Chapter 4

Meditation and Psychotherapy

Stress, Allostasis, and Enriched Learning

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Meditation in Medicine, Neuroscience, and Psychiatry

Recently, the term *meditation* has entered neuroscience and psychiatry (Kabat-Zinn et al. 1992; Kutz et al. 1985; Linehan 1993; Snaith 1998; Varela et al. 1996). Its narrow use to designate a religious practice of contemplation has broadened to include any intentional exercise of attention (Kabat-Zinn 1982). The context for this shift is the convergence of various lines of research with the introduction of Indian methods of meditation common to traditional Asian medicine and psychology (Claxton 1986; Goleman 1977; Loizzo and Blackhall 1998; Walsh 1988). The methodical nature of Indian self-regulation techniques has contributed not only to their popularity but also to their adaptation in the new fields of mind-body medicine, cognitive neuroscience, and cognitive therapy (Benson et al. 1975; Linehan et al. 1979; Varela et al. 1996). Interest in meditation as an adjunct to dynamic therapy is also increasing (Epstein 1995; Moleno 1998). As a result, psychiatrists are being asked to evaluate research and clinical alternatives involving the use of techniques that were previously dismissed as placebo practices or as obsessive rituals (Bogart 1991; Craven 1989; Holmes 1987; Snaith 1998).

For psychiatrists, the challenge posed by rising interest in meditation is part of the larger challenge posed by alternatives to conventional medicine (Berkenwald 1998; Eisenberg et al. 1993). The clinical usefulness of meditative techniques for stress-related conditions such as heart disease was established well before the recent

trend toward complementary and alternative medicine (CAM) (Benson 1977; Benson and Wallace 1972). Mind-body medicine, founded on meditation-based techniques such as the relaxation response, is more evidence-based than most alternative practices and even many conventional ones (Fugh-Berman 1996) and is routinely distinguished from CAM (Goleman and Gurin 1993). The recent National Institutes of Health (NIH) initiative to fund mind-body medical centers reflects the consensus that self-regulation techniques such as meditation are of proven value for many conditions and are vital to the future of medicine. There is increasing neuroscientific evidence that the psychobiology of stress plays a critical role in many psychiatric syndromes (Fawcett 1992; Kagan et al. 1988; Schmidt et al. 1997; M. Smith et al. 1989). This lends weight to recent clinical findings that meditation-based stress-reduction techniques are effective in a broad range of psychiatric maladies (Kabat-Zinn et al. 1992; Linehan 1993; Linehan et al. 1991, 1992; Miller et al. 1995).

In addition to being evidence-based, meditative alternatives pose a unique challenge for psychiatry because their mechanisms and effects overlap with those of conventional psychiatric methods such as hypnotherapy and psychotherapy (Gruzelier and Brow 1985; Kabat-Zinn et al. 1992; Marriott 1996; Mikulas 1981; J. Smith 1987). Although this overlap is hard to define given the preliminary state of research in both fields, certain features linking meditation and psychotherapy are emerging (Bogart 1991; Marriott 1996; D. Shapiro 1987; J. Smith 1987). Beyond their use as relaxation techniques, Indian systems of self-regulation such as Hindu yoga and Buddhist meditation pose unique challenges as alternative therapies (Claxton 1986; Kelly 1996; Walsh 1988; West 1987). Unlike modern alternatives, these Asian methods are more ambitious in nature and scope, with coherent systems of theory, practice, and education that have withstood the centuries and adapted to diverse civilizations (Goleman 1977; Thurman 1984; Walsh 1988). They challenge researchers and clinicians not just because they are more ambitious and complete than modern techniques, such as hypnosis or psychoanalysis, but also because, like hypnosis and psychoanalysis, they involve systems of theory and practice that strike many as arbitrary and unscientific (Bogart 1991; Carrington 1978; Holmes 1987).

Alternative medical research offers three approaches to the problem: 1) If meditative practices are reducible to the placebo effect, how do we prove this without studying them in their entirety (Holmes 1987)? 2) If meditative practices are effective techniques embedded in prescientific systems, how do we distill their active ingredients (Benson et al. 1975; Carrington 1987)? 3) If Asian systems of meditation involve something akin to a scientific psychology and empirical therapeutics, how do we learn what they have to offer as coherent systems to modern psychiatry (Loizzo and Blackhall 1998)? In this chapter I explore the third approach, weighing the strongest arguments and evidence supporting the potential contribution that the world's meditation traditions can make in modern psychiatry against the conceptual and methodologic challenges (Bradwejn et al. 1985; Delmonte 1987; D. Shapiro 1987; Walsh 1996). This requires a review of the current state of meditation research and clinical application and demands a perspective and a method that diverge in ways from the usual review format. Any useful introduction to this field requires a cross-cultural perspective as well as correlating preliminary data with findings from related fields. Reference to traditional concepts, key Sanskrit technical terms (see Table 4–1), and data from a handful of basic research fields makes for unusual psychiatric reading but is essential given the preliminary state of current knowledge (Walsh 1996).

From Meditation to Psychotherapy: The Bridge of Hypnotic Learning

In this chapter, I employ a cross-cultural comparative framework based on learning models of meditation, hypnosis, and psychotherapy. First, however, I must provide some historical perspective.

Early Meditation Research

Although meditation research began in the field with the first portable electroencephalograms (EEGs) (Anand et al. 1961; Bagchi and Wegner 1957; Das and Gastaut 1955; Kasamatsu et al.

Table 4–1. Key Sanskrit terms and English equivalents

English term and synonyms	Sanskrit term and equivalents
action	*karma*
addictive behavior	*kliṣṭa-karma*
addictive responses or addictions	*kleśa*
alertness	*samprajanya*
analytic insight	*vipaśyana*, Pāli *vipassana*
attention	*manaskāra*
attentional alteration or contemplation	*dhyāna*
attentional absorption or trance	*samāpatti*
body, matter, somatic system	*śarīra, rūpa, rūpa-skandha*
central neural pathways and complexes	*suṣumṇa-nadī-chakra*
concentrative quiescence	*śamatha*
cognition, cognitive system	*jñāna, saṃjñā, saṃjñā-skandha*
compassion or empathy	*karuṇā*
compulsive behavior	*upādana-karma*
concentration	*samādhi*
concentrative quiescence	*śamatha*
consciousness, consciousness system	*vijñāna, vijñāna-skandha*
construction, construct	*vikalpana, vikalpa*
contemplation	*dhyāna*
creative imagery or creation stage	*utpatti-krama*
defensive reactivity or self-protective habit	*ātmagrahabandha*
devotional practices, devotional service	*bhakti-sevā*
egocentric instinct or self-protective instinct	*ātmagrahavāsanā*
emotion, emotional system	*saṃskāra, saṃskāra-skandha*
empathy or compassion	*karuṇā*
euphoria-mediated insight	*abheda-sukha-śūnya-jñāna*
euphoric openness or undivided bliss-void	*abedha-sukha-śūnya*
exclusive, narrow, or single-pointed concentration	*ekagraha-samādhi*
focus	*anuvṛtti*

Table 4–1. Key Sanskrit terms and English equivalents *(continued)*

English term and synonyms	Sanskrit term and equivalents
freedom	*vimokṣa*
giving and taking	Tibetan *gtong-len*
great perfection	*mahāniṣpanna*, Tibetan *rdzogs-chen*
great seal or universal seal meditation	*mahāmūdra*
guide or expert guide	*kalayānamitra*
higher education or reeducation	*adhisikṣya*
instinctive or unconscious responses	*svabhāvavikalpa*
inclusive, open or spacious equipoise	*akāśopama-samahita*
individual vehicle	*hinayāna*, Pāli *Theravada*
insight or wisdom	*prajñā*
cognitive or intellectually acquired insight	*śruta-mayī-prajñā*
affective or reflectively acquired insight	*cinta-mayī-prajñā*
behavioral or meditatively acquired insight	*bhāvanā-mayī-prajñā*
intention	*cetana*
intuitive clarity or lucid insight	*prabhāsvara-jñāna*
intuitive realization or perfection stage	*niṣpanna-krama*
imagery-mediated insight or indivisible appearance-voidness insight	*abheda-pratibha-śūnyatá-jñāna*
imaginative schema or visualized environment	*maṇḍala*
kindling, inner fire, or psychic heat	*caṇḍali*, Tibetan *gTum-mo*
loving-kindness or love	*maitrī*, Pāli *metta*
lucid insight or intuitive clarity	*prabhāsvara-jñāna*
meditation	*bhāvanā, dhyāna*
mentor	*gūru*
mind	*citta, manas*
mind-body process or integration process	*yoga-tantra*
mindfulness	*smṛti*, Pāli *sati*
mind-training or mind-reform	*blo-byong*
mnemonic formula	*mantra, dhāraṇī*
motivation	*chandana*

Table 4–1. Key Sanskrit terms and English equivalents *(continued)*

English term and synonyms	Sanskrit term and equivalents
neural complex	*cakra*
neural energy	*prāṇa*
neural pathway	*nadī*
neurotransmitter, modulator, or secretion	*bindu*
noble truths	*āryasatya*
truth of suffering	*duḥkhā-satya*
truth of reinforcement or origin	*samudaya-satya*
truth of extinction	*nirvāṇa-satya*
truth of the path	*mārga-satya*
nonconceptual concentration	*nirvikalpasamādhi*
nondualistic insight	*advaityajñāna*
nonrelational or intrinsic identity	*svalakṣaṇa*
nonrelational or intrinsic reality	*svabhāva*
openness or voidness	*śūnyatā*
optimal mind-body process or unexcelled integration process	*anuttarayogatantra*
orgasmic euphoria or innate bliss	*sahaja-sukha*
passion practice	*rāga-dharma*
perception	*sparśa, pratyakṣa*
plasticity, pliancy, or fluency	*praśrabdhi*
process vehicle	*tantrayāna*
prosocial emotions or boundless attitudes	*apramāṇa-dhyāna*
pure or real bliss consciousness	*sat-cit-ānanda*
quiescence meditation	*śamatha-bhāvanā*
reeducation or higher education	*adhisikṣya*
reeducation in insight or wisdom	*prajñā-adhisikṣya*
reeducation in mindset or meditation	*samādhi-adhisikṣya*
reeducation in lifestyle or ethics	*śilā-adhisikṣya*
relativity or conditioned development	*idampratyāyatā, pratītyasamutpāda*
reliance	*pratisāraṇa*
resistance or obscuration	*āvaraṇa*
cognitive resistance	*jñeyāvaraṇa*

Table 4–1. Key Sanskrit terms and English equivalents *(continued)*

English term and synonyms	Sanskrit term and equivalents
affective resistance	*kleśāvaraṇa*
sensation, sensory system	*vedanā, vedanā-skandha*
sexual arousal	*śṛngārānurāgana*
single vehicle	*ekayāna*
social field	*sattvaksetra*
social or universal vehicle	*mahāyāna*
state of mind, state of consciousness	*manasāyatana, vijñānasthiti*
subconscious mind	*ālayavijñāna*
sympathy	*sahṛdaya*
teacher	*śāstṛ*
therapeutic technique or liberative art	*upāya-kauśalya*
therapeutic vehicle or liberative method	*yāna*
individual vehicle	*hinayāna,* Pāli *Theravada*
social or universal vehicle	*mahāyāna*
process, creative or diamond vehicle	*tantrayāna, mantrayāna, vajrayāna*
transcendent insight	*prajñāpāramitā*
translucency or clear light	*prabhāsvara*
unconditional empathy or compassion	*anupalambha-karuṇā*
virtual body or illusion body	*māyadeha*
visualized environment or imaginative schema	*maṇḍala*
voidness or openness	*śūnyatā*

1957), Western conceptions about Indian meditation were shaped by the introduction of transcendental meditation (TM), a scientifically framed, tradition-based technique that consists of adopting certain postures (from hatha yoga) while focusing on a mnemonic formula (*mantra*) recited subvocally. Research showed that the technique of sustaining single-pointed concentration on a chosen stimulus induced a more or less profound hypometabolic, hyperattentive state (R. Wallace et al. 1971). In advanced practitioners, it often yielded a euphoric, nonconceptual absorption described as "pure consciousness" (Banquet 1973). Early

conceptions of meditation as a more or less profound but unitary state of relaxed alertness were reinforced when Herbert Benson developed a TM-based method of inducing a relaxation response that could reduce stress reactivity and psychophysiologic activation (Beary and Benson 1974; Benson et al. 1975). Initial findings that this method worked for managing stress, hypertension, and other cardiac disorders were extended to a range of problems from addiction to anxiety (Beary and Benson 1974; Benson and Wallace 1971, 1972; Benson et al. 1975, 1978), laying the foundations for mind-body medicine. Researchers observed that meditative and hypnotic subjects shared certain predisposing variables and that EEG studies of TM and hypnosis showed common state markers (Bushell 1998). This finding led to comparisons of the techniques and a conception of meditation as a trance that helps control automatic processes by attentional alterations that heighten susceptibility to autosuggestion (Delmonte 1981, 1984c; Gruzelier and Brow 1985; Heide et al. 1980; Van Nuys 1973). Variations in the depth of the meditative state were explained (as in hypnosis) by predisposition and skill variables that made the state more or less effective in facilitating conscious self-regulation and long-term change. Because this conception accurately describes the early stages of concentrative meditation (*samadhi* or *shamatha*) (e.g., Banquet's [1973] TM stages 1 and 2), it is still widely accepted (Snaith 1998).

Mindfulness

Later understanding advanced in two ways. Exploration of the variety of Asian meditative practices revealed their experiential and biological diversity (Goleman 1977; West 1987), and further studies of concentrative meditation helped differentiate these practices from normal rest, sleep, and hypnosis (Davidson and Goleman 1977; Infante et al. 1998; Jevning et al. 1992, 1996). Key to exploring the variety of meditative practices was the introduction of analytic insight meditation, commonly called *mindfulness* (Kabat-Zinn 1990). Basic mindfulness meditation (*smrti* or *sati* in the Pali dialect) involves trying to sustain attention from moment to moment on a chosen focus in the body or mind. Typically, the first focus is the breath, which serves both as the paradigm for the

practice of deautomatizing mind-body processes (Deikman 1966) and as the induction vehicle for the relaxed alert state on which advanced practice depends (Morse et al. 1984). Although basic mindfulness practice and concentrative meditation are indistinguishable at early stages (Brown 1977; A. Wallace 1999), mindfulness diverges in its advanced stages; it opens the focus of attention to admit whatever enters experience while using relaxed alertness to maintain an observational stance of impartial attention. This impartial attention investigates whatever appears without the bias of habitual judgments or emotional reactivity. This final discipline of mindfulness is traditionally defined as analytic insight meditation (*vipasyana* or *vipassana* in Pali), in which discursive intellect is used before, during, and after meditation sessions as part of a threefold education aimed at personal freedom and change (Mikulas 1978, 1981). The explosion of interest in mindfulness was fueled by evidence that it enhances learning-related attentional variables such as perceptual discrimination (Brown et al. 1984) while promoting the development of positive psychobiologic traits such as sense of coherence and stress-hardiness (Davidson and Goleman 1977; Easterlin and Cardena 1998; Kabat-Zinn et al. 1997). Growing understanding of mindfulness and analytic insight meditation helped researchers explain inconsistent findings from meditation studies using practitioners from different traditions (Delmonte 1984a). New frameworks of meditative experience based on classical Indian mindfulness literature were developed (Goleman 1977) to map the relations between various Indian practices and to locate Jewish, Christian, Islamic, Central Asian, and East Asian Buddhist practices.

The Learning Model

As the varieties of meditation were being categorized and compared, further research on TM and the most advanced practices of Hindu and Buddhist tantric yoga was highlighting the biological distinctiveness and self-regulatory scope of meditative states (Benson et al. 1982; Heller et al. 1987; Jevning et al. 1992). From the finding that the state-trait decreases in stress reactivity in TM involved alterations not only in response set but also in stimulus set, researchers concluded that the mechanisms and effects of

meditation were more profound than those of hypnosis and involved learning and neural plasticity (Davidson and Goleman 1977; Gruzelier and Brow 1985; Mikulas 1981). This learning model gained support from clinical studies suggesting that mindfulness was effective in pain, anxiety, and borderline personality disorder because it enhanced learning by increasing attentional competence (Kabat-Zinn 1982; Kabat-Zinn et al. 1992; Linehan 1993). This shift in meditation models was congruent with developments in hypnosis research that suggested hypnotherapy worked by heightening attention and enhancing problem solving and learning (Bushell 1998; DePascalis and Penna 1990; Sabourin et al. 1990). The consensus that meditation and hypnosis are similar and are both better explained as learning, rather than as suggestion, offers a bridge from meditation to psychotherapy, for example, Freud's "waking-state hypnosis" (Marriott 1996). Before crossing this bridge, however, the new learning models of meditation must be grounded cross-culturally in a comparative framework of meditation.

Learning models of meditation may challenge common conceptions, but classical Indian models treat meditative self-regulation as part of a path of higher learning whose three tracks involve cognitive, affective, and behavioral reeducation (*adhisiksya*). Reeducation is viewed as a continuing process, with three developmental phases aimed at progressive insight (*prajna*) based on intellectual, reflective, and meditative learning. In addition to clarifying traditional learning models, recent scholarship also offers more complete maps of meditation. Goleman's (1977) fifth-century source omits later developments, including the more advanced mind-body process (*yoga tantra*) techniques that would set the gold standard for effectiveness (Benson et al. 1990; Heller et al. 1987; Isayeva 1995; Thurman 1998). The framework I adapt is based on Indo-Tibetan Buddhist sources ranging from Atisha (982–1054) to Tsong Khapa (1493–1517) (Thurman 1984, 1998). One of the advantages of this framework is that it was developed in dialogue with the Hindu tradition and may be easily coordinated with frameworks based on the synthesis of Abhinavagupta (c. 1000), such as that of Sri Aurobindo (Isayeva 1995).

Given this framework of meditation, we can cross the bridge from hypnotherapy to learning models in psychotherapy. Appreciation of the constructive role played by internal variables in learning has led to the modified behavioral model of cognitive-behavioral therapy (CBT) (Beck et al. 1979) and to related moves to integrate analytic and learning models of dynamic therapy (Luborsky 1984). Greater dialogue with neurobiology (Rieser 1984) has made psychotherapy researchers aware that learning plays a formative role in the development of brain structure and function and that its substrate, neural plasticity, is a pervasive and continuous property of neural systems rather than the exception to a rule of genetically determined "hard-wiring" (Kandel and Schwartz 1991). The biology of learning has been invoked as a final common pathway in the mechanisms of action of the major classes of psychopharmacologic agents (Hyman and Nestler 1996) and has been cited as the foundation for a new scientific framework for psychiatry (Kandel 1999). Combining this framework with developments in mind-body medicine and neuroscience will complete the comparative learning model and help schematize the discussion to follow.

From Trauma to Enrichment: Stress, Learning, and the Brain

Stress

In recent years, research on the mechanisms and effects of stress has opened a new window on the pathogenesis of mental illness (Fawcett 1992; Kagan et al. 1988; Schmidt et al. 1997; M. Smith et al. 1989). The triphasic sequence of events observed in the general stress response—1) fear-based cognition, 2) aversive effect, and 3) hypothalamic-pituitary-adrenal (HPA) activation leading to decreased neurogenesis, long-term degradation of neural tissue, and decreased cortical volume—is also at work in the genesis of psychologic trauma, anxiety, and mood disorders (Bremner et al. 1995; Carroll 1991; Coplan et al. 1996; Darnell et al. 1994; Drevets et al. 1992; Sheline et al. 1996; Starkman et al. 1993; Yehuda 1997). Selective serotonin reuptake inhibitors (SSRIs) are now thought

to reverse the degradation process and promote neural plasticity by increasing nerve growth factors in the hippocampus and prefrontal cortex (Haddjeri et al. 1998), supporting learning models of depression as a neural plasticity disorder. The allostasis model from mind-body medical research promises to be helpful in the assessment of the pathologic effects of uncontrollable stress:

> Allostasis means achieving stability through change, and it refers in part to the process of increasing sympathetic and hypothalamic pituitary adrenal activity to promote adaptation and to reestablish homeostasis. Allostasis also highlights our ability to anticipate, adapt or cope with impending future events . . . when allostatic systems remain active they can cause wear and tear on tissues and accelerate pathophysiology—a phenomenon we have called allostatic load. . . . There are three types of allostatic load: 1) frequent overstimulation by frequent stress, resulting in excessive hormone exposure, 2) failure to turn off allostatic responses when they are not needed or inability to habituate to the same stressor, both of which result in overexposure to stress hormones, 3) inability to turn on allostatic responses when needed, in which case other systems (e.g. inflammatory cytokines) become hyperactive and produce other types of wear and tear. (Shulkin et al. 1998, p. 220)

In this and prior articles, Shulkin et al. (1994) proposed a general mechanism for allostatic load based on tonically increased fear due to stress-conditioned amygdalar hyperactivity. They asserted that a broad range of psychiatric disorders—from anxiety, posttraumatic stress disorder (PTSD), addictions, and depression to Alzheimer's disease and schizophrenia—reflects a spectrum of psychopathology caused or accelerated by wear and tear due to allostatic load. The continuum of types 1, 2, and 3 allostatic load could account for the nonspecificity of psychiatric symptoms such as negative anticipation, aversive reactivity, and learned helplessness. This model also highlights the constructive role of the individual in biobehavioral responses as well as the exorbitant hidden cost to the mind and brain of the failure to relearn the conditioned fear responses that maintain allostatic load. Pinpointing defensive reactivity as a prime risk factor and a common pathway to mental disorders helps to align psychiatric nosology with mind-body medical findings that trace the pervasive pathologic effects of

disease-prone behaviors to the defensive psychologic traits of self-involvement, fearful attachment, and hostility (Scherwitz et al. 1986; Williams 1989).

Learning

Although psychiatric researchers have recognized the therapeutic implications of findings that cortisol-mediated hippocampal damage can be reversed by decreasing cortisol levels (Seeman et al. 1997), they have interpreted those implications narrowly as confirming the plasticity model of SSRI action and the need for more plasticity agents. Researchers in geriatrics and rehabilitation have explored the effectiveness of cognitive-affective-behavioral strategies for enhancing plasticity, neurogenesis, memory, and learning (Carney et al. 1999; Farmer and Clippard 1994; Sohlberg and Mateer 1989; Swaab 1991). The rationale for these strategies comes from animal studies of the effects of enriched environments on learning (Bushell 1998; Rosensweig and Bennett 1996; Ryff and Singer 1998; Swaab 1991). Four decades of research on the hypothesis of use-induced plasticity of the nervous system have shown that training or enriched experience induces dramatic changes in the cerebral cortex of rats and other animals. Training or enriched experience altered neurochemistry, increased cortical weight and thickness, enhanced size of synaptic contacts and number of dendritic spines and branchings, and improved performance on tests of learning, and did so more or less independently of age (Rosensweig and Bennett 1996). The data are remarkable both qualitatively and quantitatively, showing increases in some variables of up to 10%–25% with as little exposure as 40 minutes per day (Ferchmin and Ertovic 1989; Greenough and Volkmar 1973; Ng and Gibbs 1991). Extension to humans is supported by findings that adults who continue learning retain higher brain size and capacity (Schaie 1994; Shimamura et al. 1995). Equally dramatic is the inverse effect of impoverishment (Wiesel and Hubel 1965). How do we explain the discrepant effects of stressful versus enriched environments, that is, "wear and tear" versus "use it or lose it"? The current consensus is that use-dependent plasticity is the rule and stress-induced atrophy the exception (Rosensweig and Bennett 1996; Ryff and Singer 1998; Swaab 1991).

Table 4–2. Stages of integrated concentrative and analytic meditation

Concentration	Skills	Motivation	Insight
Individual phase	**Low arousal**	**Exclusive attention**	**Cognitive learning**
Focus	Learning	Relief	Discursive
Steady focus	Reflection	Renunciation	Analytic
Repeated focus	Mindfulness	Impartiality	Holistic
Increased focus	Mindfulness	Equanimity	Perceptual
Social phase	**Low arousal**	**Inclusive attention**	**Affective learning**
Discipline	Alertness	Concern	Intuitive
Calm	Alertness	Compassion	Imaginative
Quiescence	Effort	Care	Visceral
Process phase	**High arousal**	**Integrative attention**	**Behavioral learning**
One-pointedness	Effort	Commitment	Euphoric
Equipoise	Plasticity	Altruism	Orgasmic

Source. Thurman 1984.

Effects on the Brain

Given a cognitive-affective-behavioral learning model, the negative effects of stress and the positive effects of enrichment on the brain are consistent with the reciprocal inhibition of aversive and reward learning systems hypothesized by researchers for decades (Block 1977; Bushell 1998; Doidge 1990; Heath 1963; MacLean 1959). Although the effects of stress are mediated by fear-based aversive arousal of amygdala-maintained (aminergic) defensive responses, the effects of enrichment are thought to be mediated by trust-based euphoric arousal and disarming (endorphinergic-oxytocinergic) sexual-nurturant responses maintained by septal-hippocampal reward circuitry, periorbital cortex, and the bed nucleus of the stria terminalis (Bushell 1998; Panksepp 1998). In the following sections, I incorporate models of allostatic load and environmental enrichment into the comparative learning framework I developed above in order to review the mechanisms of meditation.

Meditation and Psychotherapy: Two Methods of Enriched Learning

The Indo-Tibetan framework of meditative practices divides the path of insight into three progressive developmental phases and prescribes for each a distinct therapeutic technique or vehicle (Table 4–2). Fundamental is the individual vehicle (*hinayana*), which is aimed at developing the insight required for freedom from compulsive behavior (*karma*) and addictive responses (*klesha*). It prescribes a technique of impartial observation known as mindfulness or insight meditation, practiced with an attitude of renunciation, especially within the South Asian tradition. Intermediate is the social vehicle (*mahayana*), aimed at developing self-transcendent insight and unconditional empathy. It prescribes analytic insight integrated with concentrative quiescence and practiced with an attitude of universal compassion, especially in Central and East Asian traditions. Finally, the process vehicle (*tantrayana*) aims at a visceral insight called *translucency* that is integrated with a virtual body of euphoric compassion. It prescribes techniques

of intuitive self-analysis within visualized environments (*mandala*) that are perfected by the experience of orgasmic openness, and is practiced with an attitude of euphoric compassion, especially in the Tibetan tradition. This simple schema is more friendly than prior maps to the mind-body process techniques of advanced Hindu yoga practices (Patanjali stages 5–8) such as raja yoga (TM stage 3/TM-Sidhi), and also has the advantage that its developmental phases permit cross-cultural and structural-functional comparisons. Specifically, individual practices are comparable with classical analytic and cognitive therapies; social practices are comparable with object-relations approaches and interpersonal and group therapies; and process practices are comparable with Jungian and Reichian analysis, hypnotherapy, and intimacy work. Structurally and functionally, the three developmental phases may be conceptualized as facilitating relearning and plasticity at the neocortical, limbic, and subcortical levels (i.e., in encoding, registration, and commitment phases supporting short-, intermediate-, and long-term memory) in line with MacLean's (1959) comparative biological "triune brain" version of Freud's structural model (see Panksepp's revision [1998]).

Individual Meditative Practices

The first body of evidence to consider in examining this schematic framework pertains to mindfulness meditation and its relation to free association and cognitive therapy. Although mindfulness practice usually begins by focusing attention on the breath, its final application involves maintaining a nonreactive observational stance of open, impartial attention toward whatever enters the field of awareness. The effectiveness of mindfulness in treating anxiety disorders and chronic pain is thought to reflect its general health benefits, including decreased anxiety and increased stress-hardiness, rather than a disease-specific mechanism (Kabat-Zinn 1982). This concept agrees with the four noble truths (aryasatya) framework of individual self-healing, in which self-imposed suffering is approached generally, as the product of misguided behavior whose reinforcement must be understood before its extinction (nirvana) can be realized by a path of cognitive-affective-behavioral reeducation (Claxton 1987; Govinda 1974). The mechanism postulated for the effects of mindfulness involves a state of relaxed alertness in which somatic deactivation fosters an observational stance of heightened attention, open to normally automatic processes yet uncoupled from affective-behavioral reactivity (Kabat-Zinn et al. 1992). The general benefits of mindfulness are explained by the role heightened attention plays as the final common pathway and rate-limiting step in cognitive-behavioral learning (Goleman 1977; Kabat-Zinn 1982).

Discussion of the mechanism of meditation has focused on three questions pertinent to mindfulness: 1) the relation of meditative states to rest, 2) whether the attentional shift in meditation is toward opening or narrowing, and 3) the relation of this shift to cerebral laterality. Although the physiology of many common meditative practices resembles relaxed alertness from rest to the onset of stage 1 sleep, reported differences in metabolism and consciousness are regarded as sufficient to mark meditative states as psychobiologically discrete (Delmonte 1984c, 1985, 1987; Jevning et al. 1992; R. Wallace et al. 1971; Walsh 1996). EEG findings relevant to basic mindfulness practice—decreased alpha frequency and increased alpha amplitude and coherence with frontal spread—are indistinguishable from drowsiness, although nonmeditators are generally unable to stop the progression of drowsiness into stage 1 sleep, whereas meditators routinely can (Fenwick 1987). In general, debate over whether meditation is more calming than rest reflects the common misperception that the aim of meditation is relaxation. Like free association, mindfulness may be best understood as a cultivated state in which the normal progression from waking to sleep onset is stopped and exploited for deautomatizing insight and long-term change rather than as a fourth state of consciousness (Delmonte 1995; Holmes 1987).

The question of attentional alterations is raised by the contrasting modes of attention found in Hindu yoga versus Zen meditation. Using the finding that resting alpha is normally blocked by stimulation as a measure of responsiveness, early field studies of Indian yogins reported that blocking was absent, suggesting nonresponsiveness (Bagchi and Wegner 1957; Das and Gastaut 1955), whereas similar studies of Zen meditators showed that blocking not only was present but did not habituate as usual, suggesting

enhanced responsiveness (Kasamatsu and Harai 1966). Eventually, these data were taken as confirming the distinctive attentional alterations in two main types of meditation: 1) concentrative meditation aimed at single-pointed focus yields exclusive heightened attention, and 2) mindfulness meditation aimed at impartial focus yields inclusive heightened attention (Davidson 1976). Although subsequent studies on TM practitioners showed inconsistent results, the consensus that these discrepant findings are the result of different voluntary alterations of attention still stands and is supported by evoked potential studies (Baumgartner and Epstein 1982; Fenwick 1987; Ikemi 1988). The attentional alterations in meditation seem to involve nonspecific mechanisms for altering cortical responsiveness that cannot fully distinguish meditation from other methods of deautomatization, such as yoga, imagery, and qi gong (Fenwick 1987; Ikemi 1988; Karawatt 1991; Liu et al. 1990).

Some researchers have proposed that the essential mechanism of meditation is a shift in cerebral dominance from the left to right hemisphere (Fenwick 1987). Early debate focused on whether the shift was due to right hemisphere activation (Davidson 1976; Ornstein 1972) or left hemisphere deactivation (Erlichman and Weiner 1980; Prince 1978). The current consensus supports varying degrees of right hemisphere activation as a mechanism in early stages and bihemispheric deactivation in more advanced stages (Earle 1984; Fenwick 1987; Liu et al. 1990). Although much of the reasoning behind this debate is based on the overgeneralization (from TM) that suppression of thought and repetition of mnemonic formulas are essential to meditation, some degree of right hemisphere activation appears in mindfulness despite its use of left hemisphere activating analysis and lack of right hemisphere activating repetition. Tachistoscopic studies of mindfulness show enhanced perceptual discrimination indicating right hemispheric activation (Brown et al. 1984). Increased meditative access to right hemisphere–stored negative emotions has also been cited by proponents of right hemisphere activation (Davidson et al. 1976) and is typically reported in mindfulness (Delmonte 1989, 1995; Miller 1993).

Right hemisphere activation and access to negative emotion have also been invoked in several biological models of psychoanalysis (Delmonte 1989, 1995; Kissen 1986; Reiser 1984). Anticipating Freud, traditional descriptions of mindfulness or insight meditation insist that attention, even single-pointed, nonconceptual concentration, is not an end in itself but a means to support the integration of mind-body systems with analytic insight through autointerpretation (Gimello 1978). The insistence that analytic insight is essential to mindfulness would favor the model of balanced hemispheric dominance; enhanced cortical task specificity and integration would thus be the mechanism of both basic mindfulness practice and access to more profound meditative self-analysis. Support for such an integrated-systems model is found in state theories of hypnosis (Gruzelier and Brow 1985), in studies of hemispheric integration in meditative breathing (Jella and Shannahoff-Khalsa 1993; Naveen et al. 1997; Persinger 1993; Stancak and Kuna 1994), and in brain imaging studies of meditation (Herzog et al. 1991).

Mindfulness reflects the integrated effect of the manipulation of relaxed alertness, the coherence of restful corticothalamic alpha activation, and the balance in hemispheric dominance. Such individual self-healing practices allow the analytic hemisphere to recruit the entire neocortical-thalamic-reticular axis (neomammalian brain) for cognitively enriched learning (encoding) without the automatic defensive appraisals that maintain cognitive-perceptual allostatic load (Anand et al. 1961; Banquet 1973; Emavardhana and Tori 1997; Gellhorn and Kiely 1972; Jevning et al. 1992; Rubin 1985).

Social Meditative Practices

Social meditative practices prescribe the most extensive use of discursive analytic insight and prosocial affective techniques. Their analysis seems calculated to remedy any allostatic load caused by defensive responses to psychosocial stressors. The idea is to analyze concepts and perceptions of self as supposedly fixed, or based on some nonrelational identity or reality. This analysis helps develop insight of the sheer relativity of self and world, negatively defined as the voidness of such reified self-constructs. Hindu forms of analysis focus on nondualistic insight and sympathy. The common aim is to overcome conscious and uncon-

scious resistance to the self-transcendent insight and empathy on which social health depends.

The effects and mechanisms of social practices have been explored in a classic study of Zen priests (Kasamatsu and Harai 1966). Zen integrates concentrative and analytic techniques as basic training for Zazen meditation, which is typical of such practices. Zazen meditators use discursive reason or poetic formulas (*koans*) to analyze dualistic self-concepts and reactive emotions and to cultivate nondualistic insight and impartial empathy toward the world. This study of Zazen has been influential because of its methodology and significant findings. After an initial stage of alpha change, as in mindfulness and TM stage 1 and 2, the tracings of some priests showed rhythmic trains of theta waves (6–7 Hz) not seen in sleep. There was a direct correlation between these trains of theta waves and years of meditative experience. A more direct correlation was found between the theta trains and the Zen master's rating of priests as low, middle, or high in advancement. Theta trains were blocked by a sensory stimulus, and this blocking did not show habituation as in normal sleep or waking. The latter finding was interpreted as supporting the meditators' reports that they experienced the world more immediately than in normal waking but without habitual dualism or reactivity.

Hypnosis research supports this interpretation, linking enhanced theta in the 5.5–7.5 Hz range with improvements in problem-solving, perceptual processing, and cognitive and experimental task performance as well as with increased temporal blood flow (Crawford et al. 1989; Sabourin et al. 1990; Schacter 1977). Unlike the theta rhythm found in rest and drowsiness, this theta rhythm is associated with class II inhibition and is correlated with absorptive and selective attentional skills, imagery-mediated mentation, and efficient and attentive performance (Barr et al. 1995; Sabourin et al. 1990). The EEG findings, combined with the heightened sense of clarity, equanimity, and empathic relatedness reported by the priests, support the suggestion that such practices involve activating and/or integrating the temporal lobes with the frontolimbic reward system mediated by septal-hippocampal circuitry (Fenwick 1987; Mandell 1979). One case study of ecstatic seizures showed rhythmic 6- to 8-Hz theta waves during euphoric

experience (Ciringotta et al. 1980). This finding suggests the possibility that the long-term changes the Zen master rated may be explained by a kindling mechanism similar to that used to explain changes in interictal personality in temporal lobe epilepsy (TLE) (Bushell 1998; Persinger 1993).

Some researchers reject kindling models of long-term meditative change, arguing that they pathologize meditation and ignore its therapeutic effects (Orme-Johnson 1995). Yet psychiatric research suggests that the interictal changes seen in euphoric TLE are so clearly adaptive that this subgroup should not be considered pathologic (Bear et al. 1985; Carroll 1991; Doidge 1990; Fieve 1997). The case would be even stronger for meditators who consciously self-regulate kindling for therapeutic benefit and adaptive change (Bushell 1998). In this view, social meditation exploits the feed-forward facilitation and long-lasting afterdischarge typical of septal-hippocampal circuitry (Adey et al. 1962; Spencer and Kandel 1961) in order to self-induce long-term potentiation (presumably by selective self-stimulation of hypothalamic reward circuits) (Slawinska and Kasicki 1995), thereby fostering the long-term learning of prosocial insights and emotions.

Through deepening relaxed alertness and hemispheric integration into the limbic system, social meditation practices appear to selectively recruit the prosocial reward mode of the frontolimbic-hypothalamic axis (the paleomammalian brain). This results in effectively enriched learning (registration) by activating septal-hippocampal inhibition of the defensive (amygdaloid) reactivity that maintains perceptual-affective allostatic load (Davidson 1976; Mandell 1979; Persinger 1984, 1993).

Process Meditative Practices

Finally, process practices combine mantra recitation, visualization, and breath-control techniques to yield deeper forms of restful alertness as well as lucid forms of rapid eye movement (REM) and non-REM sleep, sexual intercourse, and near-death experience. These lucid altered states are used to analyze defensive self-image, affect, and action and to integrate automatic mind-body processes with a creative process of intuitive clarity and euphoric openness, or pure bliss consciousness. Research on these practices

began when one of the first field studies contradicted prior concepts of meditation as relaxation (Das and Gastaut 1955). Autonomic and EEG markers of increased arousal were observed during the most profound meditations of the most experienced subjects. These findings were replicated in subsequent studies of various process techniques (Bagchi and Wegner 1957; Banquet 1973; Benson et al. 1982, 1990; Corby et al. 1978). Arousal markers, such as increased heart rate, cerebral blood flow, and galvanic skin response (GSR) and stable, high-frequency beta (20–40 Hz) in meditating EEG were all the more intriguing because they were linked with paradoxical findings of peripheral deactivation, such as profound reductions in basal metabolism (40%–64%) (Benson et al. 1982, 1990; Heller et al. 1987; Infante et al. 1998; Jevning et al. 1992; Narayan et al. 1990).

Although repetition of mnemonic formulas has often been cited in models of meditation as right hemisphere–dominated waking, it is a distinctive process technique used to reinforce imaginative schemas (*mandalas*) that induce paradoxical arousal states more comparable with the "heart-brain preparation" seen in REM sleep than with the relaxed alertness found in mindfulness, Zazen, or stages 1, 2, and 4 TM (Jevning et al. 1992). The traditions view these lucid, high-arousal states and their imagery-meditated analysis as means of accessing deeper states of euphoric arousal, linked on their map of conscious self-regulation with the primary core neural pathways, complexes, energies, and transmitters (*nadi, chakra, prana, bindu*) that support appetites, consciousness, and vital functions, including plasticity (*prashrabdhi*). A study of Tibetan optimal mind-body process (*anuttara yoga tantra*) meditators who had progressed beyond the creative imagery stage to the bliss-meditated self-analysis of the intuitive realization stage documented their ability to self-regulate body temperature and metabolism. This self-regulation was taken as a gross measure of progress in the basic realization-stage euphoric technique of kindling (*candali* or *gTum-mo* in Tibetan). The most advanced practitioner was the one found to have the paradoxical arousal pattern of reduced metabolism with high-frequency beta (Benson et al. 1982, 1990).

The imagery used to induce kindling belongs to a passion practice in which virtual or real intercourse yields orgasmic bliss. This

bliss is used to support lucid euphoric analysis and disarm defensive responses. Passion practice may account for reports of virtuoso process practitioners whose meditating EEGs show global activation comparable with that correlated with orgasmic experience during direct stimulation of reward circuitry in the human brain (Funderburk 1977; Green et al. 1970; Heath 1963). Current imagery research shows that structured imagery is a reliable method of inducing specific effects, and that vivid mental imagery acts as a centrally generated sensory stimulus that can be regulated to yield precise control over a wide range of automatic processes (Bushell 1998; Kosslyn 1994; Kunzendorf and Sheikh 1990). As for the traditional model of disarming defensive responses, researchers cite replicated studies of process virtuosos enduring air-tight burial for days at a time (Anand et al. 1961; Heller et al. 1987) or voluntarily suspending respiration and heartbeat (Farrow and Herbert 1982; Funderburk 1977). Direct and indirect support for traditional claims of lucid REM or slow-wave sleep may be found in recent studies of lucid deep sleep, lucid dreaming, and anesthetic recall (Gackenbach 1992; Green et al. 1970; Mason et al. 1997; Travis 1994). Such findings support the traditional claim that conscious learning and self-induced plasticity can occur even in the most primary pathways and complexes of the central nervous system (*susumna-nadi-chakra*). They also suggest that normally unconscious behavioral responses can be deconditioned by euphoria-mediated lucid insight.

A likely mechanism for process practices is that prosody- and imagery-mediated activation deepens the lateral hypothalamic driving of septal-hippocampal theta by recruiting pontine neurons that promote REM. This induces a lucid, REM-like state in which prosocial-consummatory emotional response patterns not prefigured in instinctual programs can be rehearsed and consolidated (Gackenbach 1992; Jevning et al. 1992; Loizzo 1998; Panksepp 1998). Within this state, sexual imagery–mediated selective kindling of the ventromedial-hypothalamic consummation system deepens septal euphoria, inducing a lucid orgasm-like euphoric state that supports the deconditioning of addictive-defensive behavioral responses and the learning of consumatory-nurturant alternatives (Doidge 1990; Halper 1998; Krivan et al.

1995; Loizzo 1998; Mandell 1979; Mason et al. 1997). In sum, high-arousal heightening of attention in primary process practices appears to result from manipulations that deepen limbic-hypothalamic reward activation. These manipulations also recruit the extrapyramidal–basal ganglia axis (the reptilian brain) for behaviorally enriched learning (rehearsal and commitment) by activating ventral hypothalamic inhibition of addictive (dopaminergic) seeking and compulsive (noradrenergic) defensiveness that maintain behavioral allostatic load (Bushell 1998; Harte et al. 1995; O'Halloran et al. 1985; Panksepp 1998).

Research, Teaching, and Clinical Uses of Meditation

Beyond its relevance to the biology of self-regulation, meditation plays a key role in neuroscience because it is the best available method of training reliable expert subjects for studies of mind-brain interactions (Austin 1998; Goleman 1977; Ornstein 1972). Varela et al. (1996) argue that cognitive neuroscience lacks a methodology to research the constructive role of intentional acts in brain development and suggest an enactive neuroscience integrating Indian meditative methods. Walsh (1988) advises that modern science use meditative traditions to develop consciousness disciplines for psychiatry. Others have argued that meditative methods enhance impartial objectivity and empathy gained by a training analysis and thus should be integrated into psychotherapy training (Burnard 1987; Chung 1990; Dubin 1994; Epstein 1995; Santorelli 1999). Still others advocate using mindfulness in the medical curriculum (Santorelli 1999; S. Shapiro et al. 1998; Sommer and Hassed 1995) and in science in general (Delmonte 1987; Wicklund 1975).

As for clinical indications, some have concluded that, in mind-body therapies, the conventional disease-based treatment approach should be complemented by a skills-learning positive health approach (Ryff and Singer 1998). This conclusion fits with current research showing the general health benefits of meditation (Goleman and Gurin 1993; Kabat-Zinn 1990) and also fits with the growing number of healthy Americans who meditate. Awareness

of the potential health benefits of yoga and meditation has grown with the generation exposed in their youth to Indian traditions (Epstein 1995; Goleman 1977; Hassed 1996; Ornish 1998) and with the popular demand for alternative health practices (Eisenberg et al. 1993). The demand for authentic instruction in Asian meditations has obviated the need for clinical forms of TM (Benson et al. 1975; Carrington 1978), yet the conventional view of the predisposing variables and clinical benefits of meditation still assumes the TM-based view of meditation as a unitary relaxation technique (Carrington 1987; Delmonte 1989; West 1987). This TM-based view sees predisposition to meditative practice in terms of suggestibility and limits its benefits to self-regulation of arousal variables that fuel stress-related physical and mental problems (Craven 1989; Snaith 1998). This TM-based view has given way to typologies of meditation informed by Indian traditions and organized around a new view of meditation as an attentional discipline (Goleman 1977; Kutz et al. 1985). The new view explains the diversity of traditional practices and expands the range of individuals and problems for which meditation may be indicated (Bogart 1991; Kelly 1996). This new view found support in studies showing that traditional mindfulness meditation is well tolerated by the general population and generally effective in conditions in which attention may be a critical variable in cognitive-behavioral change (Kabat-Zinn et al. 1985, 1987, 1992; Teasdale et al. 1995). This new view also predicts responses to different techniques by measuring the predisposition to mental versus somatic anxiety (Davidson et al. 1976) and helps explain the efficacy of traditional practices with techniques for diverse dispositions (Kabat-Zinn et al. 1997).

The framework of meditation I explore in this chapter extends this new view of meditation as attentional discipline and attempts to schematize the spectrum of Indian mind-body health traditions. Because these traditions include elaborate systems of positive health, they appeal to many individuals who use psychotherapy for self-exploration and self-change (Epstein 1990; Kelly 1996; Snaith 1998; Walsh 1988). Similar to our psychotherapy tradition (only older and more cross-cultural), Indo-Asian meditation traditions include a broad array of practices to suit the needs of di-

Table 4–3. Comparative typology of meditative therapies and psychotherapies

Hindu	Buddhist	Analytic	Behavioral
Individual practices	**Low arousal**	**Exclusive attention**	**Cognitive learning**
Hatha yoga	Basic mindfulness	Psychodynamic	Relaxation techniques
TM 1 and 4	Basic shamatha	Ego psychology	Autogenic training
Krishnamurti	Basic vipassana	Classical analysis	Cognitive-behavioral therapy
Social practices	**Low arousal**	**Inclusive attention**	**Affective learning**
Yoga 1 and 2	Giving and taking	Object-relations	Family therapy
Bhakti-Seva	Mind reform	Interpersonal	Dialectical behavior therapy
Vedanta	Zazen/Vipasyana	Existential	Bereavement work
Process practices	**High arousal**	**Integrative attention**	**Behavioral learning**
Yoga 5	Kriya/Carya Tantra	Kohutian	Hypnotherapy
TM 3/yoga 6	Yoga/Anuttarayoga 1	Jungian	Guided imagery
Kundalini/yoga 7	Anuttara yoga tantra 2a	Reichian	Sex therapy
Sahaja/yoga 8	Anuttara yoga tantra 2b/ Mahamudra	Lacanian	Intimacy work

Note. TM = transcendental meditation.

verse populations. Meditation traditions also systematized their techniques for professional use in university-based medical and psychologic disciplines (Loizzo and Blackhall 1998; Thurman 1984; V. Wallace 1996; Zysk 1991). By comparing these systems with current neuroscience, it should be possible to match dispositions and problems with specific techniques. The framework discussed above suggests a preliminary typology (Table 4–3). This typology assumes a structural-developmental perspective and maps techniques in terms of learning-related variables in cognitive, affective, and behavioral dimensions. In what follows, I offer some general guidelines for the clinical uses of meditation following the typology derived from the learning-based framework of meditation discussed earlier in this chapter.

Meditation may be of interest and benefit to anyone wishing to take an active role in his or her psychiatric care or psychotherapy or in promoting mental health (Delmonte 1984d, 1987, 1988; Kelly 1996; Kutz et al. 1985; W. Smith et al. 1995). Similar to free association, meditative introspection routinely heightens awareness of anxiety, negative emotions, traumatic memories, and derealizing experiences, such as hypnagogic illusions, and thus may make patients more aware of their symptoms (Lazarus 1976; Walsh and Roche 1979; West 1987). In meditation traditions, as in psychotherapy, care is taken to prepare individuals, especially early meditators, with cognitive strategies that foster insight and self-control (Barbieri 1996; Castillo 1990; A. Wallace 1999). Selecting a practice appropriate to individual objectives, level of development, character style, and/or psychopathology is also crucial to long-term success (Engler 1984; D. Shapiro 1992). Given an open mindset and setting, meditation is well tolerated even by individuals with major psychiatric disorders, the largest problem usually being compliance (Delmonte 1984b, 1988; Luckoff et al. 1986). Although meditation has been beneficial in recovery from chemical dependency (Benson and Wallace 1971; Brautigam 1977; Murphy et al. 1986; Schafii et al. 1974, 1975; Shaffer et al. 1997), most instructors advise those actively abusing substances that 1–6 months of sobriety is a prerequisite for stable practice (Kabat-Zinn 1982). Traditionally, people with acute illnesses or exposed to extreme environmental stressors are advised to stabilize their condition

and minimize exposure before learning to meditate (MacDonald 1977). Yet these contraindications are relative, and the current consensus is that predisposition and motivation, rather than the nature or severity of symptoms or circumstances, most determine the ability to sustain an effective meditation practice (Delmonte 1981, 1984d, 1995; Kabat-Zinn et al. 1985). Some argue that meditation works best for milder symptoms (Delmonte 1984b, 1988), but this argument overlooks the effectiveness of traditional multicomponent approaches and neglects advanced techniques (Kabat-Zinn 1990; Linehan 1993). Refractory illnesses and severe stress often provide the incentive to meditate, a basic fact of life to which the traditional systems are well adapted (Epstein 1995; Kabat-Zinn 1990; Mikulas 1978; West 1987).

As for specific techniques, individual self-healing practices, such as basic mindfulness, vipassana, basic TM, hatha yoga, basic quiescence meditation, tai chi, martial arts, and clinical meditations, are best suited to high-anxiety, high-control individuals with low stress tolerance, low affect tolerance, at least moderate self-esteem, and moderate capacity for attentional absorption (Delmonte 1984a, 1987, 1988, 1995; Dinardo and Raymond 1979; Hjelle 1974; Spanos et al. 1980; Turnbull and Norris 1982). Individual practices have been found effective for adjustment to general stressors (Beauchamp-Turner and Levinson 1992; Easterlin and Cardena 1998), anxiety and obsessional conditions (Benson and Wallace 1971; Castillo 1990; Girodo 1974; Kabat-Zinn et al. 1992), acute traumatic stress (Miller 1993; Shannahoff-Khalsa and Beckett 1996), and obsessive, avoidant, and sociopathic personality styles (Bleick and Abrams 1987; Fehr 1977; Orme-Johnson et al. 1977; J. Smith 1978). They have also been found effective for somatization, chronic pain, and chemical dependency (Kabat-Zinn et al. 1985; Murthy et al. 1997; Shaffer et al. 1997). As adjunctive therapies, individual practices may work best with dynamic therapies (Bogart 1991; Delmonte 1995; Epstein 1995; Kutz et al. 1985), CBT (Berwick and Oziel 1973; Mikulas 1981; Teasdale et al. 1995), desensitization (Castillo 1990; Greenwood and Benson 1977), behavioral medicine (Benson et al. 1978; Daniels 1975; Kabat-Zinn et al. 1985), consultation-liaison psychiatry (Glueck and Stroebel 1975; Kabat-Zinn 1982, 1990), and substance abuse counseling (Shaffer et al. 1997; Taub et al. 1994). The

best-studied clinical application of these practices has been the use of mindfulness for anxiety disorder. Early studies showed clinical meditation techniques to be as effective as hypnosis and more effective than relaxation for the treatment of anxiety (Benson et al. 1978; Daniels 1975). A study by Kabat-Zinn and colleagues (1992) corrected some of the methodologic problems limiting prior work, including self-selection bias and lack of correction for inconsistencies in self-report versus behavioral measures. This study showed that an 8-week program in mindfulness-based stress reduction has efficacy for anxiety and related depression that is comparable with conventional treatments. A follow-up study demonstrated 4-year stability of effects and distinguished the cognitive-behavioral learning strategy in mindfulness from those in CBT, desensitization, and hypnosis (Miller et al. 1995). Despite the limits of small sample size and lack of randomly selected comparison and control groups, the mindfulness studies further support the growing consensus that individual meditation practices are as effective in treating anxiety as conventional therapies and more effective than relaxation alone.

Social self-transcendence practices, such as self-analytic insight, loving-kindness, Hindu yoga (steps 1 and 2), Hindu devotional practices), Tibetan practices such as giving and taking or mind-training, and East Asian Buddhist practices such as Zazen, are suited to interpersonally sensitive individuals with social anxiety, low role-stress tolerance, and moderate affect tolerance and absorption capacity (Heide et al. 1980; Lesh 1970; Maupin 1965; J. Smith 1987; Tloczynski and Tantriella 1998). Studies have suggested that these practices are effective for adjustment to social stressors (Sasaki 1992; Tloczynski and Tantriella 1998); social anxiety (Fergusson and Gowan 1976; Maupin 1965); depressive disorders (Edwards 1997); the sequelae of physical and sexual abuse (Linehan 1993; Linehan and Shearin 1988); depressive, paranoid, and borderline personality styles (Linehan et al. 1992; Simpson et al. 1998; Sweet 1990); and relationship dependency (Linehan 1993; Sweet 1990). As adjuncts, social self-transcendence practices may work best in conjunction with object-relational (Finn 1992; Leone 1995), interpersonal (Newman 1994), and existential therapies (Aitken 1982; Edwards 1997; Lesh 1970; Welwood 1982); long-term treatment of physical or sexual abuse (Linehan 1993; Simp-

son et al. 1998); cognitive-behavioral skills groups (Linehan et al. 1979; Simpson et al. 1998; Sweet 1990); and family-marital therapies (Jain et al. 1985). The best-studied use of these practices is in the cognitive-behavioral treatment of borderline personality disorder. Linehan et al. (1979) distinguish the group skills training in dialectical behavior therapy (DBT) from conventional CBT with reference to Zen concepts of interdependence and Zazen meditation. Studies have shown DBT to be superior to conventional psychotherapy in reducing depression, self-injury, and rehospitalization in borderline personality disorder (Linehan and Shearin 1988; Linehan et al. 1991, 1992; Simpson et al. 1998).

Advanced process practices, including Hindu yoga (stages 5–8), kundalini yoga, siddha yoga, sahaja yoga, ananda marga tantric yoga, raja yoga (TM stage 3/TM-Sidhi), Kashmiri Shaivite tantra, Indo-Tibetan Buddhist anuttara yoga tantra, *mahamudra*, or *dzog chen*, may be best suited to high-intensity, low-control individuals with performance anxiety, high stress tolerance, high affect tolerance, and high capacities for expressed emotion, absorption, imagery-mediated mentation and sexual response (Choudhary 1985; Corby et al. 1978; Delmonte 1987; Fehr 1977; Gelderloos et al. 1990; Spanos et al. 1980). Preliminary studies suggest that these practices may be effective for dysthymia (W. Smith et al. 1995; Telles and Naveen 1997); performance anxiety (Fergusson and Gowan 1976); inhibited creativity (Fergusson 1993; Jedrczak et al. 1985); the sequelae of childhood neglect (Abramovitch 1995); bipolar disorder (Gackenbach 1992; Gellhorn and Kiely 1972); histrionic, narcissistic, and schizoid personality styles (Alexander et al. 1991; Gelderloos et al. 1990); and shame-based inhibitions to healthy sexuality and intimacy (Jedrczak et al. 1985; Shapiro and Walsh 1982). As adjuncts, process practices may work best with Kohutian, Jungian, and Reichian analysis (Gottschalk 1989; Jung 1978; Karawatt 1991; Kelly 1996; Spiegelman and Miyuki 1985), guided imagery (Karawatt 1991), psychodrama therapies, hypnotherapies (Marriott 1996), and sexual therapies (Gellhorn and Kiely 1972; Mandell 1979). Work adapting process vehicle techniques to clinical settings and problems has just begun (Katzenstein 1998). Given findings that mental imagery is effective for mood regulation (Kosslyn 1994) and that process techniques reduce seizure

activity (Deepak et al. 1994; Panjawani et al. 1996), one promising area for study is the use of process visualization practices in bipolar disorder.

There is a growing body of literature on how meditation affects alliance (Carrington 1984; Epstein 1995; Kennet et al. 1975; Kutz et al. 1985; Moleno 1998; Vigne 1991; Welwood 1982). Because many who use alternative methods assume physicians will be skeptical (Eisenberg et al. 1993; Winterholler et al. 1997), it is incumbent on clinicians to ask patients about alternative methods. We should learn enough to advise patients about the risks and benefits of alternative therapies and whether they complement conventional care. Growing consensus on the safety and general health benefits of meditation makes it reasonable for clinicians to support and monitor its use by most patients. When meditation seems to conflict with treatment, there is a sizable amount of literature in which clinicians familiar with meditative traditions explore areas of agreement and clash with psychotherapy (Bogart 1991; Claxton 1986; Epstein 1988, 1990, 1995; Gregoire 1990; Moleno 1998). The difference in approaches to alliance in meditative and psychotherapy traditions is more problematic (Cooper 1999; Kennet et al. 1975; Welwood 1982). Meditation ultimately involves self-reliance, but in practice, critical reliance on a teacher, expert guide, or mentor is considered the most effective means of progress, especially for the advanced meditator (Thurman 1984, 1998). The relationships in meditation practice are more tutorial in nature, resembling the empathic encounter favored by Jung, Ferenczi, Winnicott, and Kohut. Another distinctive feature of meditative alliance is the importance placed on the real relationship, especially on the student's responsibility for choosing a teacher who can model desired qualities. Although these features appear to burden the clinician, the relationship in meditative therapies is often more collegial than in conventional therapies, perhaps because vulnerability and responsibility are more shared (Santorelli 1999; Welwood 1982). The positive health bias of meditative therapies may heighten therapeutic optimism and challenge the alliance, but meditative traditions recognize the depth of resistance and base their optimism on depth-analytic methods and empathic skills that may help correct the pathologizing bias of dis-

ease-based conventional care (Cooper 1999; S. Shapiro et al. 1998).

The course and outcome of meditative therapies can vary widely depending on the individual, the objectives, and the practice involved (Engler 1984; D. Shapiro 1992; Walsh 1988). In contrast to clinical meditations, traditional meditations are viewed less as isolated techniques than as the deepest forms of life learning (Thurman 1984). This insight-oriented, long-term process approach resembles that in analytic therapies (Epstein 1995; Moleno 1998). Like psychotherapy, meditation can be practiced with very modest objectives, as in Indo-Tibetan medical traditions in which it is part of multicomponent lifestyle therapies (Loizzo and Blackhall 1998; Ornish et al. 1990). Even a short course of lifestyle therapy can have profound, lasting effects and better outcomes than conventional treatments (Kabat-Zinn 1982; Kabat-Zinn et al. 1985, 1987). Selective use of meditation techniques to complement conventional treatments is feasible provided that the multicomponent lifestyle approach is respected (Linehan 1993). Outcome studies suggest that meditation may have long-term trait-changing effects, not just as the result of repeated state change but also by the incorporation of meditative insights and skills into nonmeditative activities in daily life (Davidson and Goleman 1977; Kabat-Zinn et al. 1987). More than mere attentional alterations, meditative lifestyle therapies involve alterations in cognitive and affective problem solving combined with alternative behavioral strategies that foster an internally enriched learning environment (Loizzo 1998; Rubin 1985; Warrenburg and Pagano 1983).

Over the years, evidence has been mounting that meditation-based mind-body methods enhance health care satisfaction and have the potential to cut medical costs (Benson 1996). The consensus is reflected in the recent NIH initiative to fund mind-body medical centers. Of the many factors contributing to the effect of meditative therapies on health care, three are especially relevant to psychiatry. One factor is patient satisfaction with meditative therapies, thought to be related to increased self-control (Austin 1997; Dinardo and Raymond 1979; Kabat-Zinn et al. 1987; Pelletier 1997; Stek and Bass 1973). This results from the learning of concepts and skills that support a more active role in self-care and treatment (Snaith 1998). A second factor is a product of this enhanced self-regulation (Barbieri 1996). Studies showing that patients with chronic pain, anxiety, personality, and psychotic disorders need less psychotropic medications when they meditate suggest that meditative methods may be useful complements to psychopharmacology, especially in cases of resistance, toxicity or patient preference (Kabat-Zinn 1982; Kabat-Zinn et al. 1985; Miller et al. 1995; Shanahoff-Khalsa and Beckett 1996). Finally, meditative therapies can help fill the gap between clinical needs and fiscal constraints, because they supplement individual therapies with educational groups and self-care practices in an intensive lifestyle modality that helps clinicians do more with less, even in the face of the difficult problems posed by patients with chronic pain and BPD (Kabat-Zinn et al. 1987; Linehan 1993; Simpson et al. 1998; Urbanowski and Miller 1996).

How do meditative therapies compare with conventional psychotherapies? In the Indo-Tibetan synthesis, all three vehicles of meditative practice are viewed as part of a single developmental continuum of practice, whose three vehicles are likened to a family born of one mother (self-analytic insight) and three fathers (renunciative, empathic, and impassioned techniques) (Thurman 1998). This synthesis helps explain why Asian meditative practices have been compared with so many different therapies (Benson et al. 1978; Epstein 1995; Kabat-Zinn 1982; Linehan 1993; Snaith 1998). Here, I can only touch on basic resemblances and direct the reader to references for distinctions. Like cognitive therapies and desensitization, this tradition sees behavior as more or less ingrained habitual action, reinforced by conditioning and modifiable by learning (Kabat-Zinn et al. 1985; Mikulas 1981; Teasdale et al. 1995). Like classical analytic and dynamic therapies, it sees the learning process as limited by cognitive and affective resistances to insight, that is, self-deceptive defenses shaped by development and rooted in evolutionary egocentric instincts (Emavardhana and Tori 1997; Epstein 1988; Moleno 1998). Like object-relations and interpersonal therapies, it sees human nature as fundamentally social and locates development within a naturally constructive social field (Engler 1984; Finn 1992; Hayward 1998; Linehan 1993). Like focusing and autogenic therapy, it uses attentional alterations to enhance problem-solving and emotional self-regula-

tion (Snaith 1998). Like Jungian analysis and hypnotherapy, it uses imagery-mediated insight and attentional absorption to expose and reform self-object constructs (Karawatt 1991; Spiegelman and Miyuki 1994). Like Reichian analysis and sexual therapies, it uses sexual arousal and euphoria-mediated insight to disarm behavioral defenses and enhance mind-body openness (Kahn 1985). Although Asian meditative traditions will never be all things to all people, as some seem to suggest, one of their lasting contributions may be their mature integration of divergent therapeutic paradigms that are only gradually being reconciled in contemporary psychiatry.

Of course, the framework and guidelines developed in this chapter must be regarded as provisional, based as they are on preliminary data and findings from related fields. Yet the consensus on meditation is clearer and more evidence-based than on most complementary therapies, and the need for coherent clinical guidelines is pressing enough that some interpretative framework is warranted, however speculative and provisional. The long-term prescription is further research. Given the recent NIH initiative on mind-body medicine, the prospects are good for a more definitive framework and guidelines on meditative therapies. The comparative approach of this chapter accords with D. Shapiro's (1987) recommendation that meditation research be treated as a subset of psychotherapy research. However, it adds to his methodological reasons the mechanistic considerations and comparative learning model of meditation discussed above. This addition is not insignificant, because the model coordinates traditional learning models of meditation with new approaches to psychopathology and psychotherapy based on the neuroscience of stress, learning, and neural plasticity and on related concepts of allostasis and environmental enrichment. The model establishes linkages between the three phases of the stress response, three degrees of allostatic load, three levels of stress-induced psychopathology, three structural-functional mechanisms of enriched learning, three vehicles of meditative practice, and three main types of therapies. It is hoped that this model will stimulate research, serve as an educational aid, and offer provisional guidelines for clinicians facing a challenging yet exciting new field in psychiatry.

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