us with one model derived from long-term experienced meditators. They may or may not be a state-specific science in the sense that we do not know how much the practitioners’ own belief systems were looked at carefully as part of the “outcome” success.

The reports in the classical texts give us information from long-term meditators who were presumably not trained in the behavioral sciences. Three studies have been done by behavioral scientists who are also meditators of intermediate, one to several years, experience (Tart, 1971; Walsh, 1977, 1978; Shapiro, Chapter Three). Theoretically, those trained in the behavioral sciences should have more acute and accurate discrimination skills, should be less biased and more willing to admit where the technique of meditation is or is not useful, and should try to communicate those subjective experiences to others in accessible terms. For example, Tart (1971) practiced TM meditation for a year and Walsh (1977, 1978) described his experiences during two years of Vipassana (insight meditation). In a similar vein, Shapiro (Chapter 3) recorded thoughts and images during several meditation sessions, and subsequently analyzed data for number and type of thoughts and cognitions, and percentage of time when there did not appear to be thoughts.

This approach, using behavioral scientists as subject, observer, and experimenter, has several potential pitfalls. However, it does have the advantage of direct experience and reporting by the same person, without the intervening hypotheses and interpretations of another experimenter. At the very least, observing one’s own meditation experience should be a rich source of gaining experiential understanding of relevant

concepts and of generating hypotheses and refining dependent variables for subsequent research.*

CONCURRENT VALIDITY FOR SUBJECTIVE EXPERIENCE DURING MEDITATION

Because of the subjective nature of the meditation experience, it is difficult to obtain concurrent validity on subjects' self-report. Maupin (1965) attempted to correlate attention measures (digit span, continuous additions, size estimation) with response to meditation. However Van Nuys (1973) has suggested that these measures were not relevant to the type of attention involved in meditation (see also Galin, 1974). Van Nuys notes that alterations in consciousness occur when attention is relatively fixed and sustained, whereas the tests Maupin used involved tasks that require a constant and rapid shifting of the focus of attention; furthermore, "they invite discursive, analytic thought that is actively restricted in meditation" (Boals, 1978, p. 165).

Van Nuys (1973) developed a simple technique for studying attention during the latter stages of meditation. He had his subjects push a button to report intrusion of "off-task" thoughts that distracted them from the task of meditation. He found that the reports of these intrusions correlated with hypnotizability. Other promising methods of obtaining concurrent validity may be the use of experimenter-controlled buttons to signal physiological values of the meditator to the meditator, requesting a continuing experimenter-subjective report (Herbert & Lehman, 1977), the signal detection format employed in the daydreaming studies of Singer (1975) to obtain reports of occurrence of "task-irrelevant thoughts," and monitoring hemispheric laterality and synchrony to determine brain wave patterns within and between hemispheres during meditation (Davidson, 1976; Galin, 1974).

*Whether or not it may be helpful to the meditation practice itself is a different story!—see Chapter Three and the Epilogue.

7.3 Subjective Reports of Changes in Attitudes and Perceptions After Meditation

THE STUDIES reported above have tested short-term, mostly in-state effects of meditation. Other researchers have tried to document perceptual and/or behavioral changes that occur at times other than during meditation. These studies, which look at self-concept and perceived behavior change, have gathered data primarily by use of pencil and paper tests, including Shostrom's Personal Orientation Inventory (Hjelle, 1974; Nidich, Seeman & Dreskin, 1973; Seeman, Nidich & Banta, 1972); the Northridge Development Scale (Ferguson & Gowan, 1977); and the Otis Descriptive Personality List and Otis Physical and Behavioral Inventory (Otis, 1974). All of these studies report that meditators change more than control groups in the direction of positive mental health, positive personality change, and "self-actualization." (Studies that used self-report data, but that focused primarily on anxiety, are not included here.) These changes include such items as self-perceived increase in capacity for intimate contact, increased spontaneity, self-regard, acceptance of aggression, and inner directedness (Table 7.1).

There are, however, several methodological problems with the above studies. First, none of the studies, except Hjelle's (1974), controls for expectations and demand characteristics, and Hjelle's study, as already noted, does not control for commitment (long-term practice). The commitment or motivation of the subjects may be quite important. For example, it appears that five of the original twenty subjects in the experimental condition in Seeman, Nidich and Banta's (1972) study dropped out, a fact that could have biased the experiment in a direction favoring meditation. A second methodological problem of the above studies is that they do not show, aside from paper and pencil test scores, whether the meditating subjects demonstrated behavior change.

In an attempt to learn more about daily changes in behavior, Shapiro (1978a), in addition to pre-tests and post-tests, had subjects self-monitor nine variables daily: feelings of anger, seeing beauty in nature, positive self-thoughts, negative self-thoughts, feelings of anxiety, feelings of creativity. The experimental group

TABLE 7.1 Subjective Changes Following Meditation

Investigators	Focus of Investigation	INDEPENDENT VARIABLE		DEPENDENT VARIABLE		Type of Design, Quality of Controls, Methodological Problems
		S's (ff; age, sex, prior experience)	Type and Length of Treatment/Training	Frequency of Treatment (h)	Subjective Effects (unless otherwise noted)	
Serman, Hoch and Banta 1972	"Self-Actualization"	Group One: control N=20, 10 male, 10 female Group Two: meditation N=15, 8 male, 7 female. Prior experience not stated	Standard Transcendental Meditation training, 30-60 min initial instruction, 3 hrs, meditation + further instruction then S's instructed to meditate 2x daily for 15-20 min	Not stated	Shostrom's Personal Orientation Inventory, 1966 (POI) tested 2 days prior to and 2 months post TM instruction showed meditators moved in positive "self-actualizing" direction compared to controls.	None reported Group selection and/or matching procedures not stated. Need behavioral measures of such items as spontaneity capacity for intimate contact, tolerance for verbal aggression, willingness to self-discuss.
Hoch, Serman and Dreshin 1973	"Self-Actualization"	Group One: N=9 non-meditating controls Group Two: N=9 meditation	Same as above	Not stated	Shostrom's POI measured pre and post (10 weeks TM instruction showed meditators moved in direction of "self-actualization". Controls showed no significant differences in testing.	None reported Same as above
Stek and Bass 1973	Tested differences between those interested and not interested in meditation in "perceived locus of control" and "personal adjustment"	Group One: N=17, median age 20 yrs., 12 male, 5 female, unselected for meditation Group Two: N=32, median age 18 yrs., 14 M, 20 F, attended 1 TM lecture Group Three: N=27, median age 19 yrs., 12 M, 15 F, unselected for meditation and "personal adjustment" Group Four: N=10, median age 19 yrs., 18 M, 12 F, controls	Tests given pre-meditation training	Not stated	Administration of Rotter's IE Locus of Control Scale (1966) and Shostrom's POI (time competence + internal support) found no significant difference between test scores for all 4 groups and common scores for college students	None reported Study might indicate that initial group differences between meditators and non-meditators are insignificant, however, group differences may exist in willingness to change, etc.
Helle 1974	"Anxiety", "Locus of Control" and "Self-Actualization"	Group One: N=15, 7 M, 8 F, meditating experience = 22.63 mo. Group Two: N=21, 11 M, 10 F, tested 1 week prior to receiving meditation instruction	Standard TM training	Not stated	Regular meditators (group one) scored significantly lower than beginners on Bender's Anxiety Scale (1956) and Rotter's Internal-External Locus of Control Scale (1956) and significantly higher on 7 of 12 POI scales (Shostrom, 1966)	None reported Possible demand characteristics in testing, study supports Serman, Hoch & Banta.
Oles 1974	Self concept change, improvement in physical and/or behavioral problems	Group One: (N=20) Transcendental Meditation and post test Group Two: (N=15) Passive Control, pre test and post test Group Three: Active Controls, A, sitting quietly 15-20 min/2x daily, B "meditative" treatment, repeating "I am a witness only" 15-20 min/2x daily	Group One: Standard TM training for 3 months All S's baseline physiological measurements for 3 months	Not stated	Psychological tests: Questionnaire on self-concept (Oles Descriptive Personality List) and checklist on variety of behavior and physical problems (Oles Physical and Behavioral Inventory) found no overall differences between TM and control S's. However, item analysis revealed TM S's claimed more specific benefits than passive controls. Interview conducted 3 months post-training indicated that specific benefit claims of active controls and TM S's did not differ. Author suggests that simply testing may account for benefits.	None reported To 18 months Treatment conditions not matched for expectation of relief!
Udappa et al. 1973	Performance, Intelligence, and Memory Quotients; Neuroticism, Mental Fatigue and Psychological Health assessed; Plasma Acetylcholine and Serum Cholinesterase monitored	N=12, avg. age 23.0 ± 3.36 yrs., "form a uniform socioeconomic class"	Hatha Yoga exercises (done in groups) for 1 hour daily x 6 months. Exercises involved graduated sequence of muscle coordination exercises, postures (asanas), breathing (pranayama) meditation, etc.	One hour daily x 6 months with trained Yoga instructor	Table 1: Certain Psychological Changes Induced by the Practice of Yoga	Within subject design, S's served as own controls.

Table 1: Certain Psychological Changes Induced by the Practice of Yoga

Observations	Test Used	Initial (baseline)	3rd month	6th month	Direction
Performance quotient (PQ)	Alexander's Pausing Test	93.15 ± 12.50	102.6 ± 16.40	108.2 ± 14.70	Increased significantly
Intelligence quotient (IQ)	Bois Block Design Test	92.17 ± 18.60	100.3 ± 6.40	105.2 ± 16.70	Increased significantly
Memory quotient (MQ)	Weschler Memory Scale	89.75 ± 9.15	97.3 ± 12.20	100.8 ± 5.50	Increased significantly
Neuroticism index (NI)	Neuroticism Personality Inventory	19.90 ± 9.95	11.40 ± 10.70	9.82 ± 8.40	Decreased
N	Solubility Index	27.10 ± 5.60	28.40 ± 5.80	26.94 ± 6.40	Decreased
Ch		2.66 ± 0.53	1.00 ± 0.19	2.58 ± 0.57	
Mental Fatigue	Dyrt Canebatation Test	3.52 ± 0.68	3.31 ± 0.90	3.03 ± 0.41	Lowered
Plasma Acetylcholine	Muscle score	5.94 ± 4.69	1.31 ± 1.73	3.64 ± 2.30	Lowered
Serum Cholinesterase	Fatigue Index	1.59	0.40	1.20	Lowered
Psychological complaints	Cornell Medical Psychological Index	125	83	64	Lowered
Psychological complaints		67	31	30	Lowered


Note: Significant values in decreased complaints on Cornell Medical Index include gastrointestinal, psychoneurological, and respiratory complaints (physiological), and anxiety, tension, and inadequacy complaints (psychological).

TABLE 7.1 Subjective Changes Following Meditation (cont'd.)

Investigator(s)	Focus of Investigation	S's (N, age, sex, prior experience)	INDEPENDENT VARIABLE Type and Length of Treatment / Training	Frequency of Therapist (E) Contact	DEPENDENT VARIABLE Subjective Effects (unless otherwise noted)	Follow-up	Type of Design, Quality of Controls, Methodological Problems												
<p>Physiological Data Table II Certain Biochemical Response to the Practice of Yoga</p> <p>Observations</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Initial (baseline)</th> <th>3rd month</th> <th>6th month</th> </tr> </thead> <tbody> <tr> <td>Plasma Acetylcholine in pg/100 ml.</td> <td>181.7±149.3</td> <td>101.1±34.3 t = 1.825 p < 0.1</td> <td>58.7±18.05 t = 2.83 p < 0.01</td> </tr> <tr> <td>Serum Cholinesterase in pH units/hour</td> <td>1.17±0.309</td> <td>0.894±0.313 t = 2.177 p < 0.05</td> <td>0.95±0.087 t = 2.095 p < 0.05</td> </tr> </tbody> </table> <p>Note: Both show statistically significant decreases also found increase in urinary excretion of testosterone and 17-hydroxy corticosteroid, increase in serum proteins and reduction of blood sugar. EEG showed more prominent alpha with less spikes.</p>									Initial (baseline)	3rd month	6th month	Plasma Acetylcholine in pg/100 ml.	181.7±149.3	101.1±34.3 t = 1.825 p < 0.1	58.7±18.05 t = 2.83 p < 0.01	Serum Cholinesterase in pH units/hour	1.17±0.309	0.894±0.313 t = 2.177 p < 0.05	0.95±0.087 t = 2.095 p < 0.05
	Initial (baseline)	3rd month	6th month																
Plasma Acetylcholine in pg/100 ml.	181.7±149.3	101.1±34.3 t = 1.825 p < 0.1	58.7±18.05 t = 2.83 p < 0.01																
Serum Cholinesterase in pH units/hour	1.17±0.309	0.894±0.313 t = 2.177 p < 0.05	0.95±0.087 t = 2.095 p < 0.05																
Shapiro 1978a	Daily covert behavior and "Global" self perception	N=15, college students in class on "Zen Buddhism and Self Management"; no prior meditation experience	Experimental Group (N=9) 1) 2 weeks behavioral observation on 9 variables 2) weekend Zen experience workshop 3) formal Zen breath meditation practiced 2x daily, plus contingent informal breath meditation and continued behavioral observation for 3 weeks Control Group (N=6) 1) 5 weeks behavioral observation 2) weekend Zen experience workshop	During intervention phase (weeks 3-5), experimenter had no contact with either group	Data from pre and post testing on Semantic Differential, Rorer's I-E Locus of Control showed no significant group differences but moved in hypothesized (positive) direction. Stanford Hypnotic Susceptibility Scale (Form C, Group Variant) showed increase in susceptibility for experimental group and decrease for controls. Behavioral Data Self monitoring of frequency of behaviors with questionnaire (e.g., positive self-statements, negative self-statements, feelings of creativity, feelings of self-control, feeling anxious, becoming angry, noting positive things in nature, relating to only part of a person, and not living in the moment). Combined index of behavioral self-observation data showed greater movement in a more favorable (hypothesized) direction for experimental group than controls.	None reported	Modified multiple time series design (cf. Campbell & Stanley, 1963, pp. 55-57). Positive direction looked at daily change as well as global pre/post. Weakness: need overt co-varying variables with daily self-reported change of feelings.												
Lesh 1970	Counselors measured on empathy and openness to experience	All S's were college students taking counseling courses Group One: N=16; taught Zen breath meditation Group Two: N=12; controls Group Three: N=11; group "definitely against" meditation exercise.	Group One: Zen breath meditation practiced 30 min./day x 4 weeks	Meditation Instructions given by tape to avoid bias	Pre and Post Treatment Measures: 1) Increased empathy among meditating group on Affective Sensitivity Scale (ASS) responses to videotaped client situation. Both control groups did not show improvement in empathic ability. 2) No correlation found between ASS and blind ratings of subjective response to meditation (Maupin, 1965). 3) Positive correlation found between openness to experience (Experience Inquiry, Fitzgerald, 1966) and response to meditation. 4) Positive correlation between individual scores on openness to experience and ASS 5) Correlation found between high scores on ASS and "self-actualization" measure (Shostrom's PO).	None reported	Between subjects design, possible selection bias.												
Leung 1973	Counselors measured on empathic ability and ability to respond selectively to clients (e.g., hearing of "notice authority" statements)	N=57, avg. age 22.75 yrs., 22 male, 45 female; prior experience not stated. Group E-1: Deep breathing training first + external concentration training. Group E-2: External concentration training first + deep breathing training. (E-1 + E-2 N=37) Group 3: N=20; controls; given no training.	Training for groups 1 + 2: 7 hrs. training in meditative deep breathing, 7 hrs. training in external concentration on a specific verbal stimuli or tape. Social verbal reinforcement given S's for correct performance of exercises.	Not stated	Criterion Measures: Group E-1 - Measured S's predictive analytical empathy in response to videotaped sequences of acted client situations (40 min. total). Analytic empathy measurement taken after 10 minute portions of videotape. Group E-2 - Indicated to E number of "notice authority" statements made by actor "clients" in videotape. In second part of training the criterion measures were reversed. Both (E) groups showed more accurate analytic empathy and heard more notice authority statements by clients than controls. E-1 showed more predictive ability on self-other attitude scale and heard more notice authority statements than E-2.	None reported	Post-test only control group design.												

(informal and formal Zen meditation) daily reported data significantly more in a favorable direction: less feelings of anxiety, more feelings of creativity, etc. This longitudinal study was useful because it provided self-report of feelings rather than simply before and after pencil and paper test data of global feeling change. However, it is unclear from the study which parts of the treatment intervention were responsible for what percentage of the variance of the successful outcome. Further, no concurrent covarying overt variables were involved in the study, which still leaves us with the problems of self-reported data.

7.4 Non-Subjective Indices of Attitude and Perceptual Change After Meditation

 SEVERAL STUDIES have looked at behavioral indices of attitude and perceptual change.* Some studies† have noted that meditators seemed to have better auditory receptivity and perceptual discrimination than controls, as well as improved reaction times and increased capacity to attend. Meditators, however, were not more adept at learning a novel perceptual-motor skill (Williams, 1978). Linden (1973) and Pelletier (1974), using the Witkin Embedded Figures Test, found differences between meditators and non-meditators in field dependence. The above studies provide useful information about the relationship between meditation and perceptual changes. Two studies that attempt to clinically measure the effects of perceptual changes were done by Lesh (1970) and Leung (1973).

Lesh (1970) found that counselors who had practiced Zen meditation for one-half hour per day for one month had substantially increased accurate empathy, while those in two control

*Davidson, Goleman & Schwartz, 1976; Singer, 1975; Pelletier, 1974; Shaw & Kolb, 1977; Brown, Stuart & Blodgett, 1974; Graham, 1971; Pirot, 1973.

†Davidson, Goleman & Schwartz, 1976; Shaw & Kolb, 1977; Brown, Stuart & Blodgett, 1974; Graham, 1975; Pirot, 1973; Udupa, Singh & Yadav, 1973; Holt et al., 1978.


TABLE 7.2 Studies on Attention and Perception

Investigator(s)	Clinical Problem	S's (N, age, sex, prior experience)	INDEPENDENT VARIABLE		Subjective Effects	DEPENDENT VARIABLE		Type of Design, Quality of Controls, Methodological Problems
			Type and Length of Treatment/Training	Frequency of Therapist (t) Contact		Behavioral, Physiological, Overt	Concurrent Data	
Van Nuys 1973	Meditation, attention and hypnotic susceptibility	N=47 males, prior experience not reported	Task: Concentration on doorstop and flame breath meditation. Session One: Individual tests of 15 min. focused attention on each object. Session Two: Same	Not reported	Tests given post-task. Session One: Embedded Figures Test. Session Two: Stroop Color Word Test, A's Experience Inquiry, Harvard Scale of Hypnotic Susceptibility, Field Depth of Hypnosis Test. Found correlation between 2 measures of hypnotic susceptibility and number of intrusions reported during meditation.	Behavioral Self-report of intrusions of thought during attention task	None reported	Within subject, S's served as own controls
Pelletier 1974	Autokinetic perception ("perceptual style")	N=40, avg. age 24.7 yrs., 20 male, 20 female Group One: Meditators, volunteers from intro. TM meeting. Group Two: Sitting controls	Group One: Standard TM instruction 3 mos. practice. Group Two: Instructed to sit quietly 20 min. each morning (x 3 mos.)	Not reported	Pre and post tests of autokinetic effect shifted towards field indep. On Rod and Frame Test (Cancio & Vach, Wilkin et al) meditators showed increased accuracy. On Embedded Figures Test (Gardner et al) meditators showed shorter latency time.	None reported	None reported	Half of S's in each group not pre-tested to control for possible interaction effects of perceptual measures and meditation
Shaw and Kolb 1977	Simple reaction time	Group One: N=9, meditators, one no or more experience. Group Two: N=9, non-meditators	1) Learning trials 2) 100 trials with reaction dence 3) Rest or meditation (20 min.) 4) 100 more trials	Not reported	Report states "Meditators brighter in mood and more responsive in conversation after meditating"	Behavioral Meditators had shorter reaction than non-meditators in first test. After resting, meditators improved, non-meditators were slower in reacting.	None reported	Test of statistical significance not reported. Matching of groups not reported.
Brown, Stuart & Blodgett 1974	1) 2-point threshold determination of skin sensitivity 2) visual brightness discrimination 3) simple reaction time 4) complex reaction time	Group One: N=11, 18-22 yrs., female meditators with experience from "few weeks" to few mos. Group Two: N=11, 18-22 yrs., female non-meditating controls	1) Pre-state performance measurement 2) Pre-state resting (eyes open) 3 min. 3) Group One: Transcendental Meditation (15 min.) Group Two: resting, eyes closed (15 min.) 4) Post-state resting (eyes open) Note: meditators took 3 min. avg. to open eyes. 5) Post-state performance measures	Not reported	Not reported	Behavioral Tests given pre and post meditation or sitting for 3 meditators meeting physiological criteria. Performance improved on all measures. One control also met meditative criteria. Performance of all controls worsened. Physiological Note: heart and respiratory rates, presence of frontal EEG alpha and theta rhythms used to define "meditation state" - only 3 S's met this criteria.	None reported	Small N, short meditation time used (15 min.), and only 1 trial reported. Experimenters anecdotes suggest meditators may have been sleeping.
Graham 1975	Frequency and amplitude discrimination of auditory threshold	Study Group: N=8, experience with TM not reported	Condition One: 20 minutes meditation. Condition Two: 20 minutes rest with 3 to 10 days interval between conditions	Not reported	Not reported	Behavioral Pre and post tests showed greater percentage improvement after meditating (+25.4%) than after reading (-3.2%) in auditory discrimination and +37.0% and -15.1% respectively. In frequency discrimination. Meditators seem to evidence lower perceptual thresholds after practice.	None reported	S's divided into 2 groups, AB, BA design. Study does not report S's selection procedures.
Pirol 1973	Perceptual auditory discrimination of tones	N=32, 8 in each cell, prior experience not stated	Stimuli: 40 pairs of tones, one 2,000 milliseconds and one 2,225 milliseconds in length (1,000 Hz, 30 dB). S's had to discriminate longest tone after TM or relaxation	Not reported	Not reported	Behavioral Meditators performed better post-meditation than relaxation, despite in which order they had meditated. Physiological CSR, EMG, finger pulse volume and ERG measures to be reported	None reported	Four groups with all possible disorders of meditation and relaxation represented. Repeated measured and one-way between groups analysis performed.
Davidson, Goleman, and Schwartz 1976	Differences in attentional absorption and trait anxiety	N=58, mean age 20.81 yrs., (S.D. 2.77); 36 male, 23 female	Meditation practice ranged from TM to Zen breath meditation. Group One: (N=11) Controls expressing interest in meditation. Group Two: (N=14) Beginners, one month's meditation exp. or less. Group Three: (N=18) Regular practice of meditation for 1-24 months. Group Four: (N=15) Long-term meditators (greater than 24 month's exp.)	Tests given as "take home" among battery of other personality and attitude questionnaires.	S's tested on Short Personal Experience Questionnaire (PEQ), Tellegen Absorption Scale (TAS), and Spielberger State-Trait Anxiety Inventory (STAI). Reliable increment in PEQ and TAS (e.g., increase in capacity to attend) and reliable decrement in STAI (trait anxiety) observed across groups from controls through long-term meditators.	None reported	Cross-sectional design.	

groups did not change. Accurate empathy was measured by an "affective sensitivity" videotape showing a client telling about his/her problem. Subjects were to formulate what they thought the client's problem was. Lesh hypothesized that meditation helped the counselors by giving them an openness to their own inner experiences. The counselor, by knowing what s/he was feeling, was less likely to project those feelings and judgments onto what the client was saying.

In one of the few studies to control for order of teaching different meditation techniques, Leung (1973) taught counselors a deep breathing (internal focus) technique and an external concentration technique. He randomly assigned subjects to treatment groups that reversed the order of teaching the techniques. The criteria for measuring outcome were accurate empathy on a task similar to the one used by Lesh, and also having the subjects count the number of "notice authority" statements made by actor clients on a simulated client situation videotape. Regardless of the order in which the techniques were taught, both groups showed more accurate empathy and heard more notice-authority statements than controls.

7.5 Summary

 WHAT CAN WE make of these studies? *First*, it clearly seems important to distinguish between short- and long-term meditation experience. Compared to "Eastern" standards most Western meditators are at a "beginning level" in terms of length of time spent in meditation practice. The classical texts give us a cartography—a context for clarifying different types of long-term meditation experience. *Second*, it seems a useful scientific strategy to have those trained in the behavioral sciences who also meditate be both experimenters, subjects, and observers, although certain conditions must be observed. *Third*, it does seem possible to gain useful and precise information about the phenomenology of the meditation experiences. As Osis et al. noted, "in spite of the almost universal claim that the meditation experience is ineffable, clear dimensionalities emerge" (1973, p. 130). *Fourth*, it appears that even in short-term meditators, relatively strong experiences occur (Deikman, 1966; Maupin, 1965). Further, as the work of Osis and

Kohr suggest, meditation experiences, with the exception of anxiety, were different from the mood brought to the session—evidence for the view of meditation as an altered state of consciousness. *Fifth*, both Osis and Deikman argue that although belief systems may be part of the variance accounting for the effect of the altered state, more than simply belief systems are at work in meditation because “different beliefs of different subjects will on the whole cancel each other out. . . whereas meditation seems to tap more universal dimensions” (Osis et al., 1973, p. 130). Deikman noted that “hypnotic experiences do not appear to have the ineffable, profoundly uplifting, highly valued quality of the mystic state and are not remembered as such” (1963, p. 340). He noted that there may be strong belief systems, suggestion, and demand characteristics operating but then suggests that the hypothesis of demand characteristics is not consistent with the fact that the highest mystic experiences are similar in their basic content despite wide differences in cultural backgrounds and expectations: a) feeling of incommunicability, b) transcendence of sense modalities, c) absence of specific content, such as images and ideas, and d) feelings of unity with the ultimate. *Sixth*, not all altered states are pleasant and uplifting. For example, in his final experiment, Osis put in questions to tap these negative experiences, and Kohr found a negative experience factor to be a clear dimension. As noted, these negative experiences can also be seen in the earlier reports of Van Nuys, and in an article by French, Schmid and Ingalls (1975) on altered reality testing resulting from too much meditation. Further, a recent article by Otis (in press, 1980) describes the adverse effects of meditation, presumably some of which resulted from experiences during meditation.

Therefore, in conclusion, greater clarity and precision seem necessary in describing altered states. Rather than on the one hand shying away from this area as epiphenomena or dismissing it *a priori* as “psychotic and delusional,” or on the other hand calling it “enlightened and higher consciousness,” we need to gather more precise information to see when these powerful experiences may in fact be psychotic and when they may be truly enlightened and spiritual. Further, with this kind of precise information, in addition to being able to compare meditation with other self-regulation strategies, we also may be able to learn more about meditation as an altered state of consciousness, and thereafter compare it to other altered states such as dreaming (Faber et al., 1978), hypnotic trance, psychosis, sleep, and others.

Chapter 7: Further Reading

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