



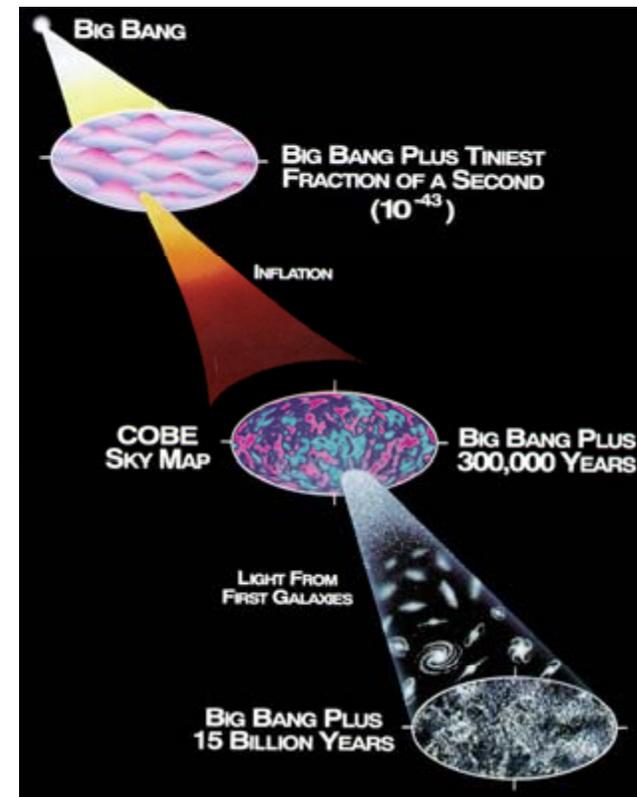
***A Proposed Model to Quantify
Measurement of Consciousness as a
function of time***

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Center for Indic Studies
University of Massachusetts Dartmouth

Origin of Universe

About 300,000 years after the Big Bang, there was the era of **recombination** in which protons and electrons combined to form neutral Hydrogen. At this point, baryonic matter in the Universe consisted of about 75% Hydrogen and 25% Helium (by mass), with some small amounts of **heavy elements** (elements starting from Lithium).

- Oscillating nature of universe
- Age of universe – about 20 billion years to 11.4 billion years
- Concept of time and space



Source:

<http://www.seas.columbia.edu/~ah297/un-esa/universe/universe-chapter5.html>
Encyclopedia of Applied Physics, Vol. 23 (Page 47 - 81), 1998 WILEY-VCH Verlag GmbH, ISBN: 3-527-29476-7



Magazine Content

[May 2004 issue](#)

COSMOLOGY

The Myth of the Beginning of Time

String theory suggests that the big bang was not the origin of the universe but simply the outcome of a preexisting state

By Gabriele Veneziano

Was the big bang really the beginning of time? Or did the universe exist before then?

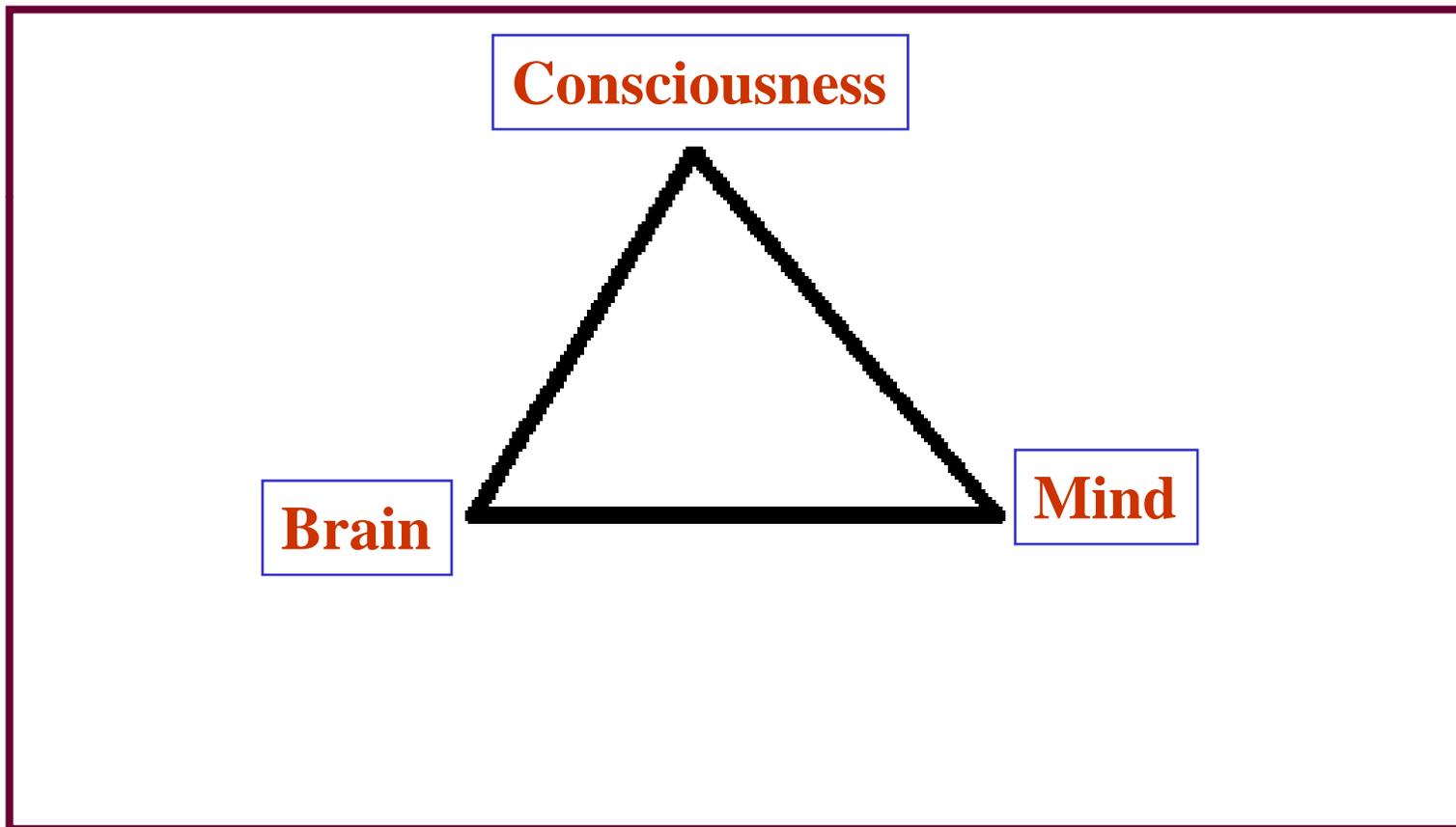
Einstein's general theory of relativity led modern cosmologists to much the same conclusion. The theory holds that space and time are soft, malleable entities. On the largest scales, space is naturally dynamic, expanding or contracting over time, carrying matter like driftwood on the tide.

Big Brain Theory

(Times of India, January 16, 2008)

- Cosmologists predict reincarnation, multiple universes, and death of spacetime
- The universe can recur again and again in an endless cycle of big bangs
- Some calculations are predicting infinite number of free-floating brains for every 'normal' brain. Are we normal in that case?

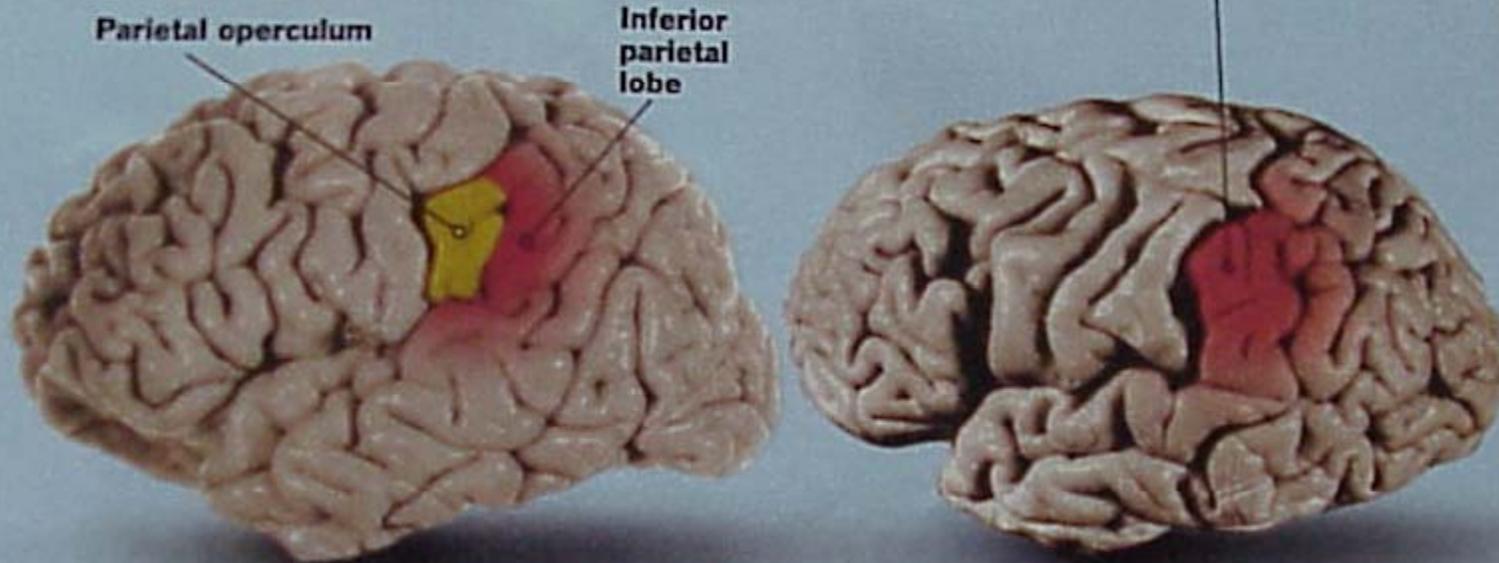
Tools of Understanding



WHY EINSTEIN WAS EINSTEIN AND YOU'RE NOT

NORMAL BRAIN contains regions called the parietal operculum and the inferior parietal lobe; the latter is the seat of mathematical and visual reasoning

EINSTEIN'S BRAIN was no bigger than most, but the parietal operculum region was missing. This allowed the inferior parietal lobe to grow 15% wider than normal



Was Einstein's Brain Built for Brilliance?

Quite possibly, say Canadian researchers—and they

WITELSON, KISSAN, HARVEY—THE LANCET

sue itself to Dr. Sandra Witelson, a neuroscientist who runs a "brain bank" at McGill University. Her comparative studies of brain structure and function in normal, undiseased brains have been a boon to science by people whose genius had been obscured before death. She has a solid set of benchmarks to measure Einstein's brilliant thoughts against. In the comparison, she found that the inferior parietal lobe, which to measure Einstein's brilliant thoughts, the comparison as a whole, Witelson and her colleagues compared Einstein's brain to that of men close to his.

What they found was that while the overall size of Einstein's brain was about average, the inferior parietal lobe was about 15% larger than normal.

mal. "Visuospatial cognition, thought and imagery of numbers," says Witelson and her co-authors, "is dependent on this region of the brain." She argues that Einstein's impressions to come from visual imagery, then translated into the language of mathematics (think relativity, for example, where he musings on what it would be like to travel through space on a beam of light). Not only was Einstein

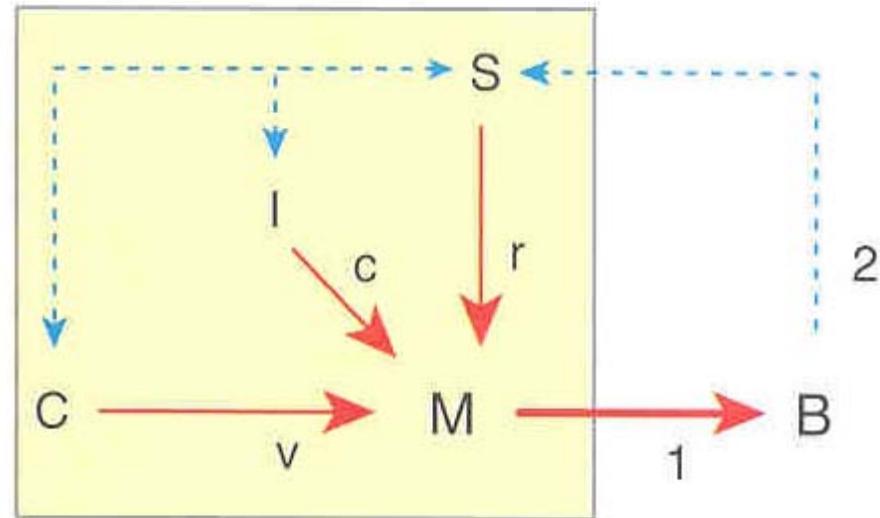
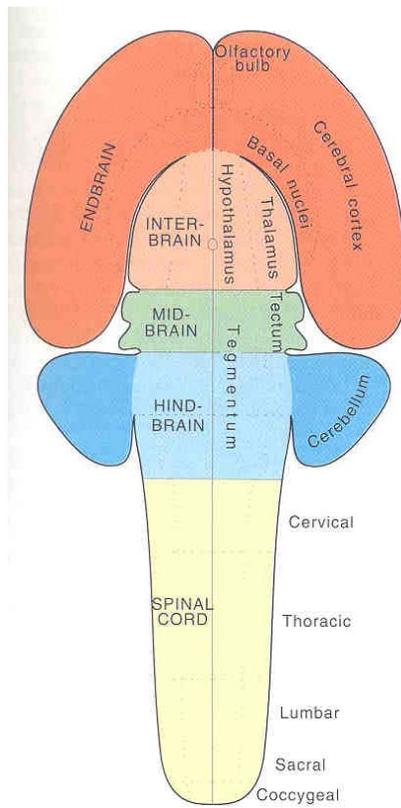


FIGURE 2.15 This model of information flow through the nervous system (inside the box) postulates that behavior (B) is determined by the motor system (M), which is influenced by three neural inputs: sensory (S), intrinsic (I), and cognitive (C). Sensory inputs lead to reflex responses (r), cognitive inputs produce voluntary responses (v), and intrinsic inputs act as control signals (c) to regulate the behavioral state. Motor system outputs (1) produce behaviors whose consequences are monitored by sensory feedback (2). Sensory feedback may be used by the cognitive system for perception and by the intrinsic system to generate affect. The cognitive, sensory, and intrinsic systems are all interconnected, hence the arrowheads at the end of each dashed line within the box (nervous system). Refer to Swanson.¹⁶ Reprinted by permission of Oxford University Press.

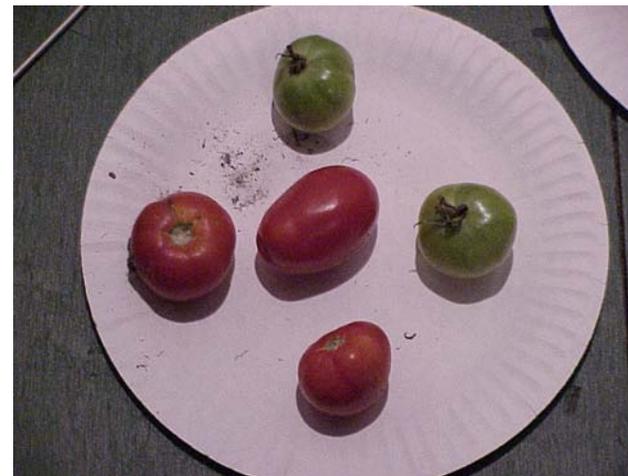
Consciousness

- a universal concept

- Is consciousness present in each matter-living and non-living.
- Plants, as an example.
- Changes in the color of green tomato and pepper in the company of red vegetables.
 - Watermelon changes its color with other watermelon.
 - A rotten apple spoils the whole pack.

Consciousness in plants/vegetables

3-Day of natural co-habitation



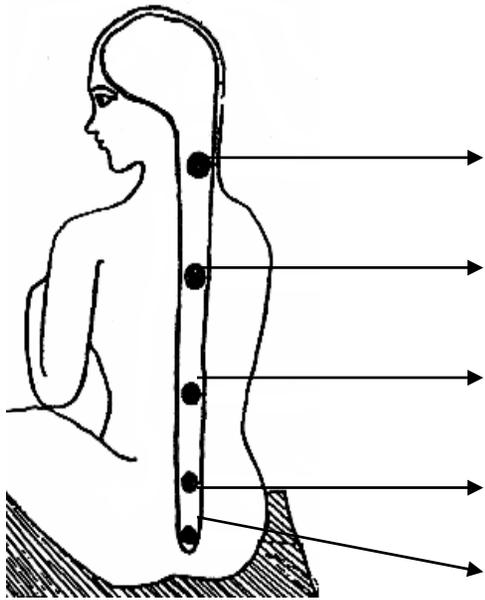
Human Consciousness through Kriyayoga



- Change in body posture.
- Record intensity of awareness in the four zones of the back.
- Repeat it over several days to several months time period.
- 100 subjects with over 1000 responses, unaware of the study and implications.

Evaluation of Human Consciousness

Perception Scale: 1,2,3,4,5 (1-Lowest, 5-Highest)



	Straight	Left	Right	Backward	Forward	Straight
1	1	5	4	3	5	2
2	5	4	3	5	4	5
3	4	1	5	4	1	4
4	3	3	2	2	2	3
5	2	2	1	1	3	1

Serendipitous Measurement of Consciousness

- **2-D matrix developed**
- **The matrices were totally different for different individuals**
- **No pattern in the matrices based on gender, age, previous practice observed**
- **No reproduction of a matrix even for the same individual**
- **Over 9.31×10^{20} ways possible**



Forensic Biology



Firearms and Toolmarks

Detection and Automatic Identification of Human Walk

J. Musić, M. Cecić, and V. Zanchi (Croatia)

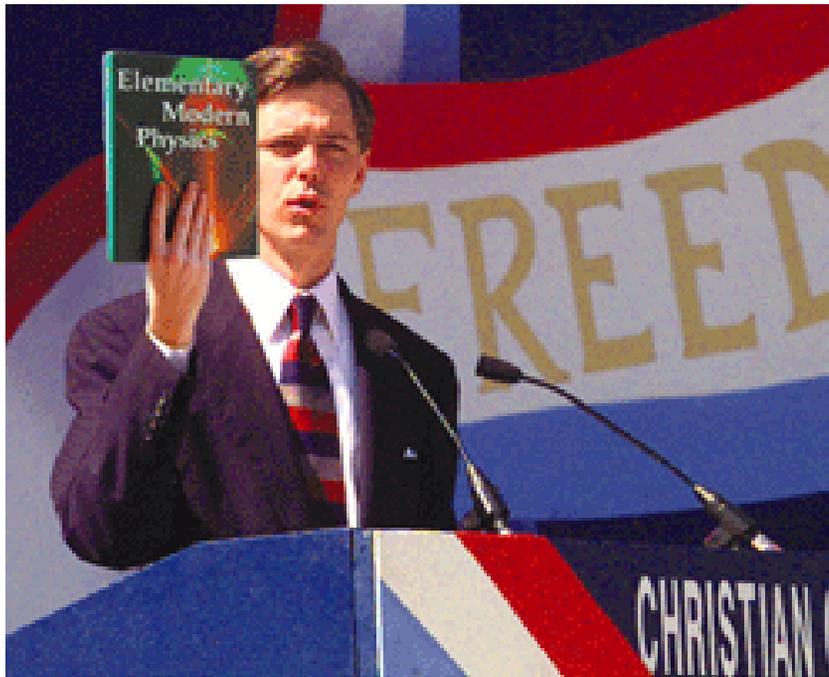
From Proceeding (458) Biomedical Engineering - 2005

-  Fingerprint Identification
-  Hand Geometry
-  Facial Feature Identification
-  Keystroke Dynamics Identification
-  Signature Identification
-  Voice Identification
-  Future Biometric Technologies

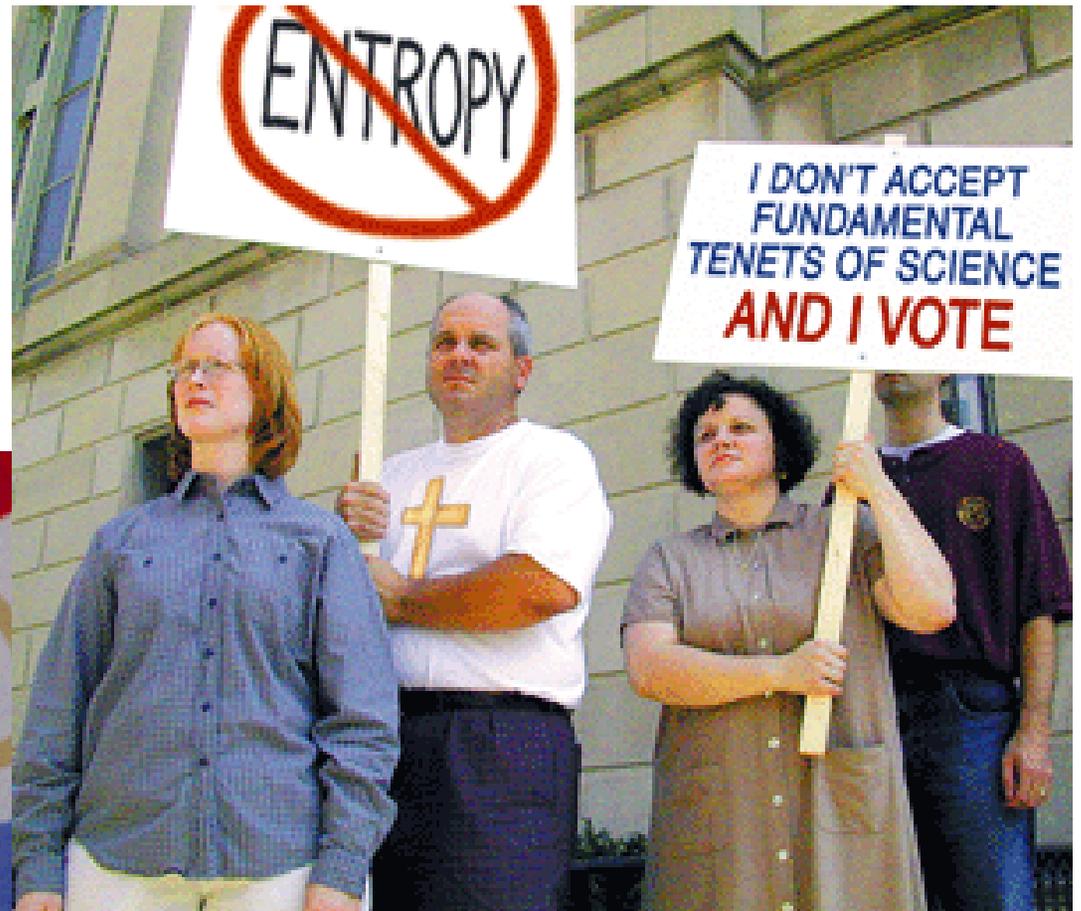
Consciousness in Summary

- Exists in every living and non-living being
- Can be examined scientifically in a quantitative form within scientific limitation
- Everyone is unique and free to be a leader
- One can only live in the moment, rest is changed substantially
- Likely to introduce quantum alteration in the scientific understanding and the scientific practice

September 6, 2000
Topeka, KS



Above: Christian Coalition president Ralph Reed holds a textbook he claims is being used to teach physics in schools.



Above: Conservative Christians protest the second law of thermodynamics on the steps of the Kansas Capitol.



Vishnu Nabhi

Francis Crick

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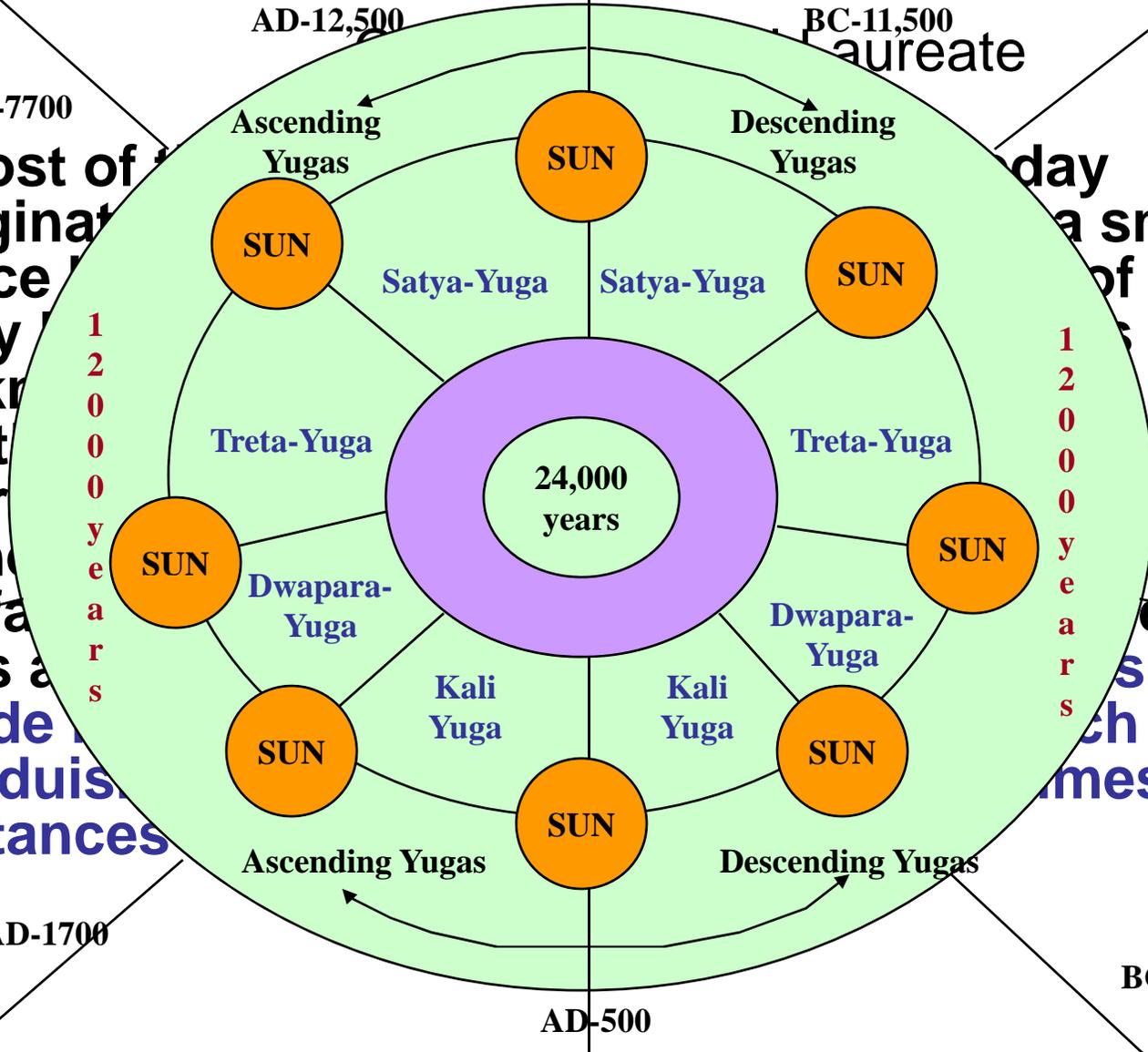
Laureate

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- “Most of the original place very unknown earth started as far as was made Hindu distances

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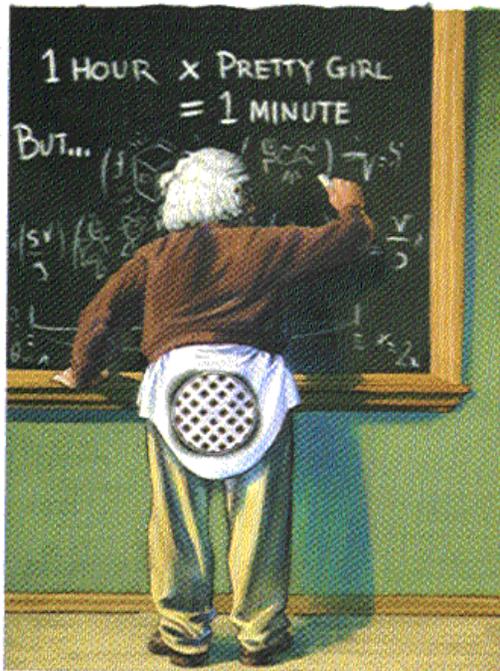
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Scientific Interpretation of Different Situations of Sun and Commencing of yugas in respect of Vishnunabhi

Time, Mind and Einstein's Theory of Relativity



- “When a man sits with a pretty girl for an hour, it seems like a minute. But let him sit on a hot stove for a minute and it’s longer than any hour. That is relativity” - **A. Einstein**, *J. Exothermic Science and Technology*, 1(9); 1938

The Consciousness Model Hypothesis

- Consciousness is a general concept of existence of any and all the things known and unknown, and is universal.
- The consciousness in its ideal and complete form is experienced equally by everything, including human beings.
- Awareness of the consciousness occurs with limiting the consciousness to one or more of the infinite dimensions of the consciousness, including space and time.
- Any one of these limitations is reflected in mind which acts as the relativist of a human being.
- Mind is a form of energy that changes frequently with time and space, and any other changes in the universe by being an integral part of the consciousness.
- The relationship of mind with time and space opens the possibility of its examination by the tools of modern science, which is primarily the study of matter as a function of time and space.

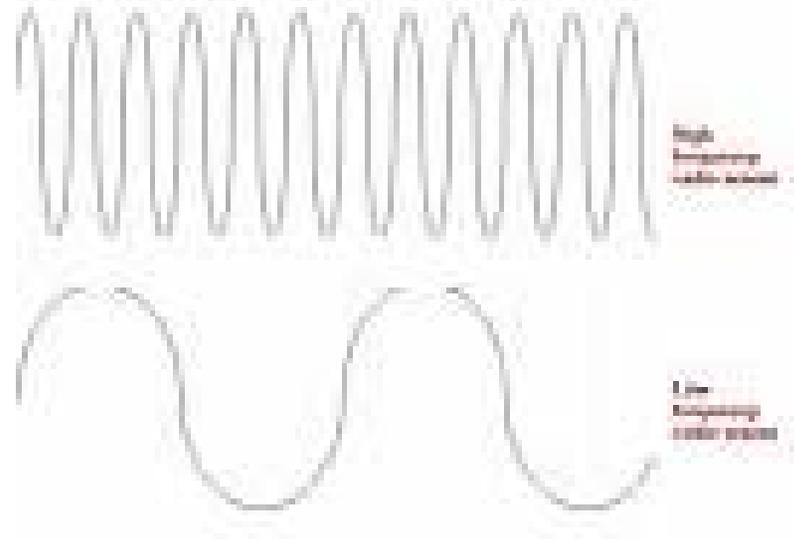
The Consciousness Model

Assumptions

- In order to examine the consciousness, one has to create a model for consciousness which could be based on intuitive assumptions yet lead to measurable parameters to validate the model and create an understanding of the consciousness in a scientific manner. We make a model of the consciousness by assuming the following.
 - 1. Consciousness is all pervasive
 - 2. Expression of consciousness can be represented by vibrations.
 - 3. Different things may have different frequencies of vibration.
 - 4. A vibrational frequency can be defined as periodic change in signal in any of the infinite dimensions of consciousness with respect to another dimension of the consciousness (e.g., space vs. time, energy vs. time, space vs. energy, etc.).
 - 5. Vibrations are natural to all matter and non-matter components of the universe and para-universe.

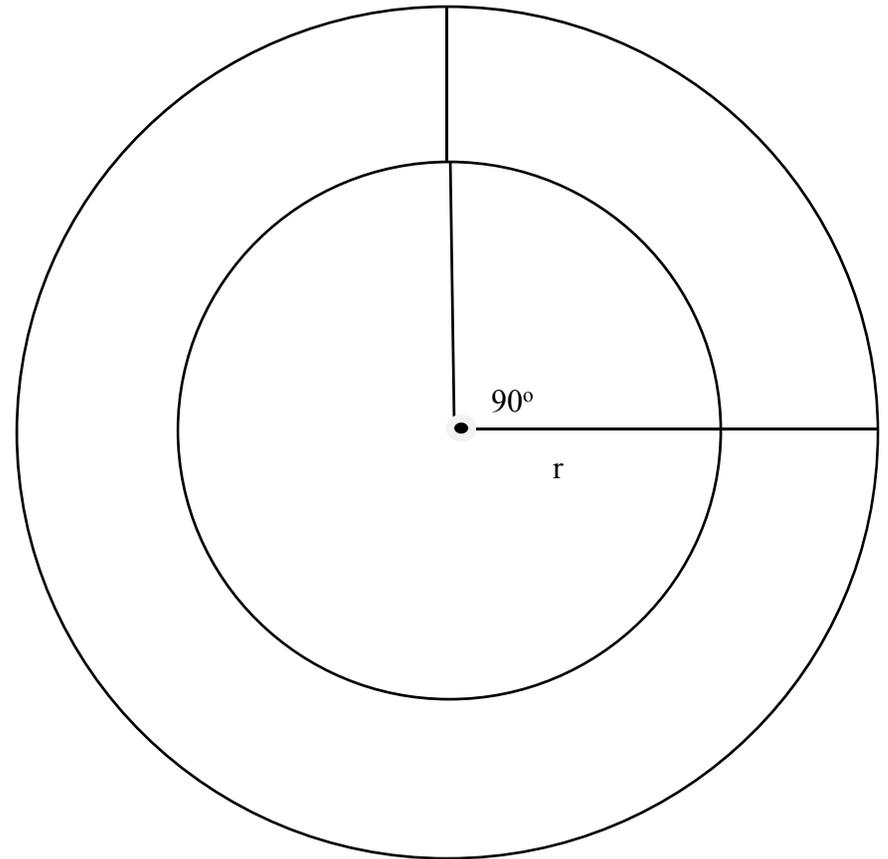
The Model

- Assuming the consciousness to be represented by space vs. time, a signal in space will increase in frequency with decrease in time, and as the time reaches zero, the signal will become all pervasive, and will represent reaching of the consciousness.
- Similarly, with increase in time (reaching infinity) wavelength of the signal will increase to become all pervasive, again reaching the consciousness.
- In either case, the amplitude of the signal remains constant irrespective of variation in time. Contraction and expansion of **time** is thus a defining factor to attain consciousness.



Time in a circle as a representation of consciousness and mind

- The model of time is to show how the mind's perception of time changes with respect to one's consciousness.
- Center represents total consciousness, complete knowledge, or truth.
- Radius, r , is amplitude of ignorance.
- The mind's perception of time corresponds to the length of the arc created on that mind's specific circle.
- While the angle and actual measure of time stay the same, the mind's perception of time, and the length of the arc, both increase.



Implications of Time in a Circle

- This model created to map our perception of time also fits the Hindu view of time and consciousness.
 - Sees time as circular and cyclical, such as the cycle of Yugas and the cycle of birth and rebirth.
 - One day of Brahma, the knower of all creation and its tribulations, is estimated to be 4,320,000,000 human years
- Farther one gets from this physical world, and the closer one gets to total consciousness or God, the less time and space matter or even exist. This also suggests that as time and space matter less, one is closer to total consciousness. This means that the center of the circle is in fact total consciousness, or God.

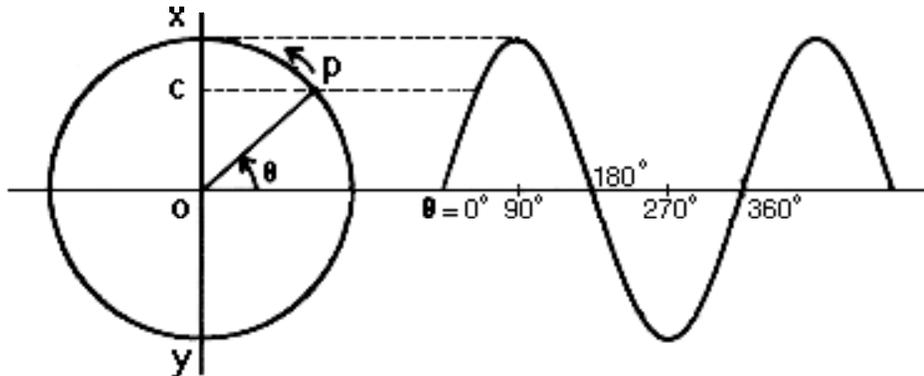
Further Implications of Time in a Circle

- While God is infinite and everywhere, He is also simultaneously intangible, unable to be seen, and thus to the human eye existing as a result of faith in His existence. The center of a circle is in similar situation: it cannot actually be found, but it is known to exist.
- The moment any physical point is picked as the center of a circle, that point takes up physical space and thus it itself becomes another circle, whose center must be found.
- Hinduism sees physical, or what we might call “real” time to actually not be real at all. In Hindu philosophy, all worldly dimensions, including that of time, are part of “Maya.”
- A mind less bound by the restrictions of worldly time is also closer to the Hindu definition of reality, and thus at a higher level of consciousness.

The angular velocity ω of the motion is defined in radians per second as the angle θ moved through per unit time, and is related to the FREQUENCY f by the equation:

$$\omega = 2\pi f$$

The displacement d , whose maximum is the AMPLITUDE A , may be expressed as: $d = A \sin \theta = A \sin \omega t = A \sin (2\pi ft)$



Geometric derivation of simple harmonic motion. A point p moves at constant speed on the circumference of a circle in counter-clockwise motion. Its projection OC on the vertical axis XOY is shown at right as a function of the angle θ .

The function described is that of a sine wave.

Measurement of Consciousness – Time in terms of Temperature

- Kinetic theory of gases:
- $V_{\text{rms}} = (3RT/M)^{1/2}$; V_{rms} – root mean square velocity
 - » R – Universal gas constant
 - » T – Temperature, K
 - » M – Molar mass
- Defining V_{rms} as d/t (d , distance in meters; t , time in seconds), and re-arranging the equation, one can get
 - $t = (d^2M/3RT)^{1/2}$
 - assuming d and M to represent constants, the expression can result in:
 - $t = C/T^{1/2}$, where C is **Consciousness Coefficient** that can be estimated for each individual or entity experimentally.
 - $C = (d^2M/3R)^{1/2}$
- For humans, M would be 1.4 Kg, and d would be 7.0956×10^{17} meters (average lifespan, 75 years, in seconds x speed of light, 3×10^8 meters/second). $R = 8.3145 \text{ J/K.mol}$
- An un-evolved human, based totally on material basis, would have a Consciousness Coefficient, C , of 5.054×10^{17} .

The Role of Vibration

Big Bang Singularity = State before which everything was pure existence and pure consciousness, *ānīd avātam*, without vibration, as described in the Hymn of Creation, the *Nāsadiya Sūktam*.

- There was neither non-existent nor existent.....:
- That one thing, breathless, breathed by its own nature:

Explanation:

It then existed without vibration. Prāna (primal energy) existed then but there was no motion in it. Then when the “kalpa” begins after an immense interval, the ānîdavātam Commences to vibrate, and blow after blow is given by Prāna to Akāsha. The atoms become condensed, and as they are condensed different elements are formed.

All that is power in the universe, manifesting as force or attraction - or even thought- is “Prana”.

Prāna +Akāsha = Universe

Every manifestation of power is “Prāna”

Every material manifestation is “Akāsha”.



The Concept of Time

‘Time is what happens when nothing else does’

-Richard Feynman

‘Time is nothing but change’

-Julian Barbour

HOW DO WE RECONCILE THESE OPPOSITE VIEWS?



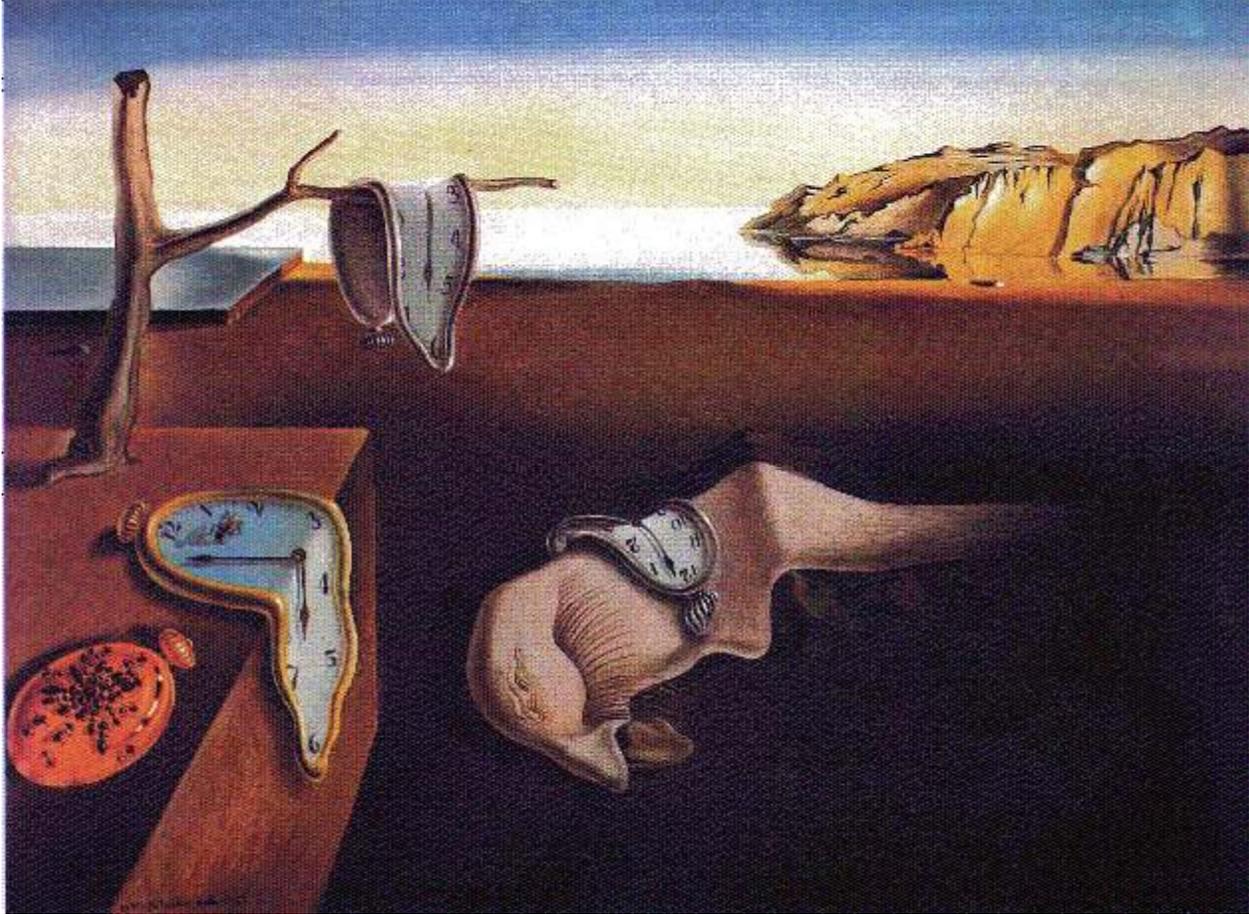
“Time Dilation” – Physical and Mental

Physics clearly relates time dilation in terms of the speed of object relative to the speed of light.

But mental time dilation is also experienced by us; it is bidirectional relative to physical time (dilation and contraction).

How can we relate mental time to level of consciousness?





Level 1: “I” and the World are Separate

1-a) information Processing and awareness can be explained through neurobiology. According to Crick & Koch (1990), Crick (1994), Koch (2004) and others, certain 35-75 hertz neural oscillations in the cerebral cortex seem to be correlated with awareness in a number of different modalities and a mechanism of binding (synchronization of separately represented pieces of information) has been hypothesized. In our model, the “consciousness coefficient” can be used to “control” the time needed to resonate cortical oscillations with chosen object of awareness. Thus, the self chooses what objects enter into the “frame of awareness” and how long they stay. Thus, a framework independent of physical time can be developed. How we develop this control is discussed later. However, it is logical that “multitasking” or “continuous partial attention” are antithetical to this process and concentration or focus will be needed to manipulate neurobiology. Davidson’s work with Tibetan Buddhists [PANS, 2004] has demonstrated the ability of Lamas with many years of meditative practices (>10,000 hours) to generate gamma waves (≈ 40 Hz) when asked to meditate on positive emotions.



Level 1: “I” and the World are Separate

In another study, Andrew Newberg conducted similar research on the subject of meditation and the brain activity of Tibetan monks. According to the subsequent findings, gleaned from scans of each monk's brain during meditation, an increase in activity was found around the frontal region of the brain, in which attention on specific tasks are processed; on the other hand, a decrease in activity was found around the area at the back of the brain, where one's processing of orientation and spatial awareness occur.

Regarding the results of his study, Newberg found that "During meditation, people have a loss of the sense of self and frequently experience a sense of no space and time and that was exactly what we saw." He concluded, "When someone has a mystical experience, they perceive that sense of reality to be far greater and far clearer than our everyday sense of reality. Since the sense of spiritual reality is more powerful and clear, perhaps that sense of reality is more accurate than our scientific everyday sense of reality“ .



Level 1: “I” and the World are Separate

1-b) The use of psychedelic drugs can cause time dilation and “expansion of consciousness” [Bentov, 1979] but we do not agree with “expansion of awareness” because this state is purely reflexive in nature and the agency of self control is absent.

1-c) State of Dream – In REM sleep (the state where dreams occur) time dilation is reported but once again this state is outside of the purview of self control.

Thus, in level 1, manipulative time dilation is only possible if we are in the waking state and can increase the gap between two thoughts/sensory perception modalities. This is possible through yoga/meditation (yogaś cittavṛitti-nirodhah)



-----It is not joy nor sorrow,
But that which is between,
It is not night nor morrow,
But that which joins them in.

It is sweet rest in music;
And pause in sacred art;
The silence between speaking;
Between two fits of passion —
It is the calm of heart.

It is death between two lives,
And lull between two storms,
The void whence rose creation,
And that where it returns.



From "Peace" by SV, 1899

Level 2: Sushūpti

In sushūpti [Vivekacūdāmani (171)],

sushupti-kālē manasi pralīnē
n'aiv'āsti kincit sakala-prasiddheh

In the time of sushūpti, when the mind is absorbed in Māyā – when there is no mind – there is nothing. I and the world are not distinct, but this is still a level of ignorance, avidyā, in that the experiencing self is not aware that it is but a part of the Whole



Level 3: Turiyā

- Purest state of awareness
- Consciousness transcends limitations of space, time & causation
- Consciousness merges with Ultimate
- Not a state of knowledge but pure experience



Space and Time are Products of Creation. To achieve maximum time dilation, we have to go out of the space-time continuum.



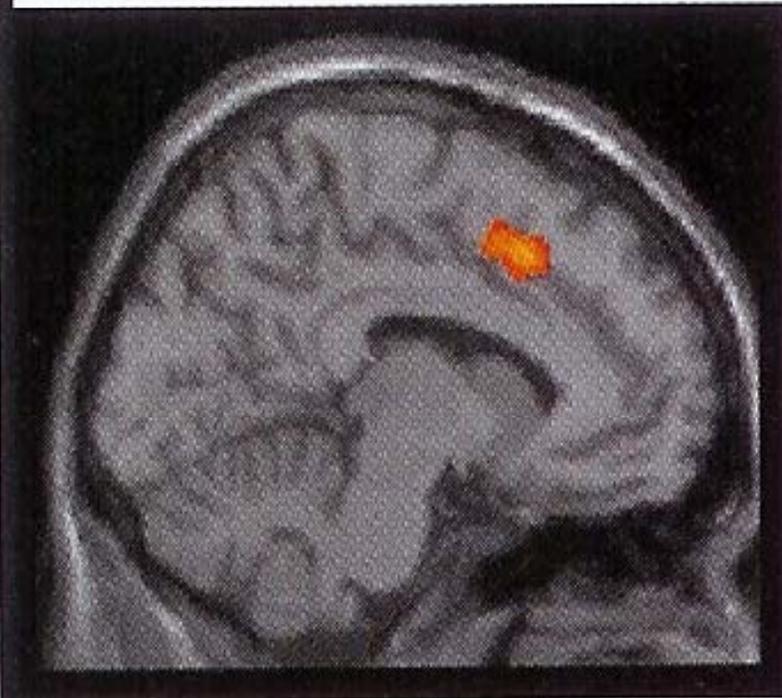
References

- Crick, F. and Koch, C. 1990. Toward a neurobiological theory of consciousness. *Seminars in the Neurosciences* 2:263-275.
- Crick, F. 1994. *The Astonishing Hypothesis: The Scientific Search for the Soul*. New York:Scribners.
- Koch, C. 2004. *The Quest for Consciousness: A Neurobiological Approach*. Roberts and Company, Englewood, CO.
- Bentov, I. 1979. *Stalking the Wild Pendulum*. Bantam, NY.
- Newberg, A. , D'Aquili, E., and Rause, V. 2001. *Why God Won't Go Away: Brain Science and the Biology of Belief*, Ballantine.
- Lutz, A., Greischar, L., Rawlings, N.B., Ricard, M., Davidson, R.J. 2004. [Long-term meditators self-induce high-amplitude synchrony during mental practice](#). *Proceedings of the National Academy of Sciences*, 101, 16369-16373.



Rejection a Real Pain, Brain Study Shows

It seems the old adage about sticks and stones and hurtful words may need revision. Social rejection,



researchers report, elicits a brain response similar to the one triggered by physical pain. Subjects snubbed in a virtual game of catch exhibited activity in a brain region called the anterior cingulate cortex, which also plays a role in pain processing.

Thinking about interracial interactions

William J Gehring *et al.*

Nature Neuroscience 6, 1241 - 1243 (2003)

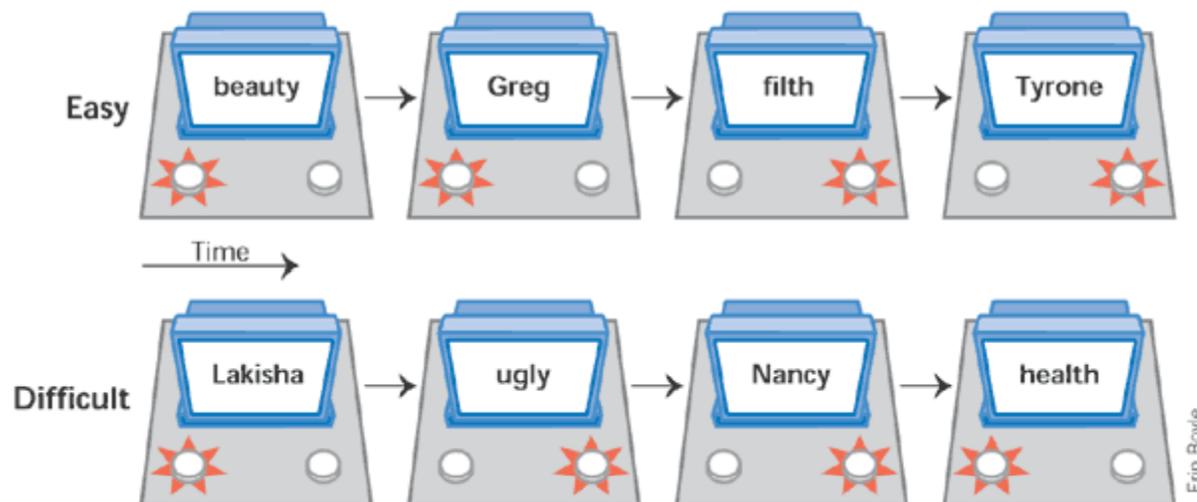


Figure 1: The Implicit Association Test (IAT).

Top panel: the participant presses the left button if the word is a white name or a positive item and the right button if the word is a black name or a negative item. Bottom panel: the participant presses the left button if the word is a black name or a positive word and the right button if the word is a white name or a negative word. The IAT effect is the difference in average reaction time between the two conditions.

Thinking about interracial interactions

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Nature Neuroscience 6, 1241 - 1243 (2003)



Figure 2: The Stroop task.

The participant presses the button corresponding to the color in which the letters on the screen are printed. In the top panel, the correct button is blue. In the bottom panel, the correct button is red. The Stroop effect is the difference in average reaction time between the two conditions.

An fMRI investigation of the impact of interracial contact on executive function

Jennifer A Richeson *et al.*

Nature Neuroscience 6, 1323 - 1328 (2003)

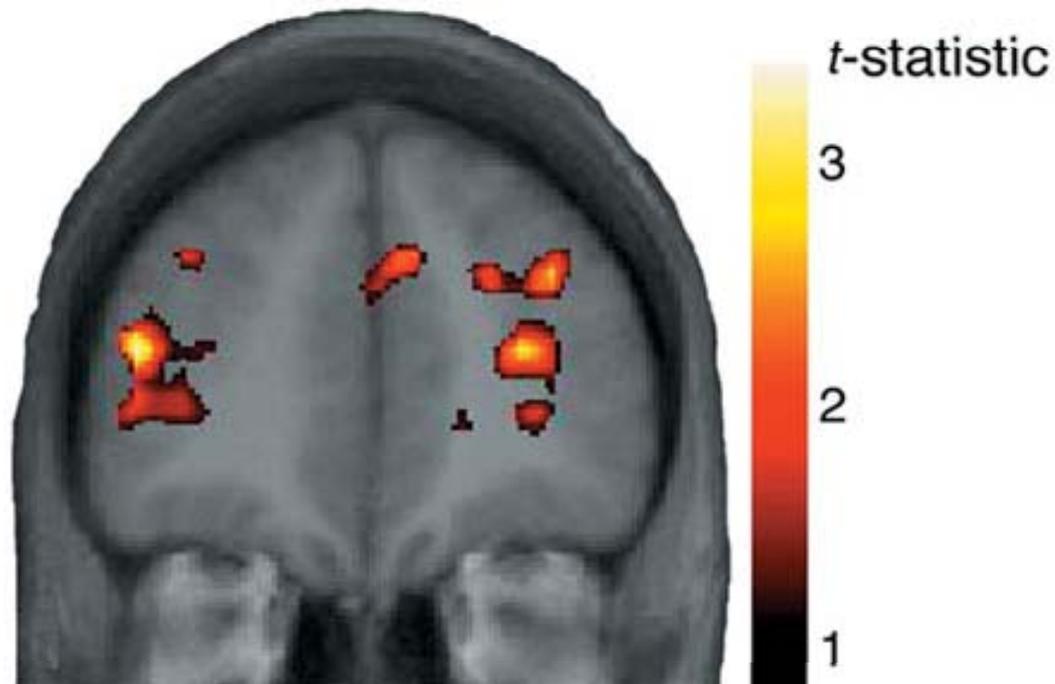


Figure 1: Statistical activation map of black faces > white faces contrast, showing regions in right and left middle frontal gyri, as well as right anterior cingulate cortex.

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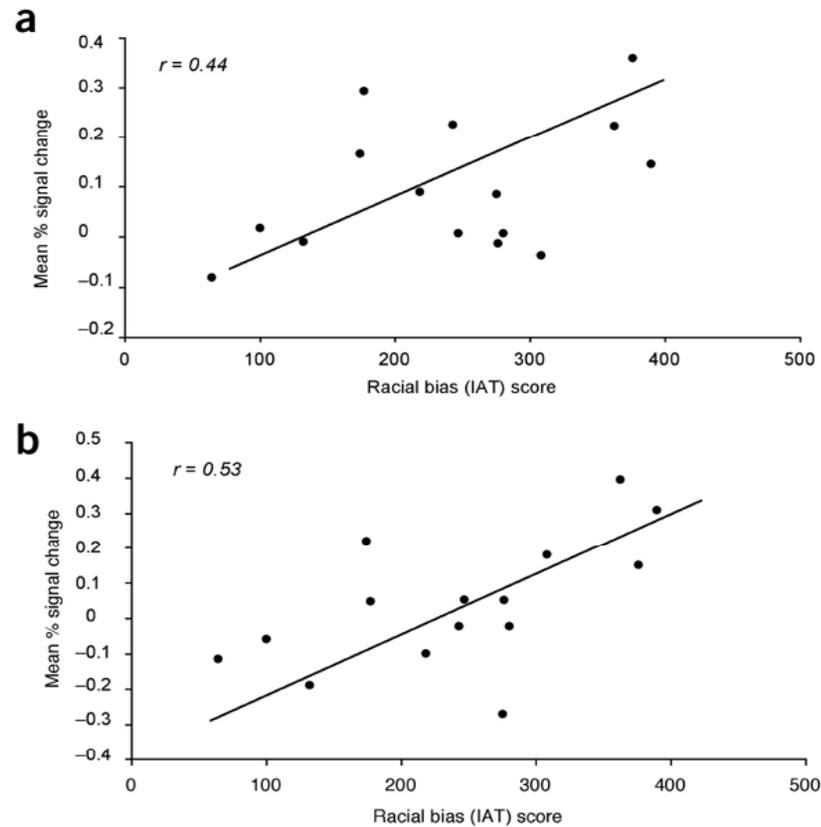
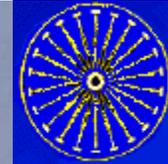


Figure 2: Scatterplots of significant correlations between racial bias and neural activity.

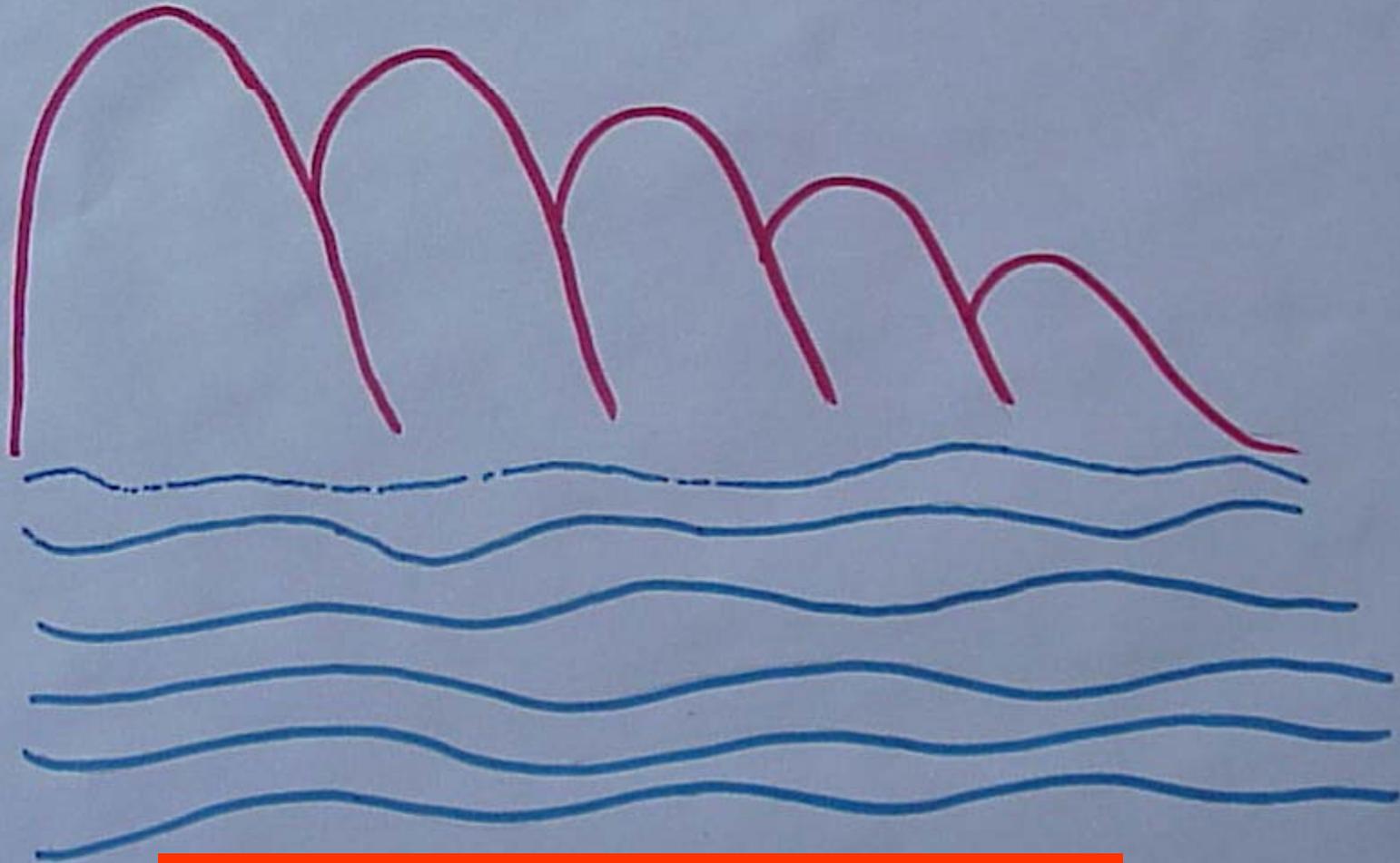
(a) Right anterior cingulate (6, 39, 33); (b) right middle frontal gyrus of DLPFC (39, 48, 27).



University of
Massachusetts
Dartmouth

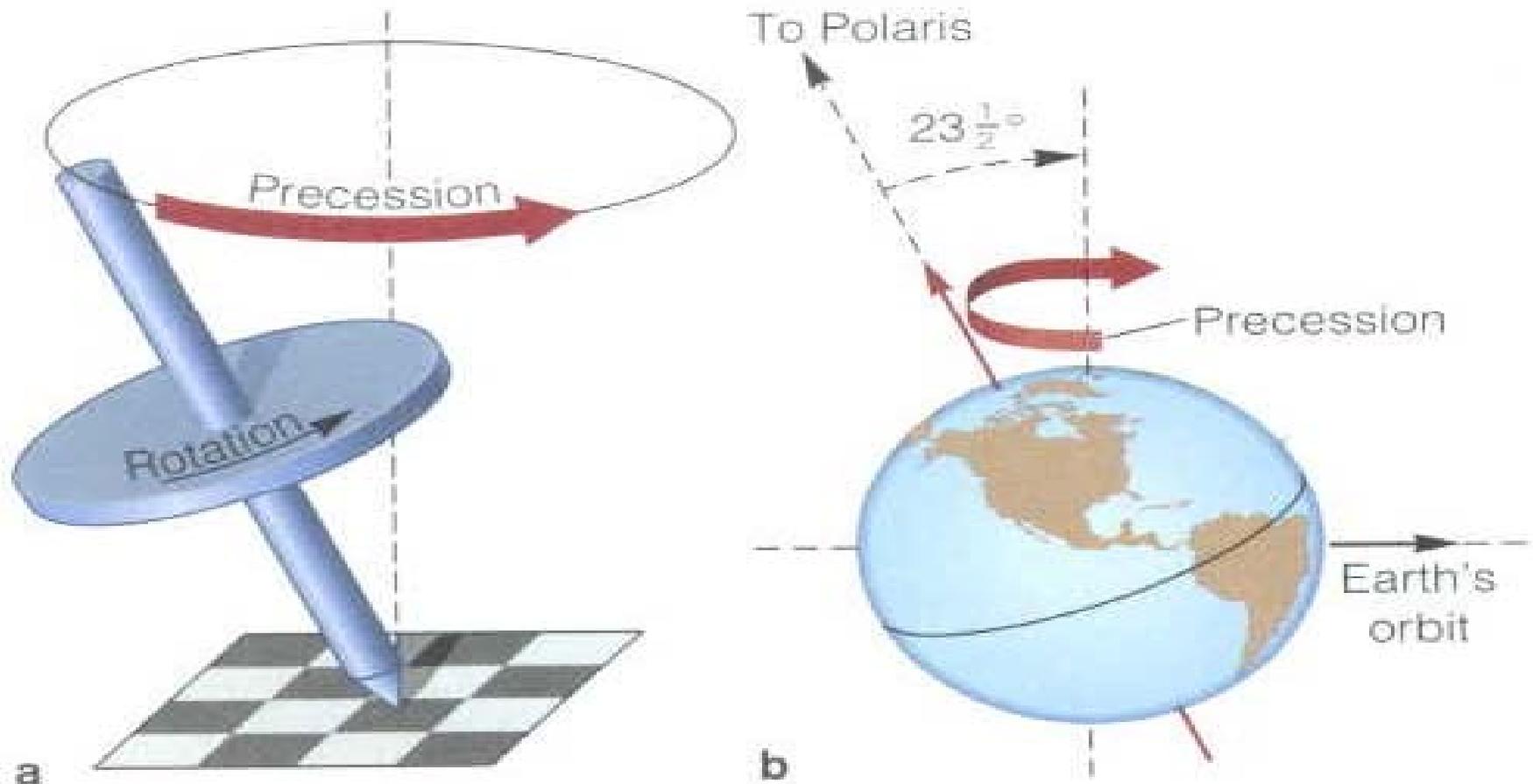


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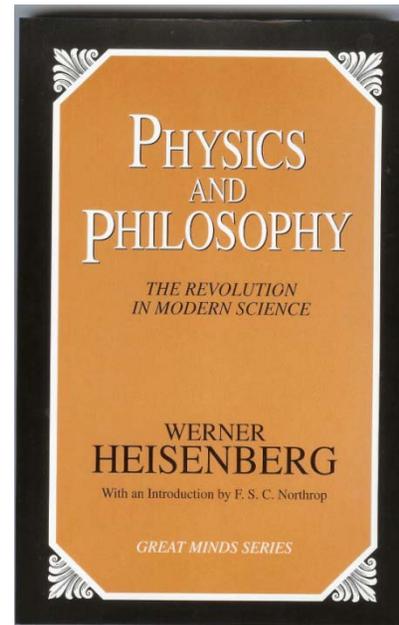
Universal View of Unity

Precession. (a) A spinning top precesses in a conical motion around the perpendicular to the floor because its weight tends to make it fall over. (b) Earth precesses around the perpendicular to its orbit because the gravity of the sun and moon tend to twist it upright.



Philosophy and Physics

- “The instruments of modern science derive from its theory and require a comprehension of that theory for their correct use”
- “This theory rests on philosophical as well as physical, assumptions”
- “When comprehended, these philosophical assumptions generate a personal and social mentality and behavior quite different from, at points incompatible with, the family, caste and tribally centered mentality of native Asian, Middle Eastern or African people”



F.S.C. Northrop,
Sterling Professor of Philosophy and Law,
Yale University
Introduction, Physics and Philosophy