

## Why Meditate? Buddhism facing Science

### Conceptual Processing vs. Perceptual Processing

### Conscious Cognitive Processing vs. Non-conscious Cognitive Processing

### Suppositional Phenomena vs. Ultimate Reality

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Exciting new scientific findings have shed a better understanding on the brain functions and the thought process, which also confirms what have been taught and described in Buddhism for over 2,500 years.

Consciousness requires the proper function and connection between the Limbic system working in concert with the cerebral cortex through the “Reticular Activation System.” \*

[Limbic system, in the mid-brain, evolved from the diencephalon, and includes the amygdala (processing of memory and emotional reactions), hippocampus (consolidation of information from short-term memory to long-term memory and spatial navigation), basal ganglia (cohesive functional unit), thalamus (brain’s major

relay station for incoming sensory information) and hypothalamus (seat of emotion). The Limbic system is basically the “Grand Central Station of Emotion.”]

Figure AB-16: Limbic System

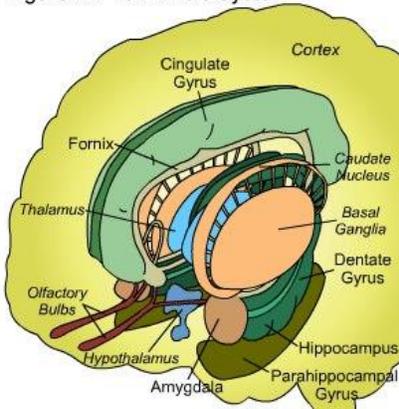
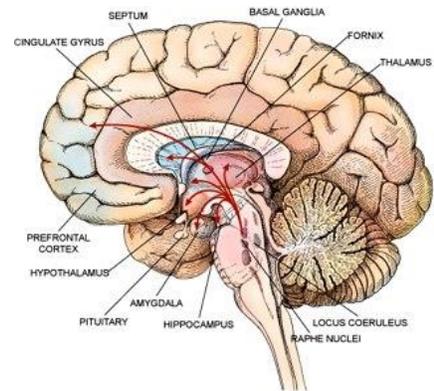


Diagram colors are consistent with Figure AB-17.



“Conscious Cognitive Processing” in our daily living only allows us to concentrate on only one thing at a time (e.g., one cannot participate or listen to 2 conversations at the very same time), the fact that has been known and emphasized in Buddhism, esp. among Buddhist meditators for over 2,600 years, that the mind can only dwell in one mental object or phenomenon at a time.

Yet, it has recently been found that the “Non-conscious or Unconscious Cognitive Processing” can have a much wider

perspective and can perceive many incoming subtle information at a time, e.g., flashing numbers on the screen at increasing speeds would allow the brain to see and name the flashed numbers correctly initially at a slower speed, until it reached higher speeds, with the numbers being flashed too fast at less than 150 milliseconds, when the brain perception would bottle-neck out. One would not be able to tell or interpret those faster flashed numbers, yet the eyes and the visual center at the occipital cortex (outer layer at the back part of the brain) have already registered all those flashed numbers, either fast or slow, completely and perfectly, but the brain could not process them quick enough through the “Conscious Cognitive Processing” on the faster flashed numbers, as if they were not there at all. *It has been found that the brain processes 400 billion bits/second of information, yet is only aware of 2,000 bits/second of them. Apparently, majority of them went unnoticed with Conscious Cognitive Processing.*

Such “*Non-conscious or Unconscious Cognitive Processing*” would play an important role when one is exposed to many incoming information, e.g., in a new environment, one’s brain could have received a vast amount of data with rich information of the whole scenario (rather than being perceived with only one single narrow view through “*Conscious Cognitive Processing*”). It has been speculated that such “*Non-conscious Cognitive computation*” may play a very important role with one’s own “*gut feeling*” in making the correct decision, which is rooted deeper and wider than the “*Conscious Cognitive Processing*” (with a single narrow view) to come up with the correct solution for the circumstance, or with a new invention in need.

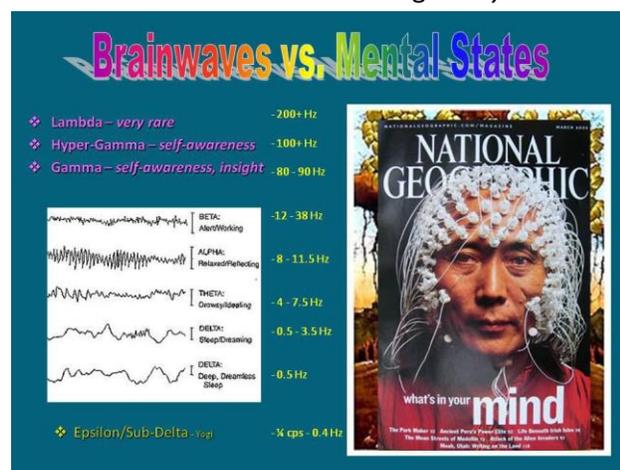
In Buddhist Insight Meditation, one would train to observe and monitor oneself *introspectively and unbiasedly* to become *mindfully-aware* of what is on-going at one’s *Body, Feeling, Mind, and Mental Phenomenon*, i.e., the “**4 Foundations of Mindfulness**,” by embedding one’s mindfulness and attentiveness at one’s body or one’s bodily movement. This could be achieved through “*Rhythmic Dynamic Meditation*” – an applied technique to the “*Sampajanna-bappa or self-awareness technique*” through being aware of subtle bodily movement and “*Iriyapada-bappa or 4 major postures technique*” of walking, standing, sitting and lying down, or observing movement of the breath without moving one’s body, “*Anapanasati or Mindfulness of Breathing.*”

*Mindful-Awareness (Mindfulness & Self-Awareness)*, experienced through *Insight Meditation* has been described as:

- *Pure Perception*
- *Bare Attentiveness*
- *Unbiased Perception*
- *Choiceless Awareness*
- *Undiscriminating Awareness*
- *Nonjudgmental Experiencing*
- *Unknowing Knowing (without conceptual interpretation or biased thought)*
- *Knowing without Thought*

in what one sees, hears, smells, tastes, touches, or thinks (i.e., the 6 sense-organs)

Mindful-awareness that one gains through such “*Insight Meditation*” would open oneself to limitless yet pure perception (Sanna), with a wide perspective at the incoming information from all directions, derived through the *6 sense-spheres* (eyes, ears, nose, tongue, body, and mind), or through one’s *Body, Feeling, Mind, and Mental Phenomena (the 4 Foundations)*. With mindful-awareness, one could catch biased thoughts, which condition one’s mind, giving rise to various emotions tainted with greed, hatred, and delusion. It is as if one could see all ongoing phenomena and the whole scenario from a control tower, seeing all the incoming and outgoing planes (i.e., biased thoughts), or from a shining light-house allowing one to see things in all directions.

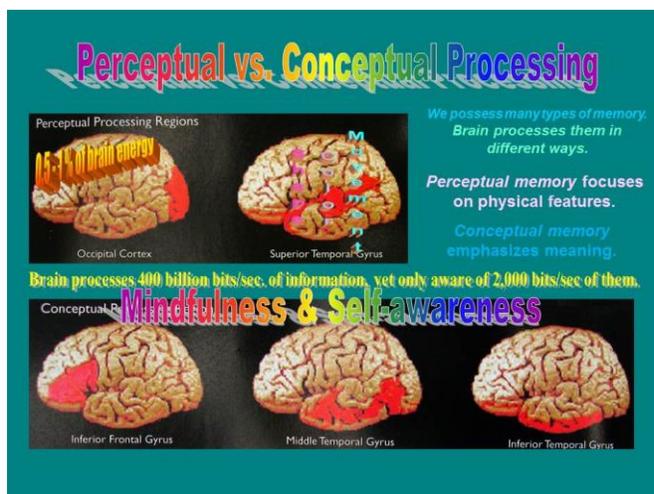


With the known observed findings during the “*Mindfulness Meditation*” or “*Insight Meditation*” that the brain would be firing at 80 – 90 cps or Hz in the gamma range (40 – 100 cps or Hz), and even at the hypergamma or lamda range (100 – 200 cps or Hz) of brain waves in some rare instances. The mind is very active, swift, soft, light, yet steady. Such Mental consciousness is an open and unbiased mind, suitable to perform any mental task (*Manodvaravajjana Citta* มโนทวารวชิณจิต), and is capable of catching all kinds of incoming information transmitted through the other 5 sense-sphere consciousness (ปัญจทวารวชิณจิต *Pancadvaravajjana Citta*) of eyes, ears, nose, tongue, or body, including one’s own mind as thought or mind-movement, which fires in the beta wave range at only 12 -38 cps or Hz.

This is not dissimilar to the newly discovered scientific findings on the “Non-conscious or Unconscious Cognitive Processing” which one can be aware and perceive a wide array of information from all directions at the same time.

Such pure perception (bare attentiveness, indiscriminating awareness, unknowing knowing, knowing with any bias or thought) through Insight Meditation would be unbiased, equanimous and open-minded. Therefore, it will allow one to see the true nature of things as they really are. With heightened mindful-awareness, one would realize that all phenomena are but transient and just passing by: arising, enduring, and ceasing, as a norm, known as “*Tilakkana* or *Trilakkana*” or the “**3 Universal Marks of Existence**”: *Impermanence, Imperfection, and Selflessness*. One would become wise as realizing that nothing is worth clinging to; as whenever attached to, they would all become a burden and would make one suffer. One’s mind would be disenchanted, discerned, and liberated, as no longer clinging to the ups and downs of life or anything in this world.

This is unlike what one may experience through “*Concentration/Tranquility Meditation*” which is focusing on only one theme or mental object, with the brain gaining mental strength, yet firing very slow in the sub-delta or epsilon wave range at 0.25 – 0.5 cps or Hz. This would result in a single narrow view,



as if shining a flash light directly ahead as a single light beam with the focused and concentrated mind. Yet it only allows one to see things right in front of oneself, operating slowly beneath and below one’s own biased thought which fires in the beta wave range at 12 -38 cps or Hz. One is not getting rid of the biased thought, and is in fact being obscured from the whole surrounding scenario and therefore unaware of the hidden danger in the surrounding darkness, i.e., the harm of greed, hatred, and delusion, generated by one’s own ignorance and biased thought.

Similarly, it is not possible to gain wisdom with such single narrow view rooted in the biased thought, through the “Conscious Cognitive Processing,” firing in the beta wave range at 12 -38 cps or Hz, unless one’s mind is operating and firing at a faster pace in the gamma range (40 – 100 cps) or beyond into the

hypergamma or lambda ranges (100 – 200 cps or Hz), capable of catching all the biased thoughts.

It is now known scientifically that the image perceived at the visual center (*JakkuVinnana Citta* of the Thought Process or “*Vithi Citta*” in Buddhism) on the back part of the brain, after passing through the lens of the eyes and transmitted as electrical impulse through the optic tract (*JakkuDvaravajjana Citta*), still needs to be transmitted to the Superior Temporal Gyrus for interpretation (*Santirana Citta*), known as “**Perceptual processing**” (focusing on the physical feature) to interpret the visualized image, e.g., as a lotus flower or a parrot, etc., based on the shape, color, movement, and position of the object. Perceptual processing only consumes 0.5 – 1% of the brain energy.



Subsequently, the neural information would be transmitted to the Middle Temporal Gyrus, Inferior Temporal Gyrus, and Prefrontal Cortex, for further interpretation (*Votthappana Citta*) to give values and meanings. This will give rise to biased thoughts, and drives, known as “**Conceptual processing**” (emphasizing the meaning and values) based on one’s past memory, experience and suppositional values. This would result in further consequence of mind conditioning with “Mental Impulse” (*Samkara*) or drive with motive, intention or “Volition” (*Cetana*; - I declare, “*Volition is Karma*” - the Buddha), based upon one’s bias rooted in the ‘self’ concept (or self-image hologram). Such Conceptual processing could consume up to 60 – 80% of the brain energy, and has been coined the term, brain’s “Dark Energy,” typically seen during day-dreaming or absent-mindedness.

This is why *Somdet Phra Yannasangvorn, the Supreme Patriarch of Thailand* has emphasized that:

*“The Buddha’s teaching is the teaching of the inward nature that anyone can practice by observing introspectively to realize the Ultimate Truth. His teaching is logical and persuasive to anyone to investigate and practice accordingly to realize the Truth as a consequence. This is because his teaching is not dealing with the outward nature, but the inward nature, with cause and consequence for anyone to investigate and practice to achieve the fruition of realization.”*

*Ven. Luangpor Teean Jittasubho* also pointed out that, “*One suffers out of one’s own thought.*” He advised that one should practice by being mindfully-aware of oneself 70% inwardly and 30% outwardly, to be efficient and effective in catching one’s biased thought as it arises, and free oneself from suffering.

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\* “Consciousness: The Charlie Rose Brain Series 2”  
<http://www.charlierose.com/view/interview/12025>