Optimizing Learning and Quality of Life throughout the Lifespan

A Global Framework for Research and Application

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This overview surveys the new optimism about the aging mind/brain, focusing on the potential for self-regulation practices to advance research in stress-protection and optimal health. It reviews recent findings and offers a research framework. The review links the age-related biology of stress and regeneration to the variability of mind/brain function found under a range of conditions from trauma to enrichment. The framework maps this variation along a biphasic continuum from atrophic dysfunction to peak performance. It adopts the concept of *allostatic load* as a measure of the wear-and-tear caused by stress, and *environmental enrichment* as a measure of the use-dependent enhancement caused by positive reinforcement. It frames the dissociation, aversive affect and stereotyped reactions linked with stress as cognitive, affective and behavioral forms of *allostatic drag*; and the association, positive affect, and creative responses in enrichment as forms of *allostatic lift*. It views the human mind/brain as a heterarchy of higher intelligence systems that shift between a conservative, egocentric mode heightening self-preservation and memory and a generative, altruistic mode heightening self-correction and learning. Cultural practices like meditation and psychotherapy work by teaching the self-regulation of shifts from the conservative to the generative mode. This involves a systems shift from *allostatic drag* to *allostatic lift*, minimizing wear-and-tear and optimizing plasticity and learning. For cultural practices to speed research and application, a universal typology is needed. This framework includes a typology aligning current brain models of stress and learning with traditional Indo-Tibetan models of meditative stress-cessation and learning enrichment.

Key words: **longevity; learning; mindfulness; meditation; imagery; psychotherapy**

Background and Significance

Of all aspects of aging, none seems more crucial to human quality of life than the preservation or decline of mental functioning. This paper explores the new optimism about the aging mind-brain, touching on several promising lines of research in stress-reduction, learning enrichment, and quality of life. Previous papers have reviewed the growing evidence that the rate and quality of aging is not genetically fixed but subject to wide-ranging variation due to environmental, psychophysical, and lifestyle factors.[1–3] This variability is most dramatically illustrated by two complementary lines of research: McEwen's work on the systemic effects of stress[4,5] and Pierpaoli's work on the biology of regeneration.[2,3,6,7] Not surprisingly, variability at the level of general physiology has been found to apply at the level of mental capacity, neural structure, and function by two parallel lines of research in neuroscience and neuropsychiatry: the work of Darnell and others on the corrosive effects of traumatic stress on mind and brain[8–10] and the work

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of Rosensweig and others on the environmental enrichment of neural plasticity and learning.[11–13]

Previous papers have drawn attention to the existence of cultural traditions and practices meant to protect the mind and body from stress, trauma, and illness and also to cultivate and replicate healing and rejuvenation. Crucial to the focus of this paper is the fact that the ultimate application of the technology of self-regulation in many such traditions is the preservation, rejuvenation, and extension of mental capacity through contemplative methods of reducing stress-reactivity and enriching plasticity (Skt. *praśrabdhi*) and learning (*adhiśiksā*). A growing body of findings from basic and clinical studies of various meditation techniques has given general support to traditional claims that contemplative practices help to self-regulate[14–16] and enhance mental functioning[17–19] in the cognitive,[20–22] affective,[23–25] and behavioral[26,27] domains.

My own work has been on the rigorous and systematic methods of self-regulation preserved in the Indian and Tibetan traditions.[28,29] While much of meditation research focuses on virtuouso practitioners, one of the great contributions of Indic traditions is the systematization and simplification of practices for public health and education.[25,30] Thus, my overview focuses on both basic research on virtuoso meditators as well as clinical research on methods of teaching novices and the general public. In this way, I hope it will help to not only clarify the optimizing mechanisms and effects of contemplative practices but also to show how contemplative lifestyles can be generally applied outside the lab or monastery, in mainstream clinical, educational, and occupational contexts.

Research and Theoretical Framework

One way to summarize this brief overview is to say that recent physiological and neuropsychiatric research has given us a picture of the relationship between aging and mental capacity far more complex and variable than any we previously had. The picture is more complex because it challenges the conventional wisdom that aging and mental decline are inexorably linked in a simple, linear progression, varying only in rate not overall curve or direction.[1,31,32] It is more variable because current research shows that external and internal factors may yield wide variations from psychoneural decline to enrichment,[33,34] and because it also shows that such variation is possible in both synchronic and diachronic dimensions.[3,7,35] So any comprehensive attempt to study or explain the relationship between mind/brain capacity and aging must seek a broad integration of a variety of research and theoretical perspectives. Also, given the cross-cultural scope of this paper, we have a further burden in that any rigorous attempt to link current scientific research with Asian or Western contemplative practices that may advance basic science and clinical application requires a more or less coherent translation between widely divergent cultural paradigms of valid knowledge and method.

Over the years, I have developed a multidisciplinary, cross-cultural framework for research and teaching in this challenging area.[29] This global framework assumes McEwen's model of allostatic load as a measure of the wear-and-tear caused by consistent aversive stimulation and stress hormone exposure.[1,4] Following McEwen, it applies that model to explain findings of cortical atrophy, decreased neurogenesis, and declining function in mental disorders from trauma to depression as failures in adaptation to environmental challenges.[8–10,36] At the opposite end of the spectrum, the framework assumes Rosensweig's model of environmental enrichment as a measure of the use-dependent increase in mind/brain function caused by consistent positive reinforcement and exposure to growth factors like melatonin.[11,37,38] It then applies that model to explain findings of cortical enlargement, increased neurogenesis and enhanced function in social learning contexts as

successes in adaptation to environmental challenges.[13,20,39,40] The framework links the two models by hypothesizing that they are limiting cases in a synchronic spectrum of mind/brain functioning that ranges in a biphasic continuum from the worst case of traumatic stress-reactivity to the best case of optimal learning and creativity.[7,41–43]

While these models describe a range of neurophysiology, they naturally line up with models that describe the spectrum from traumatic to optimal mental functioning in terms of a corresponding range in neuropsychology. Traumatic functioning has been linked with patterns of cognitive dissociation, aversive affect, and stereotyped behavior.[4,44] Since such patterns are not just the effects of aversive conditioning but also causative factors in the stabilization and reinforcement of stress-reactive maladaptation, they figure in the framework as cognitive, affective, and behavioral forms of *allostatic resistance* or *drag*. An extreme model of this mode of reactive neuropsychology is the short-circuiting of cortical processing by amygdalar startle circuits under conditions of experienced threat.[45] A less complete dissociation, between verbal and non-verbal cortex, positive and negative affect, is normal in the ordinary waking state under perceived stress.[46–48] Both forms of processing offer models of how stress-reactive mental functioning defaults to a relatively impoverished mode of automatic information processing with decreased attention and learning. The opposite, enriched mode of neuropsychological functioning is linked with enlarged working memory, enhanced cognitive association, positive affect, and behavioral spontaneity and creativity.[40,42,49] Since such patterns are not just the effect of positive conditioning but also causative factors in stabilizing and reinforcing optimal adaptation, they figure in the framework as cognitive, affective, and behavioral forms of *allostatic facilitation* or *lift*. One research model of this neuropsychological mode is virtuoso musical processing, in which normally dissociated verbal and non-verbal modules are linked in a network that gives musicians greater attention, recognition, appreciation, and mastery of musical processing.[50] Here again, the framework hypothesizes that these two models represent limiting cases in a biphasic continuum of neuropsychological function, from stress-reactivity to optimal creativity. An insight common to modern observers as early as Freud and to ancients as far back as Empedocles and Shakyamuni is that the stress-reactive and enriched growth modes of mind/body function seem to be reciprocally inhibitory.[29,51–54]

In the dimension of comparative biology, this insight has prompted modern and ancient observers to place their binary frameworks of stress or enrichment in the context of an evolutionary view of human life.[53,55] Since the human brain evolved as a hybrid of three successive mind/brains which take turns driving the overall system, in stress or trauma higher systems default to a primitive survival mode of worst-case projection, defensive emotion, and fight-flight reflexes run by the reptilian brain's stress response.[52,56] This primitive response appears to have been preserved as a conservative mode to protect mammals from predators in the wild.[57]

In contrast, the evolution of self-regulation is based on a complementary growth-and-reproductive mode of reptilian brain function and involves the mammalian synergy between enlarged cortex, enhanced social learning, and greater safety and abundance through cooperation. It reflects an enriched, abundance mode based in the biology of sex and inhibiting the stress-based survival mode.[53,56] This mode enhances fertility, nurturance, empathy, and social learning, capitalizing on windows for reproduction, childrearing, and social learning.[58] It fosters an outlook of open curiosity; an emotional style of trusting self-disclosure and behavioral style of conscious mind/body sensitivity, in which higher mind/brain functioning is generally optimized.[56]

The ability to switch from survival to abundance mode likely grew more crucial for humans as isolated periods of abundance gave

way to stable agrarian surpluses and civilization. Religious disciplines like contemplation appear to work by cultivating a natural, mammalian capacity to disarm worst case defenses and reset the mind/brain for optimal social living and learning.[42,49,59] Consistent with this hypothesis, meditative and therapeutic techniques like mindfulness, free-association, and hypnosis share brain features like greater functional coherence, more lateral cortical balance, better vertical integration of neural systems, and conscious regulation of unconscious processes.[29,47,60–62]

According to this framework, then, the human mind/brain combines three heterarchical systems of higher intelligence, each of which works in one of two systems modes: a conservative, egocentric mode heightening self-preservation and memory; and a generative, altruistic mode heightening self-correction and learning.[40,51,56,63] Cultural practices like meditation and psychotherapy work in part by teaching the self-regulation of shifts in state of consciousness from the former, reactive mode to the latter, generative mode.[49,53,61,64] This change in mind/body state supports a more or less gradual and consistent transition from allostatic drag to allostatic lift, reducing wear-and-tear and enhancing optimization.

Practical Typology and Framework

While these general models and theories of optimizing mind/brain function must remain tentative and will no doubt need modification in light of future research, they provide at least a working basis for another piece of the puzzle. A rate-limiting step for the extension of research to humans and the application of findings to clinical challenges is incorporating within this global framework a systematic, universal typology of cultural practices that permits their rigorous study and skillful application.

This procedural or clinical dimension of the framework maps optimization practices along a biphasic continuum starting with practices that reduce allostatic drag and culminating in those that promote allostatic lift. Clinical practices meant to help overcome blocks to optimal allostasis include stress-reduction and conventional dynamic and cognitive therapies.[29,65] Meditative techniques meant to do so include low arousal practices like mindfulness meditation, TM, and Hatha yoga.[16,23,66–68] One model for these practices is Delmonte's paradigm that free-association and mindfulness help heal traumatic stress reactivity by reducing cortical dissociation, hence facilitating the analysis of traumatic memories and affect preferentially stored in the non-verbal cortex.[47] Clinical practices meant to enhance positive factors of optimal allostasis include alternative psychotherapies like existential, interpersonal, and hypnotic therapies, as well as unconventional forms of psychoanalysis.[29] Meditative techniques intended to do so include complex low arousal practices like Zazen and high arousal practices like Tibetan *gTum-mo*.[26,69–71] One research model for these practices is the self-regulation of euphoric arousal in practitioners of *gTum-mo* meditation, and Sahaja and Kundalini yoga.[29,70,72,73]

Based on these assumptions, the global framework includes a comprehensive typology of optimization practices that dovetails with current brain-based models of stress-reactivity and learning as well as with traditional Indo-Tibetan models of meditative stress-reduction and learning enrichment.[29] Informed by comparative evolutionary models of neural structure and function, the brain-based typology classes optimization practices according to whether they reduce stress-reactivity/enhance learning at the neocortical, limbic, or core brain level. These are categorized as practices that optimize personal cognitive style, social emotional style, and natural behavioral style, respectively. Indic meditative typologies also assume a triune model of neural structure and function and class optimization techniques according to whether they overcome obstructions and enhance mental functioning at the

level of individual, social, and instinctive behavior (Table 1). In the Indo-Tibetan Buddhist tradition, they are viewed as belonging to three vehicles of contemplative life I call the personal, social, and process vehicles (skt. *hinayana, mahayana, vajrayana*). These vehicles are conceived as progressive phases of a continuous path of self-regulation and optimal human development that begins with psychopathology, moves through "normal" distress, and culminates in an optimal mind/body state described as perfect, complete awakening (*samyaksambuddhatva*), unobstructed omniscience (*anavāranasarvajñātā*), and/or unexcelled integration (*anuttara-yuganaddha*).[74]

Consistent with the consensus of current health psychology and cognitive neuroscience,[4,5,75] personal contemplative practices aim at overriding the self-referential, worst-case cognitive style that characterizes stress-reactive thinking, and at cultivating a self-critical, open-minded style that supports objectivity and reality-testing. Examples are practices such as mindfulness, transcendental meditation (stages 1–2), and Hatha yoga (Patañjali stages 1–4). As with free-association and mindfulness-based cognitive therapy, the putative mechanism is to override stress-reactive dissociation of verbal processing and to equalize and enhance attention to both verbal and non-verbal processing, supporting the self-regulation and optimization of neocortical-thalamic learning systems of recognition and encoding. Research paradigms here include the findings of alpha coherence,[76,77] increased cerebral blood flow,[78] increased dopamine, melatonin and GABA,[79–81] increased neocortex,[39] balanced cortical dominance,[82] heightened attention and enhanced perceptual discrimination and problem-solving in mindfulness,[18,25] TM (1–2),[83–85] and Hatha yoga.[86]

Consistent with current health psychology and affective neuroscience,[43] social contemplative practices aim at overriding the traumatic perceptual-emotional style that characterizes social stress-reactivity, and at cultivating a more trusting, sociable style that supports empathy

TABLE 1. Comparative psychoneural map of stress-reduction and learning enrichment

Practice phase	Neural level	Mental level	Blocks (drag)	Aids (lift)	Motive/Intent	Arousal/ Attention	Skill level	Insight level
Personal care	Coarse/Cortical	Waking/Fantasy	Traumatic cognition	Focus/Refocus	Relief/Release	Low/Inclusive	Reflection/ Mindfulness	Analytic/Gestalt
Social concern	Subtle/Limbic	Daydream/Dream	Traumatic affect	Discipline calm	Care/Concern	Low/Exclusive	Alertness/Effort	Imaginal/Visceral
Process integrity	Subtlest/Core	Orgasm/Sleep	Stress instincts	Mastery/Flow	Joy/Mastery	High/Integral	Devotion/Flow	Euphoric/Ecstatic

and collaboration.[40,49] Examples are practices such as insight-empathy meditation (Skt. *vipaśyana,* Pali *vipassana*), loving kindness (Pali *metta*), mind-clearing (Tib. *blo-byong*), Zazen, TM stage 3, Hindu Vedanta and Bhakti yoga (Patañjali stages 5–6). As with interpersonal and dialectical behavior therapy, the putative mechanism is to override posttraumatic reactivity in frontolimbic processing and to equalize and enhance attention to negative and positive emotional processing, supporting the self-regulation and optimization of frontolimbic-hypothalamic learning systems of registration and motivation. Research paradigms include findings of high frequency theta trains,[69,88,87] increased dopamine,[79] enhanced lateral integration of limbic processing,[62,89] increased growth of dorsolateral prefrontal cortex in contemplative insight-compassion meditators,[20,39] as well as the long-term prosocial change in personality style in euphoric TLE.[90–96]

Consistent with current health psychology and behavioral neuroscience,[4,33] natural contemplative practices aim at overriding the fight-flight response style that characterizes behavioral stress-reactivity, and at cultivating a disarming, love-growth response style that supports nurturance and creativity.[40,49] Examples are practices such as optimal integral process (Skt. *anuttarayogatantra*), kindling (Skt. *candalī* Tib. *gtum-mo*), TM Siddhi (stage 4–5), Ananda Marga, Sahaja yoga, Kundalini yoga (Patañjali stages 7–8) and Qi-gong. As with imagery therapies and visualization-and-breath-based self-healing,[30] the putative mechanism is to override the instinctive stress reactivity of the core brain and to enhance attentional control of fight-flight and love-growth responses, supporting self-regulation and optimization of extrapyramidal-basal ganglia learning systems, i.e. rehearsal and commitment. Research findings include fast beta or gamma frequencies in the EEG,[21,76,97] increases in endorphins,[98] dopamine,[79] arginine vasopressin,[99] melatonin,[81] and DHEA,[100] decreased cytokines,[101] a paradoxical pattern of high CNS arousal and deep muscular relaxation similar to REM sleep and sexual response,[26,70,102,103] a "heart-brain prep" pattern of centrally shunted blood flow and slowed metabolism[72,104–107] resembling that of hibernating, estivating, and diving mammals.[108–111]

In terms of application, this typology of cultural practices for stress-reduction and optimal learning assumes a cross-cultural comparison of the therapeutic philosophy and methods of Indo-Tibetan meditation with those of Western psychotherapy.[29] Although psychotherapy is a practice of modern medicine, it involves aims and methods that make it closer in many ways to ancient contemplative science and healing arts than to modern physical science and technological medicine. In particular, psychotherapy aims at helping people understand and control their own minds and lives from within, rather than at mastering the outer physical world; and it uses an intersubjective method of dialogue in a shared, altered state to gather information, reduce blocks to insight, and enhance healthy learning. Of course, this cross-cultural comparison challenges the preconception that practices linked with an ancient spiritual tradition like Buddhism cannot possibly be comparable with practices in our modern scientific tradition. While I have addressed this complex issue elsewhere,[28] it must suffice to point out the Freud and Jung both saw modern psychotherapy as reviving ancient arts of healing dialogue and mentoring pedagogy, while the ancient Buddhist tradition developed similar arts continuously into the modern era and preserved them to the present day. Rather than being appropriated by any single religion, in India contemplation was systematized and refined as part of qualitative science of mind, body, and healing used by all religious traditions as well as the scientific and medical counter-traditions of Buddhism, Jainism, and Indian materialism. For the purposes of research and application, a provisional typology comparing Indo-Tibetan meditation and Western psychotherapy can be extended to include the wider range of mind/body

practices across diverse times and cultures (Table 2).

Of course, such a wide range of cultural practices of self-regulation can only be mapped in the knowledge that the very effort raises methodological questions. Firstly, such a mapping runs the risk of reducing cultural practices to biology or blurring crucial cultural distinctions. To reduce this risk, it is key to compare the *common human mind/body methods* those practices employ while respecting the *culturally specific aims and uses* determining why and how they are employed. Secondly, such mapping could be mistaken to mean that the actual or potential usage of the cultural practices mapped in certain domains is *limited* to the place assigned them. However, it is more reasonable to assume that every cultural tradition includes a wide range of practices that in one way or another spans the full spectrum of stress-cessation and learning enrichment, although one or more techniques may be more highly systematized or used, prompting a specific mapping. Thirdly, the categories and stages delineated are necessarily arbitrary and conventional, defining a set of "ideal types" where there is only a continuum of human family resemblances. While categories and stages within various traditions have been observed wherever possible, any attempt at global mapping must inevitably omit many traditions and strain the categories of those it includes. The very idea of comparing self-regulation practices, Eastern and Western, religious and scientific, presupposes the general belief that the family resemblance linking human minds and nervous systems is greater than that linking the cultural forms of life they support. Finally, we must remember that this typology is speculative and tentative, and must be corrected by future scientific and scholarly research, if it is to be truly useful. Careful scholarly comparison and distinction of mind/body practices must be cross-referenced with similarities and differences found in relevant psychometric and biometric indices of correlated mental states, neural mechanisms, and health effects.

TABLE 2. Provisional comparative map of cultural practices of self-regulation

Cultural traditions:	Western religious	Western behavioral	Western analytic	Indo-Tibetan Buddhist	Indian Vedist	Eastern religious
Individual practices:	Theistic worship	Relaxation techniques	Supportive therapy	Basic mindfulness	Hatha yoga	Ancestor worship
	Centering prayer	Autogenic training	Ego psychology	Basic quiescence	TM stage 1,4	Basic Taoism T'ai Chi
	Pastoral counseling	Cognitive therapy	Classical analysis	Basic insight	Basic Vedanta	Theravada/Basic Ch'an-Zen
Social practices:	Mission/Ministry	Family therapy	Object relations	Giving and taking	Yoga stage 1–2	Yogacara/Pure Land
	Group Pilgrimage/ Contemplation	Dialectical therapy	Interpersonal	Mind training	Bhakti Seva	HuaYen/Neo-Confucianism
	Communal meditation	Couples and parenting	Existential therapy	Insight and quiescence	Advaita Vedanta	Madhyamika/T'ien t'ai
Process practices:	Greek/SufiHeart prayer	Hypnotherapy	Self-psychology	Kriya/Carya tantra	Yoga stage 5	Advanced Ch'an/Zen
	Kabalah/Theophany	Guided imagery	Jungian analysis	Yoga/Highest Yoga Tantra 1	TM 3/Yoga 6	Esoteric T'ien T'ai 1
	Hermetic/Alchemy	Sex therapy	Riechian analysis	Highest Yoga Tantra 2a	Kundalini yoga 7	Taoist yoga and alchemy
	Mystic communion	Intimacy work	Lacanian analysis	Highest Yoga Tantra 2b	Sahaja/Yoga 8	Esoteric T'ien T'ai 2

Future Prospects for Research and Application

Given the interest all humans have in aging slowly and well, and given the primary role mental capacity plays in quality of life, the importance of the topics addressed in this paper should be clear to all. Also clear from even a cursory review of the field is that this is a very exciting time for longevity research, when pessimistic assumptions are being challenged by very encouraging findings in many areas. As if current research were not promising enough, this overview draws attention to the exciting possibility that a rapidly advancing new science may be even further accelerated by contact with a time-tested non-Western scientific tradition of promoting longevity and optimization. The very fact that this may be true raises a number of complex issues of methodology that prudence requires us to address, however inadequately. Since these complex issues have been more fully explored elsewhere,[112] here it must suffice to say that the distance in theories and methods between Western mind science and Indo-Tibetan meditative science is not much greater than that between modern physical disciplines like neuroscience and modern intersubjective disciplines like hypnosis and psychotherapy.[28,29,62,65] The framework presented here builds on that proximity, building an interdisciplinary, cross-cultural bridge between meditation research and current research in hypnosis and psychotherapy. This bridge offers researchers and clinicians easy access to time-tested and comprehensive scientific traditions of mind/body theory and practice meant to optimize longevity and mental capacity. I believe this easy access has enormous potential for speeding the work of basic research and clinical application.[19,74,85]

On the basic science side, a cohort of systematically trained virtuoso subjects promises to facilitate human studies of the mechanism and scope of self-regulation of aging and mental capacity. On the clinical side, a comprehensive array of traditional methods for teaching contemplative insights and practices for longevity and optimal mental function to experts and the general public raises the possibility of more effective, reproducible interventions in complementary medicine,[28–30] mind/body medicine,[113–115] public health,[92] and education.[116] In particular, the Tibetan tradition is unique in preserving what may be the world's most rigorous and comprehensive systems for optimizing mental functioning as well as quality of living, aging, and dying.[117] Most intriguing is the fact that these systems include ways of teaching a variety of individuals of different inclinations and temperaments a variety of methods suited to a variety of sustainable lifestyles.[29,74] Critical to advancing this work is the availability of a global framework helping to coordinate the efforts of basic and clinical researchers in a wide range of fields with virtuoso practitioners and scholars, clinicians, and interventionists.

Beyond complementary medicine, another key area of where a global, systematic approach to research and application is needed is in the workplace. Understanding and replicating the optimization of mental function under stress would have obvious benefits for workers and businesses caught in the structural tension between ever-rising expectations and ever-mounting demands. Intersecting with optimizing health and well-being, optimizing mental functioning at work has cognitive, affective and behavioral dimensions and involves the whole range from stress-protection to enrichment of mental function. The limitations of disease-management programs and personal coaching have become clear in recent research and appear to overlap with those of conventional medicine and psychotherapy. A more radical, complex, and complete approach to the rate-limiting internal variables blocking allostasis and optimal functioning promises to have greater impact on presenteesim, stress-hardiness, motivation, and productivity, commensurate with that seen in meditative approaches to health. A whole new avenue of human studies is indicated here, and is

something we are pursing at Cornell, together with the Global Leadership Association.

Finally, perhaps the most obvious application of research on optimization relates to education. In almost all areas of American education, the philosophy and direction of change is not just uninformed by current science but at odds with it. The trend towards uniform standards, standardized testing, and narrowing of academic aims and methods flies in the face of recent findings on the genetic and acquired variability in learning, the detriments of stress and the benefits of positive affect, and the sensitivity of learning to social and cultural environment. Here too the existence of time-tested Indic traditions of contemplative learning, as preserved in Tibetan Buddhist monastic colleges, offers an invaluable paradigm for bringing Western education more in line with the contemporary science on learning, including optimization.[22,116,118,119] As the most fully elaborated and preserved form of the ancient Buddhist academic tradition, the Tibetan curriculum offers a time-capsule of the classical world's most optimization-friendly approach to universal education.[54,74]

In sum, contemporary research on aging holds out real promise for the preservation and optimization of mental function throughout the lifespan. Equally compelling, the growing collaboration between Western and Indo-Tibetan mind science shows real promise for the acceleration of advancement in this area of vital importance to us all.

Conflicts of Interest

The author declares no conflicts of interest.

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