Consciousness, Religion, Philosophy in the light of Modern Science

Subrata Chattopadhyay
The West Bengal University of Health Sciences
kashyapeyas@gmail.com

Vivekananda Centre for Consciousness Studies and Research (VCCSR),
School of Indian Heritage, RKMVERI
July 30, 2020

Apology

* Bilingual presentation on broad overview across disciplinary boundaries
* Some materials gathered from the Bengali book

  চেতনাঃ বিজ্ঞান, ধর্ম ও দর্শনের আলোকে (২০১৯)
* Very few selected topics to be covered for time constraints

Agenda

* Nature of the consciousness question and its uniqueness and importance

* How modern sciences address the questions on consciousness

* Culture and Consciousness

* Meditation research

Fundamental Questions

* How could something - the universe - come out of nothing?

* How could ‘life’ – organic molecules - arise out of inorganic dead matter?

* How could consciousness emerge in organic matter?

Consciousness

* Millennia-old mystery: mind-body relationship

* Most intimate experience – yet most unknown

* Most difficult to reconcile with other areas of knowledge, e.g., physics, neuroscience

* Common area of inquiry for neuroscientist, psychologist, physicist, philosopher, theologian...

What is Consciousness?

* Awareness
* Ability to respond
* Thinking
* Cognition, Affect, Emotional Expression
* Self-Consciousness

Approaches to Study Consciousness

* Neuroscience – e.g. Crick, Eccles, Edelman

* Quantum Mechanics – e.g. Roger Penrose

* Machine Intelligence – e.g. Marvin Minsky

* Philosophy/Theology -

seminars in THE NEUROSCIENCES, Vol 2, 1990 : pp 263-275

Towards a neurobiological theory of consciousness

Francis Crick and Christof Koch

Visual awareness is a favorable form of consciousness to study neurobiologically. We propose that it takes two forms: a very fast form, linked to iconic memory, that may be difficult to study; and a somewhat slower one involving visual attention and short-term memory. In the slower form an attentional mechanism transiently binds together all those neurons whose activity relates to the relevant features of a single visual object. We suggest this is done by generating coherent semi-synchronous oscillations, probably in the 40-70 Hz range. These oscillations then activate a transient short-term (working) memory. We outline several lines of experimental work that might advance the understanding of the neural mechanisms involved. The neural basis of very short-term memory especially needs more experimental study.

Key words: consciousness / attention / binding / 40 Hz oscillations / short-term memory

IT IS REMARKABLE that most of the work in both cognitive science and the neurosciences makes no reference to consciousness (or 'awareness'), especially as many would regard consciousness as the major puzzle confronting the neural view of the mind and indeed at the present time it appears deeply mysterious to many people. This attitude is partly a legacy of behaviorism and partly because most workers in these areas cannot see any useful way of approaching the problem. In the last few years several books have appeared[1-4] that address the question directly but most of these[1-3] have been written largely from a functional standpoint and so have said rather little about neurons and other machinery of the brain.

We suggest that the time is now ripe for an attack on the neural basis of consciousness. Moreover, we believe that the problem of consciousness can, in the long run, be solved only by explanations at the neural level. Arguments at the cognitive level are undoubtedly important but we doubt whether they will, by themselves, ever be sufficiently compelling to explain consciousness in a convincing manner. Attempting to infer the internal structure of a very complex system using a 'black-box' approach (i.e. manipulating the input variables while observing the output of the system) will never lead to unique answers. In short, such methods are not by themselves powerful enough ever to solve a problem, though they are good enough to suggest tentative solutions.

Our basic idea is that consciousness depends crucially on some form of rather short-term memory and also on some form of serial attentional mechanism. This attentional mechanism helps sets of the relevant neurons to fire in a coherent semi-oscillatory way, probably at a frequency in the 40-70 Hz range, so that a temporary global unity is imposed on neurons in many different parts of the brain. These oscillations then activate short-term (working) memory. In the later parts of the paper we shall be mainly concerned with visual awareness.

Before approaching the problem in detail, it seems sensible to describe our general approach to consciousness and to decide what aspects of it are best left on one side.

Prolegomenon to the study of consciousness

We make two basic assumptions. The first is that there is something that requires a scientific explanation. There is general agreement that we are not conscious of all the processes going on in our heads, though exactly which might be a matter of dispute. While we are aware of many of the results of perceptual and memory processes, we have only limited access to the processes that produce this awareness (e.g. "How did I come up with the first name of my grandfather?"). In fact, some psychologists[5] have argued that we have only very limited introspective access to the origins of even higher order cognitive processes. It seems probable, however, that at any one moment some active neuronal processes correlate with consciousness, while others do not. What are the differences between them?

From the Salk Institute, 10010 N Torrey Pines Road, La Jolla, CA 92037, USA, and Computation and Neural Systems 216-76, California Institute of Technology, Pasadena, CA 91125, USA

1044-5765/90/0204-0003$5.00/0

Neuroscience and Consciousness

* To attack ‘easy questions’

* To identify Neural Correlates of Consciousness (NCC) instead of Neural Basis of Consciousness

* Initially working on common sense-experience e.g. vision

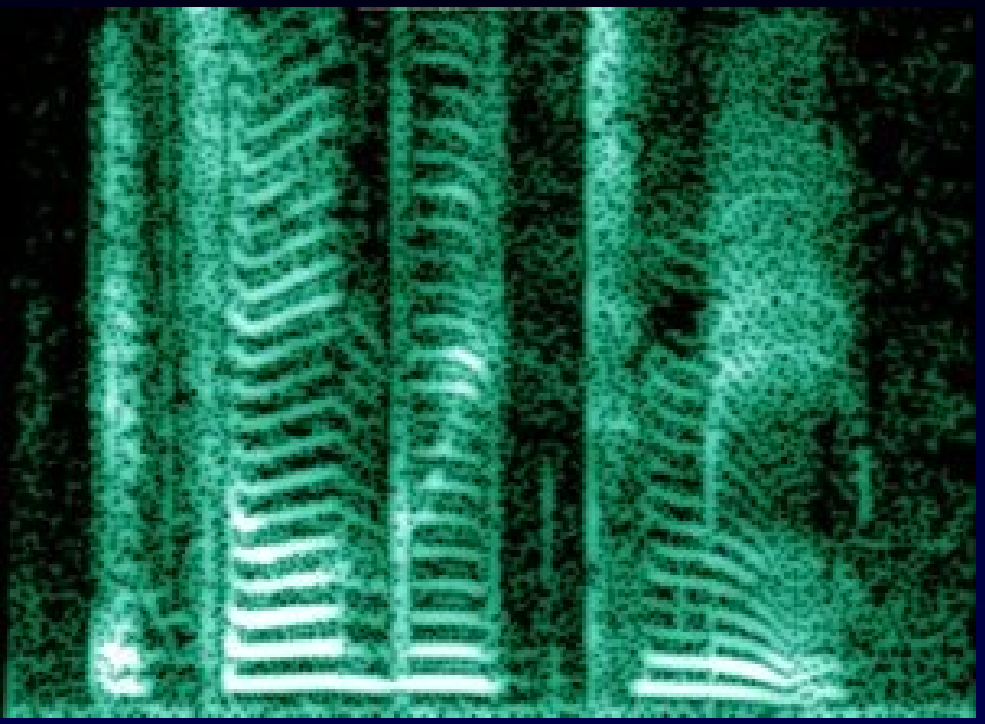
* Philosophers question the scientists

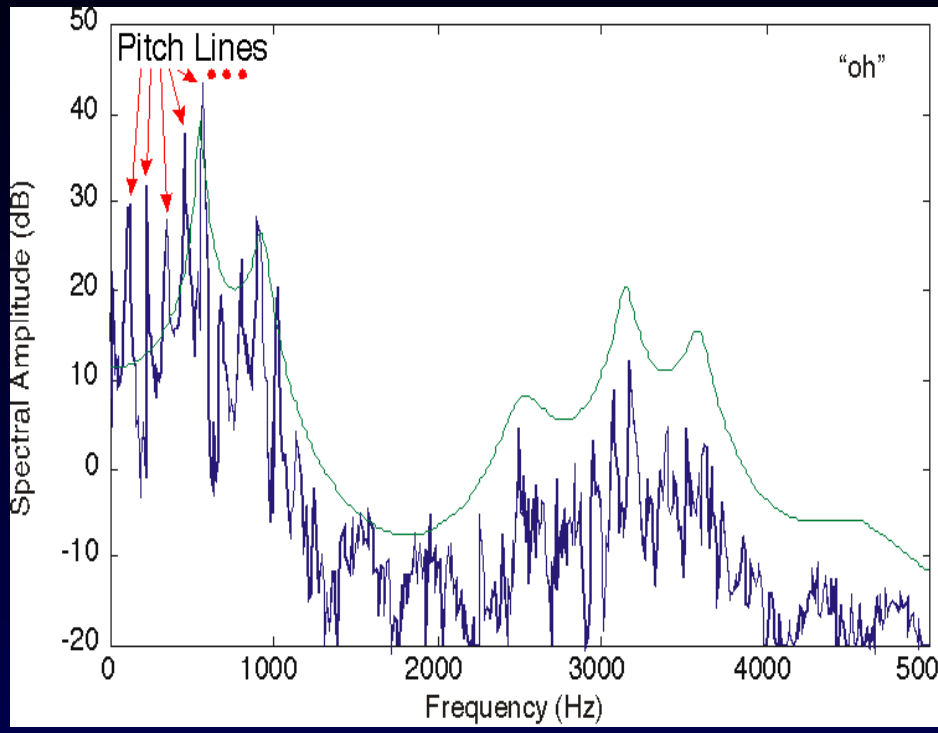
Science and Consciousness

Can objective information illuminate subjective experience?

Qualia: Qualitative feel of conscious experience

Explanatory Gap

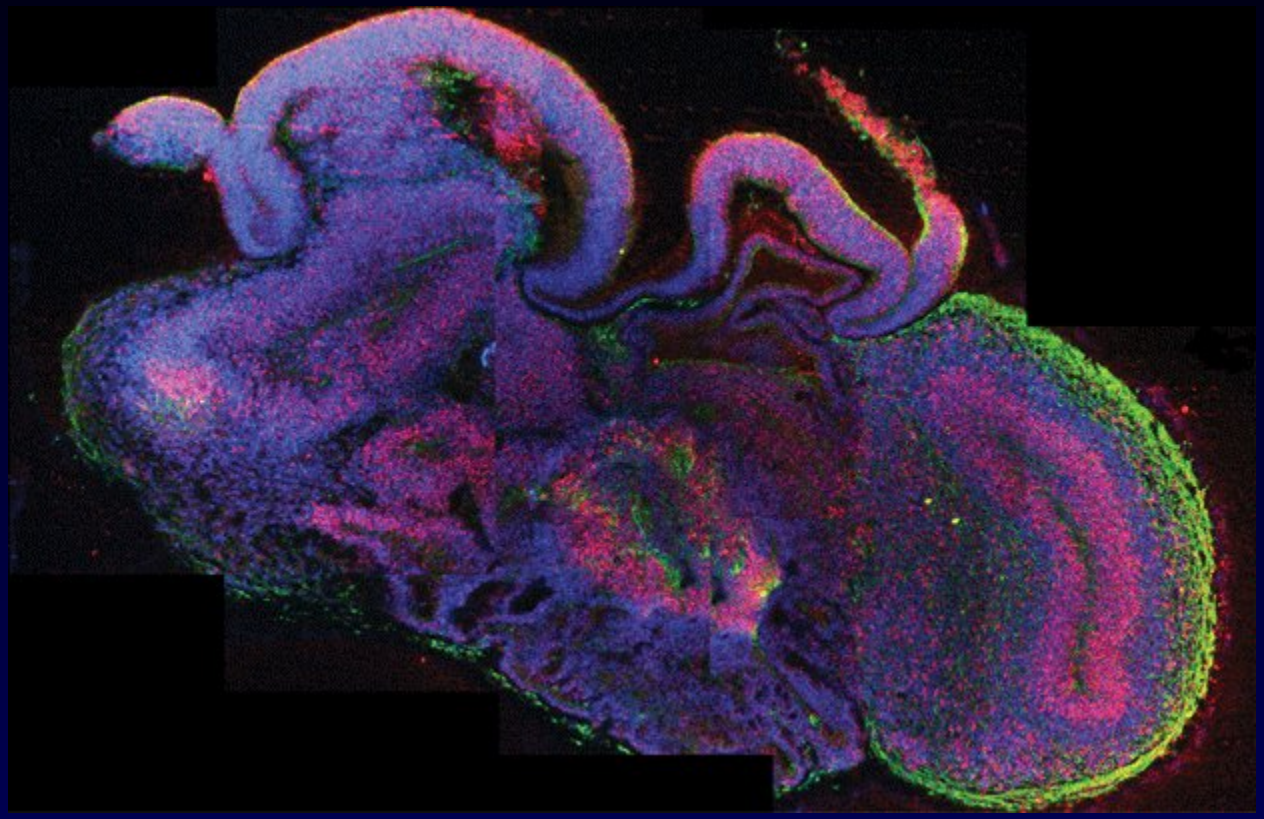




The Spectrogram of the Human Voice

Can you explain the melody of Raga *Vairabi* on the basis of air-pressure waves?

Mind-Body Problem



Miniature Human Brain produced in vitro

What is it like to be a bat?

What is it like to be a bat?

Thomas Nagel

[From *The Philosophical Review* LXXXIII, 4 (October 1974): 435-50.]

Consciousness is what makes the mind-body problem really intractable. Perhaps that is why current discussions of the problem give it little attention or get it obviously wrong. The recent wave of reductionist euphoria has produced several analyses of mental phenomena and mental concepts designed to explain the possibility of some variety of materialism, psychophysical identification, or reduction.[1] But the problems dealt with are those common to this type of reduction and other types, and what makes the mind-body problem unique, and unlike the water-H_2O problem or the Turing machine-IBM machine problem or the lightning-electrical discharge problem or the gene-DNA problem or the oak tree-hydrocarbon problem, is ignored.

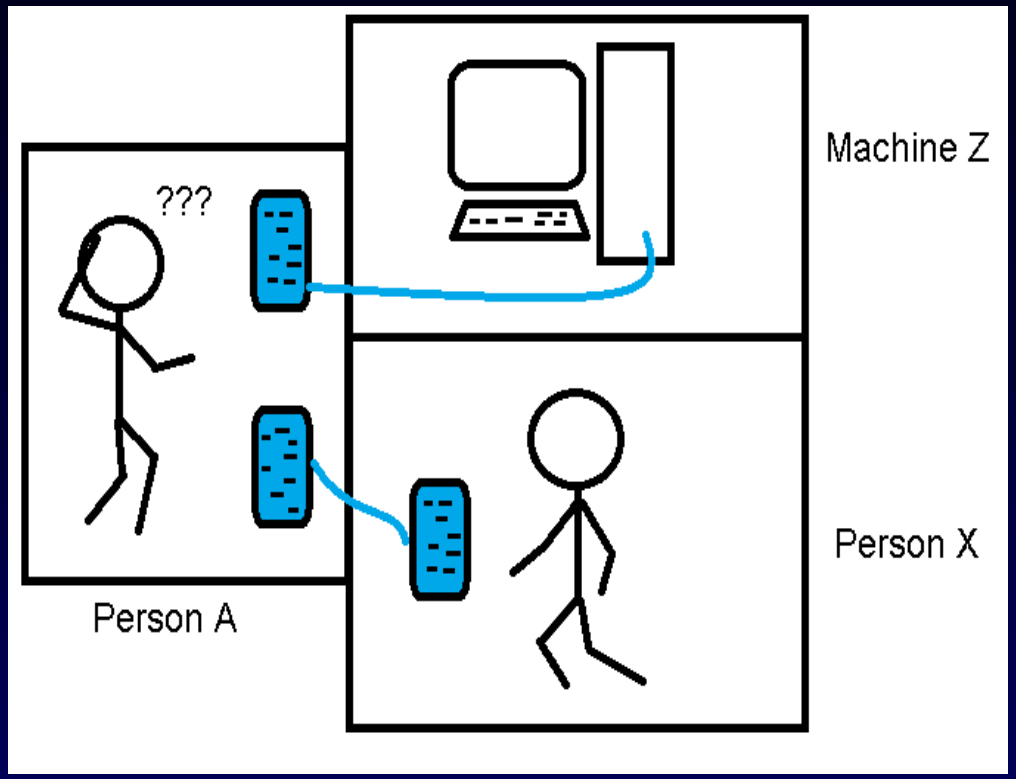
Every reductionist has his favorite analogy from modern science. It is most unlikely that any of these unrelated examples of successful reduction will shed light on the relation of mind to brain. But philosophers share the general human weakness for explanations of what is incomprehensible in terms suited for what is familiar and well understood, though entirely different. This has led to the acceptance of implausible accounts of the mental largely because they would permit familiar kinds of reduction. I shall try to explain why the usual examples do not help us to understand the relation between mind and body—why, indeed, we have at present no conception of what an explanation of the physical nature of a mental phenomenon would be. Without consciousness the mind-body problem would be much less interesting. With consciousness it seems hopeless. The most important and characteristic feature of conscious mental phenomena is very poorly understood. Most reductionist theories do not even try to explain it. And careful examination will show that no currently available concept of reduction is applicable to it. Perhaps a new theoretical form can be devised for the purpose, but such a solution, if it exists, lies in the distant intellectual future.

Conscious experience is a widespread phenomenon. It occurs at many levels of animal life, though we cannot be sure of its presence in the simpler organisms, and it is very difficult to say in general what provides evidence of it. (Some extremists have been prepared to deny it even of mammals other than man.) No doubt it occurs in countless forms totally unimaginable to us, on other planets in other solar systems throughout the universe. But no matter how the form may vary, the fact that an organism has conscious experience *at all* means, basically, that there is something it is like to *be* that organism. There may be further implications about the form of the experience; there may even (though I doubt it) be implications about the behavior of the organism. But fundamentally an organism has conscious mental states if and only if there is something that it is to *be* that organism—something it is like *for* the organism.

We may call this the subjective character of experience. It is not captured by any of the familiar, recently devised reductive analyses of the mental, for all of them are logically compatible with its absence. It is not analyzable in terms of any explanatory system of functional states, or intentional states, since these could

Computer and Consciousness

Can a Computer equal Human Intelligence?



Turing Test

Computer and Consciousness

Poem

Long years have passed.
I think of goodbye.
Locked tight in the night
I think of passion;
Drawn to for blue, the night
During the page
My shattered pieces of life
watching the joy
shattered pieces of love
My shattered pieces of love
gone stale.

Computer and Consciousness

Aaron, the AI Painter, created by Harold Cohen

Computer and Consciousness

Sophia, Social Humanoid Robot

Culture and Consciousness

Research Report

Cultural Influences on Neural Substrates of Attentional Control

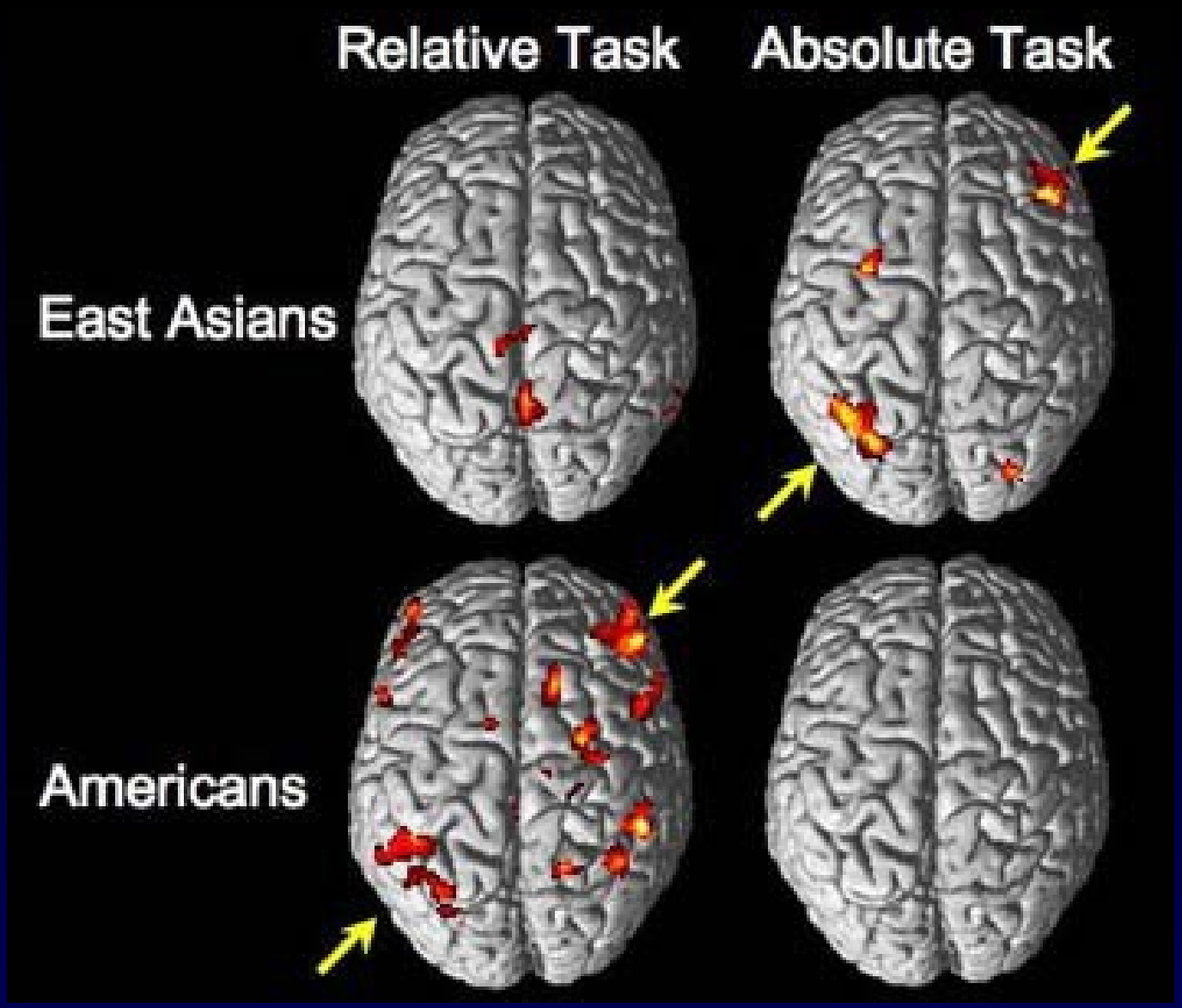
Trey Hedden,[1,2] Sarah Ketay,[3] Arthur Aron,[3] Hazel Rose Markus,[1] and John D.E. Gabrieli[2]

[1]Stanford University, [2]Massachusetts Institute of Technology, and [3]State University of New York at Stony Brook

ABSTRACT—*Behavioral research has shown that people from Western cultural contexts perform better on tasks emphasizing independent (absolute) dimensions than on tasks emphasizing interdependent (relative) dimensions, whereas the reverse is true for people from East Asian contexts. We assessed functional magnetic resonance imaging responses during performance of simple visuospatial tasks in which participants made absolute judgments (ignoring visual context) or relative judgments (taking visual context into account). In each group, activation in frontal and parietal brain regions known to be associated with attentional control was greater during culturally nonpreferred judgments than during culturally preferred judgments. Also, within each group, activation differences in these regions correlated strongly with scores on questionnaires measuring individual differences in culture-typical identity. Thus, the cultural background of an individual and the degree to which the individual endorses cultural values moderate activation in brain networks engaged during even simple visual and attentional tasks.*

contexts perform better on tasks with independent demands than on tasks with interdependent demands (Kitayama, Duffy, Kawamura, & Larsen, 2003). These findings suggest that culture influences perception in a fundamental way (Nisbett, Peng, Choi, & Norenzayan, 2001). In the study reported here, we used functional magnetic resonance imaging (fMRI) to examine where in the brain cultural experience alters processing of simple perception in conditions involving independent (absolute) versus interdependent (relative) judgments. On the basis of prior behavioral results, we expected Americans to exhibit culturally preferred processing during absolute tasks and East Asians to exhibit culturally preferred processing during relative tasks. Thus, we hypothesized that cultural experience leads to opposite effects of task conditions on brain activations in these two groups.

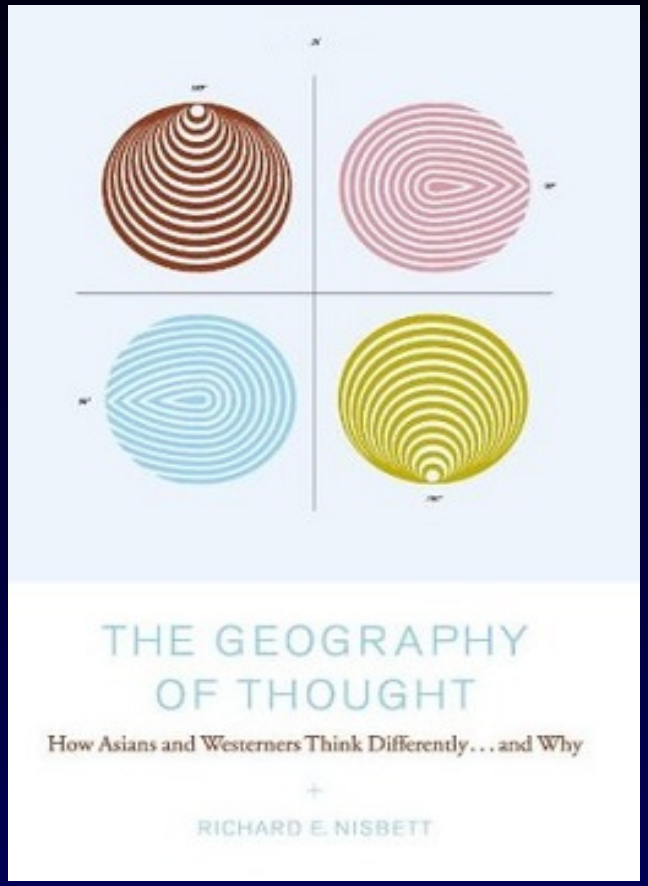
A functional imaging study comparing cultural groups during culturally preferred and nonpreferred tasks might identify no group differences in activation, but if significant cultural differences are found, they could take three different forms. First, people from different cultures might exhibit activation



Brain activity in East Asians and Americans as they make relative and absolute judgments

(Hedden and Gabrielli, 2008)

Cultural Neuroscience



Richard Nisbett, The Geography of Thought: How Asians and Westerners Think Differentlly… and Why (2003)

Meditation

* One of the eight *angas* of *yoga*

* Early studies on functions of heart and lungs

* Studies of brain waves in yogis

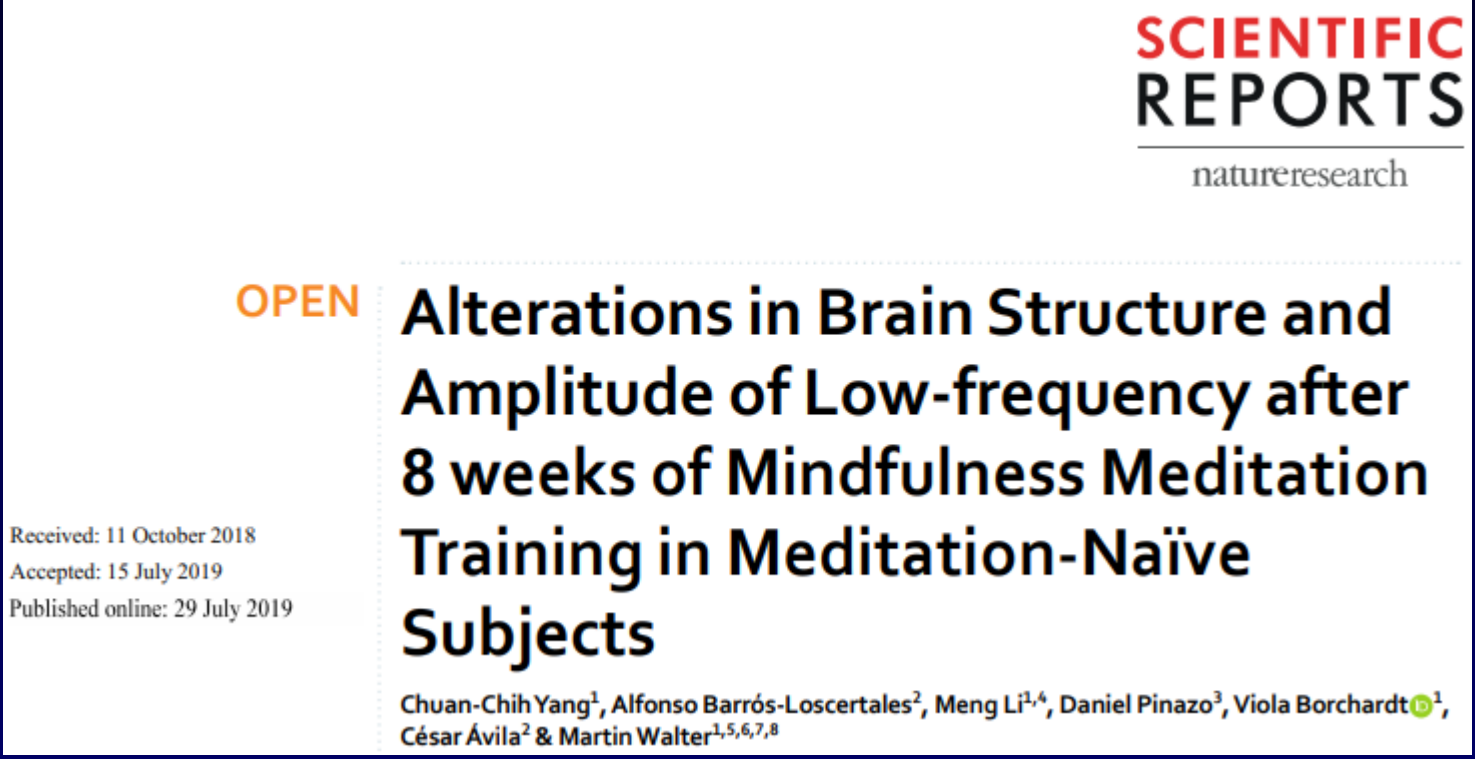
* Studies on Transcendental Meditation

* A voluntary wakeful hypometabolic state

Meditation Research

* Changes in brain functions

* Changes in brain structures



SCIENTIFIC REPORTS
nature research

OPEN

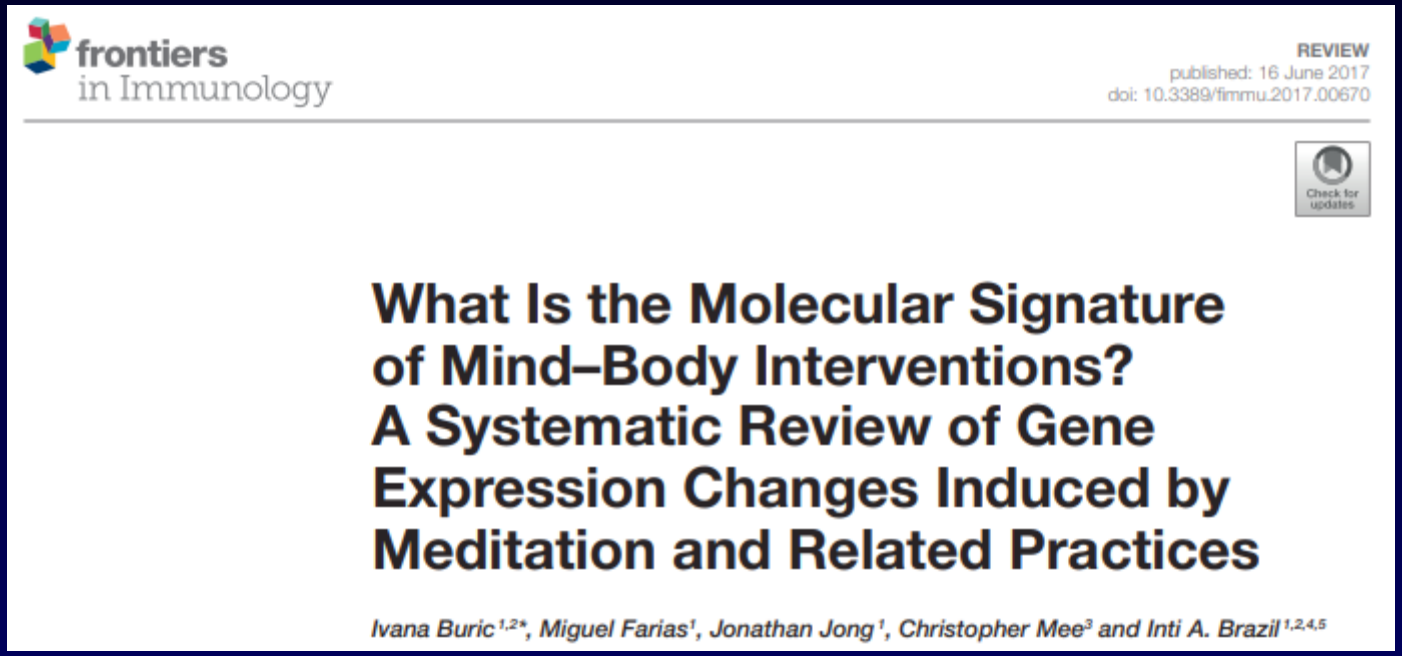
Alterations in Brain Structure and Amplitude of Low-frequency after 8 weeks of Mindfulness Meditation Training in Meditation-Naïve Subjects

Received: 11 October 2018
Accepted: 15 July 2019
Published online: 29 July 2019

Chuan-Chih Yang[1], Alfonso Barrós-Loscertales[2], Meng Li[1,4], Daniel Pinazo[3], Viola Borchardt[1], César Ávila[2] & Martin Walter[1,5,6,7,8]

Meditation Research

* Changes in gene expression induced by meditation



frontiers in Immunology

REVIEW
published: 16 June 2017
doi: 10.3389/fimmu.2017.00670

Check for updates

What Is the Molecular Signature of Mind–Body Interventions? A Systematic Review of Gene Expression Changes Induced by Meditation and Related Practices

Ivana Buric[1,2], Miguel Farias[1], Jonathan Jong[1], Christopher Mee[3] and Inti A. Brazil[1,2,4,5]*

Samadhi

* Last stage of the *Astanga Yoga*

* Through the paths of knowledge and devotion

* The last mystery

* How can you describe something which is indescribable?

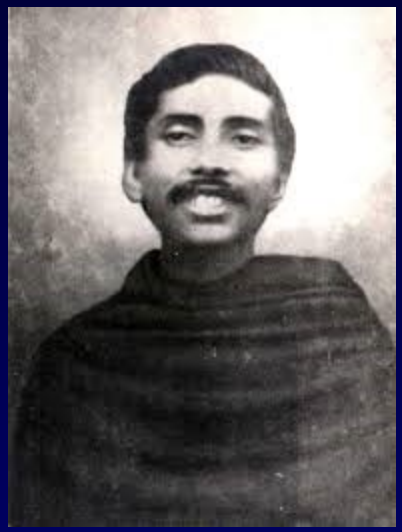
Bhava Samadhi

* Through the path of Devotion

* When the mind dissolves

* No "I"

Sri Ramakrishna



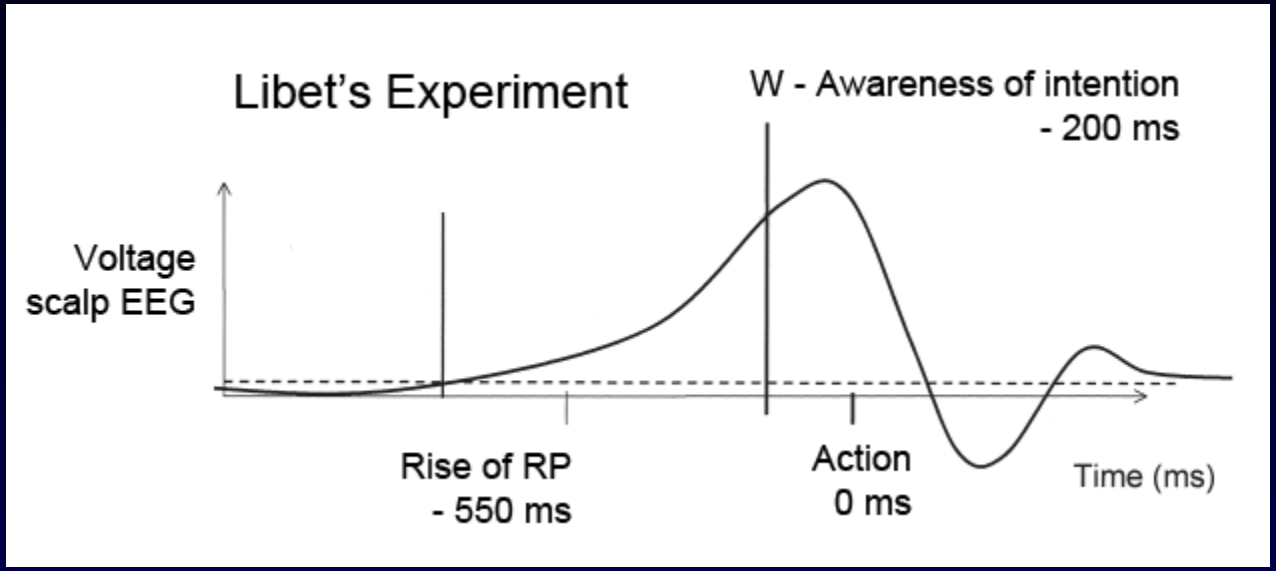
Sri Anukulachandra

ॐ सर्वे भवन्तु सुखिनः सर्वे सन्तु निरामयाः ।
सर्वे भद्राणि पश्यन्तु मा कश्चिद् दुःखभाग्भवेत् ॥

OM. SARVE BHAVANTU SUKHINAḤ
SARVE SANTU NIRĀMAYĀḤ,
SARVE BHADRĀṆI PAŚYANTU
MĀ KAŚCID DUḤKHABHĀG BHAVET.

May all beings be happy.
May all be free from sickness.
May all see and experience what is good and beautiful in life.
May no one be unhappy.

Libet's Experiment



Philosophy in Scientific Explanations

Two types of Explanations in Science

* Mechanical explanation: *How* does it work?

* Teleological : *Why* does it work?