



NIMHANS Integrated Centre for Yoga

National Institute for Mental Health & Neurosciences, Bengaluru-29

SAMATVAMI

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ISCAEM 2015 and visit of His Holiness the Dalai Lama

His Holiness the 14th Dalai Lama visited the Institute on 7th December 2015 on the invitation of NIMHANS. On this occasion, a symposium was conducted on “Integrating Contemplative and Scientific Approaches to Explore the Mind” on December 6, 2015 at NIMHANS, which was co-organized with the Garden of Samadhi Mind Centre, Bengaluru. The symposium was inaugurated by Dr. Satish Chandra, Director NIMHANS, in the presence of Dr. H. R. Nagendra, Dr. B. N. Gangadhar, and Dr. Alok Sarin. The speakers and discussants were eminent scientists and senior professors in the field of psychiatry, neuroscience, buddhist meditation and yoga, such as Dr. H. R. Nagendra, Dr. Vinod D. Deshmukh, Dr. A. K. Mukhopadhyay, Dr. C. R. Mukundan, Dr. Sisir Roy, Dr. Kiran Rao, Dr. Alex Hankey, Ven. Dhamma Jyoti, Dr. Eve Ekman, and Ven. Bikhu Tenzin Namdak. Among the topics covered during different sessions were: Mind the tool for getting at truth-The yoga perspective; Concept of mind in Theravada Abhidhamma Tradition; Preconscious mind and mindful presence; Inward Olympics with puzzle of consciousness; and Enhancing empathy to reduce stress and foster meaning - A case study and conceptual model. Enthusiastic demand from faculty,

research scholars and students of various streams led to a total of 133 delegates instead of the proposed 100. Delegates got ample time and space for interacting with the luminaries of their fields and found it fruitful. A Valedictory and feedback session was moderated by representatives from NIMHANS as well as Garden of Samadhi Mind Centre. The proceedings of the symposium were handed over to his Holiness the Dalai Lama on the 7th of December, and are being brought out in the form of a book shortly.

On 7th December 2015, His Holiness the 14th Dalai Lama addressed a large audience of faculty, staff and students at the NIMHANS Convention Centre and interacted with the audience for nearly 2 hours. During the session, he emphasized the importance of scientific validation of faith-based practices and the need for fostering compassion. His Holiness also unveiled the foundation stone for the NIMHANS Integrated Centre for Yoga and underlined the need for scientific research into yoga-based practices.



Inauguration for ISCAEM 2015



His Holiness the Dalai Lama



Foundation Plaque

EDITORIAL: *Meditation and Neuroscience*



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In this age of science traditional knowledge plays second fiddle in an orchestra dominated by hard science with the conductor wielding the baton of empirical evidence. For benefits of meditation to be accepted, their empirical validation is a sine qua non requirement. Hence, the fundamental value of neuroscientific investigations of meditation practices. They are absolutely necessary to establish the practical relevance of such disciplines to society today.

First studies of Yoga practices were carried out at Kaivalyadhama, while the earliest widely published results were on Zen meditation in the 1960s. In the west, studies at UCLA and Harvard found a simple technique to induce powerful physiological and psycho-physiological changes. However, they were followed by a disastrous attempt to emulate eastern systems by combining instructions from east and west under the erroneous assumption that a single ‘relaxation response’ must be responsible for all changes. In reality, the brain is so complex that variety of response is the hallmark of its behaviour when faced by different kinds of meditation technique.

Today, neuroscience and especially EEG are used as conductor’s baton for directing scientific investigations. Different techniques produce different effects, as expected. For investigations of a particular technique to be reproducible from subject to subject, precise methods of instruction are crucial. Under such an umbrella, three general classes of meditation have been recognized: ‘Open Monitoring’, ‘Focused Attention’, and ‘Self-Transcending’. In the first, the mind is held alert to psychophysiological activity and various reactions are prescribed and prohibited. In the second, a focus is given, and required to be maintained throughout. Only the third class, ‘Self-Transcending’, conforms to *Patanjali*’s prescription of introducing a focus that inherently guides the mind into *Samadhi*, the universally recognized state of peace. Specific instructions in open monitoring and focused attention may prevent this happening, as in the mistakenly named ‘relaxation response’. Such techniques do not lead to *Samadhi*, and do not conform to *Patanjali*’s concept of *dhyana*.

Probably the best evidence for the state of peace is that when highly experienced subjects claim to have been in the state, coherence over 0.99 is observed between all pairs of leads in all EEG wavebands, so that the information content of the ‘coherence matrix’ is zero. The *Mandukhya Upanishad* identifies this state as a fourth state of consciousness, *Chaturtham*, (or *Turiya*) pure consciousness, underlying the usual three states, waking, dreaming and deep sleep. Modern neuroscience, however, observes that EEG signatures of stages of deep sleep are equally different from each other, so cannot accept the number ‘4’. Further investigation is required to resolve this important question.

One result remains clear: Long term practice of any technique seems to guide the brain’s function into a habitual pattern corresponding to short term changes produced by initial practice. Buddhist ‘compassion’ techniques result in long-term stabilisation of capacities for compassion. Similar results come from long-term practice of *Samyama*, as prescribed in *Patanjali’s Yoga Sutras, Pada III*, possibly more varied and requiring less time. Lowering of blood pressure over periods of 3 to 6 months observed in self-transcending systems of meditation stabilize over the long term, reducing CVD hospitalization costs by 85%. The neuroscience of long-term practice may best be understood in terms of effects of short-term practice amplified by neuroplasticity

Several facts remain clear: complexity of the brain and its patterns of response require investigation of all kinds of meditation for their potential benefits and for possible special preferred areas of application; traditional techniques have long-term benefits requiring documentation over long periods of time; for health benefits, Framingham type studies are called for.

In conclusion, systematic investigation of meditation of all forms is required, especially those taught in India, quite apart from artificial western attempts at imitation such as the relaxation response. Further subdivisions of the three categories of open monitoring, focused attention and self-transcending may be discovered. Equally, new, as yet unclassified forms may be identified. Neuroscientific means of monitoring must extend beyond short term effects over a few weeks and months. Full evaluation of spiritual benefits should include long-term investigations over years and even decades. The aim of such

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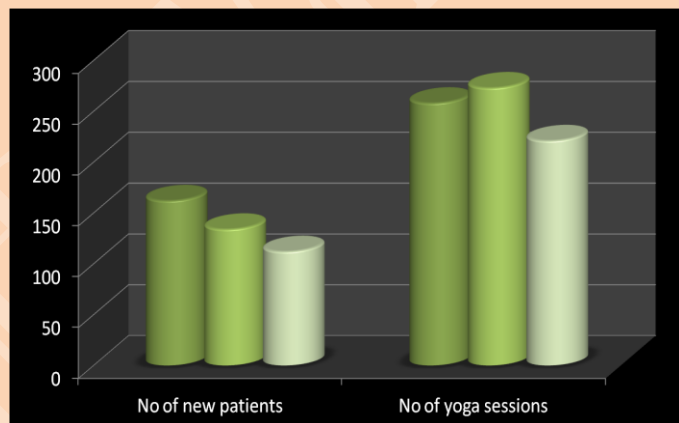
‘Open Monitoring’,
‘Focused Attention’,
‘Self-Transcending’

long-term studies must include assessment of development of higher levels of neurological functioning, and even ‘higher states of consciousness’, their neuroscientific basis and benefits.

From the health perspective, protection against all forms of disease is highly desirable, particularly against various forms of CVD; also the power to provide peace of mind in old age, when anxiety and neurosis set in, and associated poor quality of sleep. A vast program of research is required, including multi-centric studies and comparisons. Potential benefits are so great for both individual and society, and of such wide applicability, that the highest levels of funding are justified. May all in the *Yoga* community join hands in this great symphony!

Yoga therapy for Psychiatric & Neurological Disorders

NIMHANS Integrated Centre for Yoga offers yoga therapy for inpatient as well as outpatients. In the month of September 2015, yoga services were availed by 162 patients, and a total of 258 sessions were held during the month. The number of new patients referred for yoga in month of October



and November were 134 and 112 respectively, and the number of yoga sessions in these months was 273 and 221. Referrals were from all clinical departments, and these patients had diagnoses including schizophrenia or other psychotic disorders, depression, anxiety disorders, obsessive compulsive disorder, dementia, bipolar disorder, muscular dystrophy, psychogenic motor disorder, seizure disorder, learning disability, adjustment disorders and substance use disorders.

	September	October	November
No of new patients	162	134	112
No of yoga sessions	258	273	221

INVITED ARTICLE

***Samatvam*: A Homeodynamic Equilibrium**



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Samatvam is homeodynamic equilibrium, also known in neurobiology as homeostasis or homeokinetics. It is an intrinsic and fundamental property of living systems to continuously change and at the same time remain about the same as a holistic, self-organizing and open system. In all living organisms, homeodynamics is essential at multiple levels of organization including cellular, tissue, organ, organism, super-organism and ecosystem. It also applies to our consciousness, cognitive, emotional, and intentional levels.

Consciousness is a living, organismic process. It is a systems level process and an *information-processing* and *management* property of all *life*. Brain is the organ of experience and behavior. Conscious experience is a synthesis of three aspects: the observed world, the observable mental activity, and the essential self-awareness. It is the *existential* aspect of our *holistic energy-awareness-being*. It is the mysterious wonder within all of us.

In clinical neurology [1], *consciousness* is defined as a set of neural processes that allow an individual to perceive, comprehend and act, on the internal and external environments. It has three functional aspects, arousal, awareness, and attention. Consciousness is viewed as a self-generating and self-organizing process from a *Biosystems perspective*.

Conscious arousal is the degree to which an individual is awake and able to interact with the environment. Conscious arousal requires the interplay, between the midbrain reticular activating system (RAS) and the cerebral hemispheres. Like a pilot flame, the RAS is spontaneously and continuously active in all human beings. It is like the powerhouse and central processing unit of the nervous system. Without it, a conscious life is not possible.

Conscious awareness implies that the individual is not only alert but also cognizant of self and surroundings. Awareness is global and modality-nonspecific property. Awareness depends on arousal. The neuronal mechanisms required for conscious awareness are the RAS, the nonspecific thalamic nuclei and their neocortical connections.

Conscious attention implies the ability to respond to an object or an event by directing energy-aware-being. It includes alerting, orienting and executing. Attention directed to a particular part of the experienced field requires a well-functioning reticulo-thalamo-cortical network with a sense of self-agency and ownership.

Preconscious is defined as the level of the psyche that contains thoughts, feelings, and impulses, not presently in awareness, but which can be more or less readily called into consciousness. Preconscious thinking has sometimes been cited to explain apparently subconscious, intuitive thought processes, as well as certain kinds of creative leaps and insights.



Datta further explained the concept of *preconscious mind*. “Gamma waves are high frequency neural oscillations in the range of 30–100 Hz, on average about 40 Hz. These waves have been implicated in creating the unity of conscious perception or binding, and are related to awareness, problem solving, and rapid eye movement (REM) sleep [2].

When a voluntary action is causally linked with a sensory outcome, the action and its consequent effect are perceived as being close together in time. This effect is called *intentional binding*. In such intentional, preconscious activity, the *readiness potential* might play an important role. It occurs in the fronto-central area before voluntary action [3].

Preconscious awareness is preattentive. It works in parallel with conscious processing. It has an unlimited capacity for cognition, problem-solving and creativity. It is nonspecific, non-sequential, non-interactive, presymbolic and prepersonal. It is the global matrix of all conscious mental processing. The difference between the above psychoanalytic description of preconscious process and the meditative experience of mindfulness is that it is founded on the reality principle and not on pleasure principle. There is no fantasy, dreaming or conditional pleasure in meditation. There is an unconditional, natural bliss and love in the meditative whole-hearted presence.

When the preconscious mind is empty and clear of cognitive contents, it is described as *Shunyata*, and when it is holistic and all-inclusive, it is described as *Poornata*. Meditation can be all-exclusive or all-inclusive. In the all-exclusive mode, there are no contents or thoughts

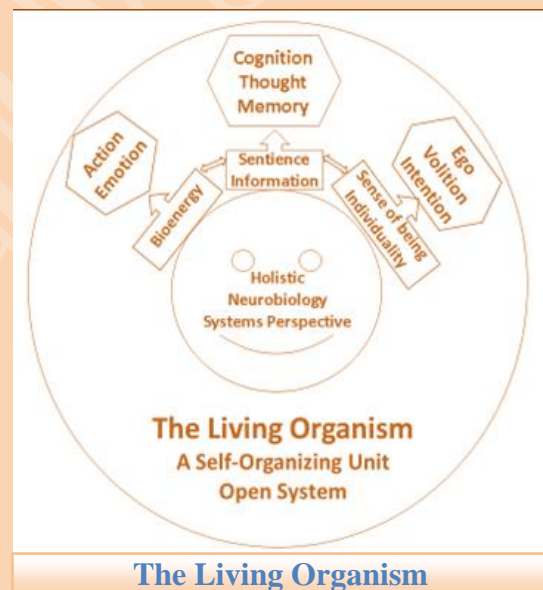
in awareness. It has been described as *Sunyata*, the great emptiness or what I have called the unique, experience of no-experience. It is known that there are no thoughts in present awareness, just as one can observe that one did not have any dream during deep sleep. This may happen during formal sitting meditation like Zazen, with absolute stillness, serenity and selfless love.

In the all-inclusive mode, there is a feeling of full participation in the present reality – a sense of existential oneness or experiential unity. Nothing is excluded from it. It has been described as *Purnata*, a fullness of conscious being and perfect mindful presence. It may happen spontaneously during inspiring moments like peak experiences, dynamic meditation, artistic creations, sports or simple events like a leisurely walk in nature. Some of the unique states have been described as flow states [4].

Human attention functions in matrix and vector modes. Mesulam [5] explains these two mods. “A matrix function regulates the overall information-processing capacity, detection efficiency, focusing power, vigilance level, resistance to interference, and signal-to-noise ratio. This aspect is clearly related to the concept of tonic attention and is generally associated with neural mechanism in the RAS. A vector function regulates the direction and target of attention in one of the modalities e.g., visceral, environmental, memory, semantic, and so forth. This aspect of attention is akin to selective attention and is generally associated with the neocortex.”

The process of cognitive pause-and-upload (CPU) involves pausing and disengaging vector-attention and unloading or letting go the cognitive contents from awareness and working memory [6]. One remains intrinsically aware and receptive to the present reality in the ground-mode of energy-awareness-being. The creative process typically has four phases: a) preparation, b) incubation, c) illumination and d) verification. The CPU deepens and enhances the incubation period, which then refreshes the recent contents of working memory. This may result in the dawn of a new idea, a word, an image, a novel design, an innovative solution, an inspired poem, or a deeper self-understanding with insight and wisdom.

Brain is an organ of experience and behavior. Experiential information is obtained through five sensory pathways. There are two additional modes of perception, namely, proprioception



and interoception. By *proprioception*, one monitors the position of one's body and limbs in space-time, whereas, by *interoception*, one monitors the physiological state of one's organism. What is important in mindful presence is not the object attended to, but the process of *attending* itself. One can learn to be self-aware and hold a holistic view of Life. [7]

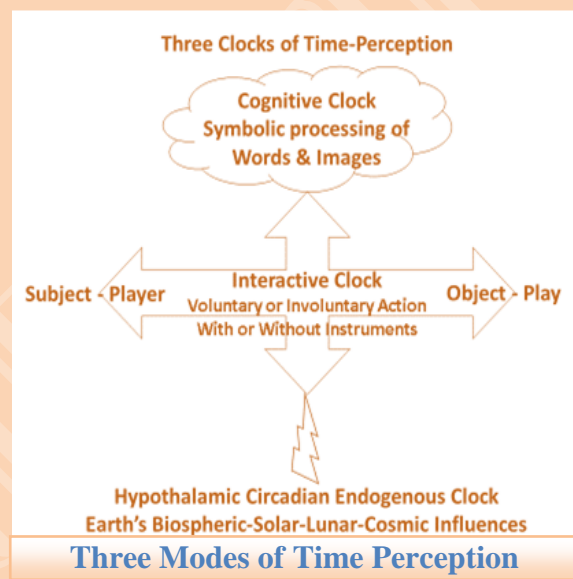
Human *sense of time* has three modes of functioning: a) *circadian clock mode* based on the biospheric and cosmic rhythms, processed through the suprachiasmatic nucleus of the hypothalamus. This maintains our sense of self-persistence in the world throughout one's lifetime. b) *Interactive clock mode* or the sensory-motor chrono-comparator which constitutes the subject-object duality and personal interactions with the world. c) *Cognitive clock mode* is active during dreaming, thinking and problem-solving. It is capable of going faster than real time and figuring out "what if" scenarios and simulations, in order to better anticipate the future.

We also have three modes of *existential being*:

- 1) *cognitive being* (thinking, dreaming, imagining, anticipating),
- 2) *interactive being* (perception-action with subject-object duality),

and 3) *Circadian being* (non-cognitive, non-interactive and non-dualistic). This *foundational self-conscious awareness* is the wonder of all wonders. It can never be objectified, but it can be *intuitively felt* as an *existential and transcendental continuum*. Such a *self-perspective* may be called the holistic and natural eco-systemic view.

During meditation, one shifts one's attention and self-perspective from the first mode of cognitive dreamer-thinker to the second mode of present mindful interactions; and then, to the third mode of the ever-present, *existential being-in-reality*. One learns to synchronize one's whole life with the biophysical circadian rhythms and to live an *effortless life of self-integration with Nature*. Such a person is usually *blissful, friendly, compassionate, curious, and creative*.



References

- [1] Bleck TP. Levels of Consciousness and Attention. In Goetz CG (Ed), Textbook of Clinical Neurology, Third edition, published by Saunders-Elsevier, Philadelphia, PA. 2007, pp 3-19.
- [2] Datta S. The preconscious mind and gamma band activity in the reticular activating system. *Frontiers in Neurology | Sleep and Chronobiology*. February 2012 | Volume 3 | Article 16 | 1-2.
- [3] Jo HG, Wittmann M, Hintenberger T and Schmidt S. The readiness potential reflects intentional binding. *Frontiers in Human Neuroscience* June 2014 | Volume 8 | Article 421 | 1-9.
- [4] Csikszentmihalyi M. *Flow: The Psychology of Optimal Experience*. New York, NY: Harper and Row Publishers, Inc.; 1990.
- [5] Mesulam, M. M. *Principles of Behavioral Neurology*. Philadelphia, PA: F. A. Davis Company; 1985:125-168.
- [6] Deshmukh VD. Cognitive pause-and-unload hypothesis of meditation and creativity. *J Altern Med Res* 2013; 5(3) 217-231.
- [7] Paulson S, Davidson R, Jha and Kabat-Zinn J. Becoming conscious: the science of mindfulness. *Ann. N. Y. Acad. Sci.* 1303 (2013) 87-104.

Yoga Appreciation Course

The NIMHANS Integrated Centre for Yoga conducts one-month Yoga Appreciation Course (YAC) for the staff and students of NIMHANS from various disciplines. This course is conducted in the months of January, April, July and October. Both theory and practical classes are conducted by faculty and staff of the Centre under the supervision of Dr B. N. Gangadhar, Professor of Psychiatry, and Officer-in-charge of the NIMHANS Integrated Centre for Yoga. The last YAC conducted in the month of October 2015 was attended by 17 members. Students who completed the course with adequate attendance were awarded participation certificates.



Participants of YAC October 2015 with the Yoga Centre staff and instructors

Feedback of a French Trainee at NICY

“One of my first surprises was that, there, physicians prescribe yoga for the patients. This doesn't occur often in France, where there is more disconnection between allopathic and alternative therapy. What I expected from NIMHANS Yoga center was to understand and learn more about the clinical and research work that was done with patients. Thanks to the wonderful and professional team, I was introduced to some current research and had access to the research done previously. I was also able to



Etienne Porhel

participate to almost all the modules prescribed to patients according to their disease: yoga for schizophrenia, for anxiety, for depression, for neurological disorder. Being in contact and following some patients was a very rich clinical experience for me. Despite the cultural gap, I could witness the learning processes, observe difficulties encountered in this process, and note some behavioural changes and ameliorations in subjective well-being. I particularly focused on the module for Schizophrenia, and after some time was given opportunity to teach to 3 English-speaking patients for almost 10 sessions. This was all along under very professional supervision. Through interviews with patients I could also understand more about how they were integrating this experience in their life, starting to use yoga as a tool to improve their health condition. I wish we could develop in France such a systematic integrative approach of yoga-therapy towards patients presenting different mental health issues and/or somatic issues. Once again I want to thank the NICY team for the welcome, help, guidance to share and teach me new skills. I am sure I can provide now better help to patients in France using these modules.”

Etienne Porhel

Clinical Psychologist

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Forthcoming events:

- Yoga Appreciation Course in January 2016.
- A talk by Dr. Sat Bir Khalsa, psychologist and faculty at Harvard Medical School USA, on 7th January, 2016 on the science of yoga and effects on psychological health.
- A one day symposium on “Understanding Cognition and Consciousness through Music & Meditation” – 8th February, 2016.

Book Post

To

Mr/Mrs/Dr

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(Mental Health & Neurosciences)

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