

# ELEMENTS OF COGNITIVE SCIENCES AND ARTIFICIAL INTELLIGENCE IN *GAYATRI MANTRA*

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## **Abstract**

The syllables and series of sounds composing *Gayatri Mantra*, and the sense and meaning attached to them are analyzed using *Upanishadic* Wisdom, *Advaitha* Philosophy and *Sabdabrahma Siddhanta*. The physical structure of mind as revealed by this analysis is presented.

An insight of various phases of mind, their rise and set, their significance and implications to cognitive sciences and natural language comprehension branch of artificial intelligence are discussed. The possible applications of such an insight in the fields of cognitive sciences, modeling of human mental processes and language learning/communication processes are hinted.

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Cognitive sciences often rediscover philosophical analyses taxingly. A better policy would be first to learn what philosophy can teach us and then

move on to experimentation and model-building within the scope of positive science. In this article an attempt is made to combine the ideas of mind existing and revealed in ancient Indian wisdom contained in the *Gayatri Mantra*, Upanishads, *Advaita* philosophy and *Sabdabrahma siddhanta*. Also the possible application of such a combination in the fields of cognitive sciences artificial intelligence and physiological psychology is hinted.

Chanting and meditation on the *Gayatri Mantra* is part of spiritual ritual of many traditionalists. This is an important phase of *Sandhya Vandanam*. The profound meaning of *Gayatri Mantra* and the meditative insight contained in the performance of *Sandhya Vandanam* is very interesting, revealing and beneficiary.

### ***Gayatri Mantra***

. *Aum bhoo bhuvah ssvah Aum tat savitur varenyam bhargo devasya dhimahi dhiyo yo nah prachodayat*

### Purport/Tatparya:

May the Divine Luminescence which causes the conscious states/phases of mind- *bhoo* (*jagrat/* wakeful/ awakened), *bhuvah* (*swapna/dream*) and *svah* (*sushupti/deep sleep*)- illuminate and inspire our intellect.

We also have:

- i. *Aum bhoo Aum bhuvah Aum svah Aum mahah Aum janah Aum tapah Ogum satyam*
- ii. *Aum tat savitur varenyam bhargo devasya dhimahi dhiyo yo nah prachodayat*
- iii. *Aum aapo jothi rasomrutam brahma bhoorbhuvassvah Aum*

### Purport/ Tatparya

*Pranavam* is *Aumkaaram*. *Pranavam* is contained in every thing as *pranava sakti*. Everything is manifestation of *pranavam*. *Sapta lokas* (*lokyate iti lokah-* what is seen is *loka*) -- *Laukika Jnanadayakaropa* ***Bhooloka*** (*jagrat/* awakened/wakeful conscious/mental state) and ***Bhuvarkala*** (*swapna/dream* conscious/mental state), the *swararopa* ***suvarloka*** (*sushupti/deep sleep* conscious/mental unawareness state), *buddhiroopa* ***maharloka*** (phase of intellectual operations), *pranayuta ahamkaararopa* ***janoloka*** (origin, form, structure, cessation and re-creation of egoistic mind state), ***tapoloka*** (one-pointed meditative mental state) and

*Sat-Chit-Ananda roopa* eternal awareness-providing **Satyaloka** (egoless/ego-transcending conscious state, which exists in all the conscious/mental states and at all times-physical or psychological)- are manifestations of and contain in and by *Brahman/Atman* .

ii. May such *Brahman/Atman*, responsible (*upanadana karana*) for our mind and associated functions illuminate our intellect to acquire real knowledge (*jnana*). We pray that Divine Luminescence and meditate on it.

iii. *Ap (rajo guna)*, *jothi (sattva guna)* and the *rasaswaroopam (tamo guna)*, *amritam* (essence of meaningful experience or experienced meaning -beyond or transcending *jeeva sthiti*), and the conscious/mental states *bhoor-bhuvah-suvah lokas* are all manifestations of the same *pranavam*-the *Brahmaswaroopam*. This is also called *savita* -the cause and creator of all these.

Chanting these *mantras* and meditation on their meaning is the chief phase in the performance of *Sandhya Vandanam*. . *Sandhya* means ***antarmukha dristi samayam***/awareness of within mental phase. ***Sandhya Vandnam*** means. ***atmaanusandhana prayatnavidhi.*** *Divam* means ***bahirmukha dristi samayam/ aatmaanubhava vismarana samayam***/ awareness of without mental phase. *Rathri or Nisa* means ***visranta dristi samayam/aatmanbhava samayam***, the state of peace, silence and bliss-the state of cessation of all mental cognitions (***maanasika kaaryakalaapaanaam viraama samayam / raama samayam***).

These purports will further be interpreted making use of *Upanishadic* wisdom, *Advaita* philosophy and *Sabdabrahma Siddhata* as follows.

### ***Upanishadic Wisdom***

Ancient Indian wisdom as revealed in the *Upanishads* has a lot to say about human consciousness<sup>1-11</sup>. Ramabrahmam provided a scientific awareness of mind, its form, structure, function, thoughts, understanding and other mental processes and their cessation from psychology point of view contemplating on *Upanishadic* wisdom as *manastattva sastra*<sup>2-11</sup>. *Upanishads* are source-books of *Atmajnana*, the Knowledge of the Self. *Upanishads* construe the state of *Atman* as the real 'I' state. They understood the Self i.e., human consciousness, to be **unoccupied (mental) awareness** and the natural, original and ground state of human mind<sup>5-8</sup>.

. *Atman* is the result of breathing process<sup>14,15</sup>. *Srestaprana*, (most possibly O<sub>2</sub>) is given as the body (*tanu*) of *Atman*<sup>14</sup>. *Atman* is in motion always (*yasya gamanam satatam tat atma* – which moves incessantly is *Atman*) and in modern scientific terms can be termed as a bio-oscillator issuing out pulses of psychic (*chit*) energy of time period 10<sup>-1</sup> second<sup>6,16,17</sup>, the time required to pronounce a short syllable like ‘a’ (*laghu akshara*)<sup>16</sup> (see Appendix I).

*Atman* provides us with the mental energy whose presence and transformations of its virtual form (*maya* also known as *chidabhasa* or *pranavam*), give us mental time-space and states of consciousness respectively (Concept Diagram I), to be aware of the body, within of the body, without of the body and also a state that transcends both body and mind consciousnesses<sup>2-11</sup>. *Maya* is the virtual mental energy flowing throughout the body providing sensing abilities to us. *Maya*, the virtual psychic energy and its transformations provide the current of awareness and hence consciousness to us. **Conscious states are the phases of mind in the awareness of *Atman***. Conscious state of cessation of mental activities, similar to zero in number system and vacuum in physical sciences, is the unique proposition of *Upanishadic* wisdom which has profound role in the human cognition processes<sup>4</sup>

### ***Advaita Philosophy and Sabdabrahma Siddhanta***

*Advaita* Philosophy is an off shoot of the *Upanishadic* awareness. *Advaita* Philosophy is more popular as *Vedanta*. And it is known to Sanskrit grammarians that *Advaita* philosophy is best suited to understand language learning and communication skills<sup>12,13</sup>. *Patanjali*, *Bhartruhari*, *etal.*, proposed and nurtured *Sabdabrahma Siddhanta* while attempting to understand language learning, comprehension and communication processes and formulating the grammar rules for Sanskrit language making use of *Brahmajnana* or *Atmajnana* and *Advaita* philosophy and applied them beneficially<sup>12,13</sup>

As stated above the presence of *Atman* and transformations of *maya* give rise to four conscious states in us. The wakeful-sleep ( ***Jagrat Sushupti***) and deep sleep (***Sushupti***) conscious states are the *advaita* ( No Two- only ***Aham*** – ***Aham*** series- here ***Aham***/ relates to unoccupied awareness or pure consciousness without any mental cognitions taking place) conscious states. Wakeful ( ***Jagrat***) and dream (***Swapna***) conscious states are *dvaita* (Two- ***aham - idam*** series - here ***idam*** relates to mental cognitions and functions in

the awareness *aham/atman* ) conscious states<sup>7</sup>. These conscious states alternately and simultaneously rise and set in us helping us to cognize/know/learn, perceive, reason, think, do intellectual operations, experience/understand, speak/teach, read and write and thus be aware of various disciplines and skills, master and use them through the medium of language or otherwise by the simultaneous use of *antahkaranas* (inner mental tools-- *manas, buddhi, chittam and ahamkaram*), sense organs and action organs<sup>2-8</sup>

According to *Upanishads* knowledge is of two kinds- (i) that acquired through the combined operation of sense organs, action organs and inner mental tools in the awareness of *Atman* ( *Maitra Jnana* ) and (ii) that is inherent / genetic ( *Varuna Jnana* )<sup>5-7,14</sup>. All our acquisitions of knowledge come under *Maitra Jnana* and the in-built urges, volitions, body and mental abilities, capabilities, nature etc., come under *Varuna Jnana*.

Simply putting, according to *Upanishads*, our mental functions are the forward and backward transformations of *chidabhasa* or *maya* – transformed by energies sensed through sense organs or the stored information as potential energies retrieved (as *vasanas* first and then *prapancham* as feelings/thoughts/perceptions) and transformed in the reverse direction to give us knowledge, experiences etc. The transformation of *maya*, reverse transformation of *maya* and cessation of transformation of *maya* - the *dvaita* and *advaita* conscious states respectively- taking place simultaneously, consecutively and alternately is the structure, form, function, state and essence of human consciousness, mental functions and cognitive processes.

The above discussion and propositions about mind and its functions in terms of *Atman and maya* can be extended and used to understand language learning and communication processes. It is mentioned above that *maya* is also known as *pranavam*, the primordial sound.

***Bhakti*** (defined as *swa swaroopa anusandhanam bhaktirityabhidhiyate*- tuning the mind to natural state of mind i.e., the state of Self- or *cheto vrittirupetya tisthati sadaa saa bhaitirityuchyate*- the state when *cheto vritti- antahkarana parinama*-ceases to take place) is another name for the state of *Atman* or *Brahman*- the *advaita* state. In this state the *pranavam* or virtual chit –energy (termed as *maya* by *Vedantins*)– does not transform into *antahkaranas* - no *vivartanam* (two-way transformation of *maya* and *antahkaranas*) , meaning no *antahkarana parinama* or *vritti* ( transformation of inner mental tools causing cognitions) takes place

Transformation of *pranavam (maya)* as *antahkaranas* and *pancha pranas*(*prana,apaana,vyana,udana and samana*) and thence activating sense and action organs respectively and simultaneously (wakeful and dream

phases of mind) is the *vibhakti* or *dvaita* state or the state of ego- *jivatma* – the state of I-, my- feelings, thoughts and perceptions. All kinds of knowing /learning /expression /teaching take place in this *vibhakti* state making use of all mental tools in the awareness of *Atman*. *Sabdabrahma Siddhatanta*, as well takes this *advaita/dvaita* concept and a theory of language learning/teaching, speaking/understanding in the four modes of mind ( ***para***, ***pasyanti***, ***madhyama*** and ***vaikhari***) is developed using *sphota vada*, a consequence of *Sabdabrahma Siddhanta*<sup>12,13</sup>.

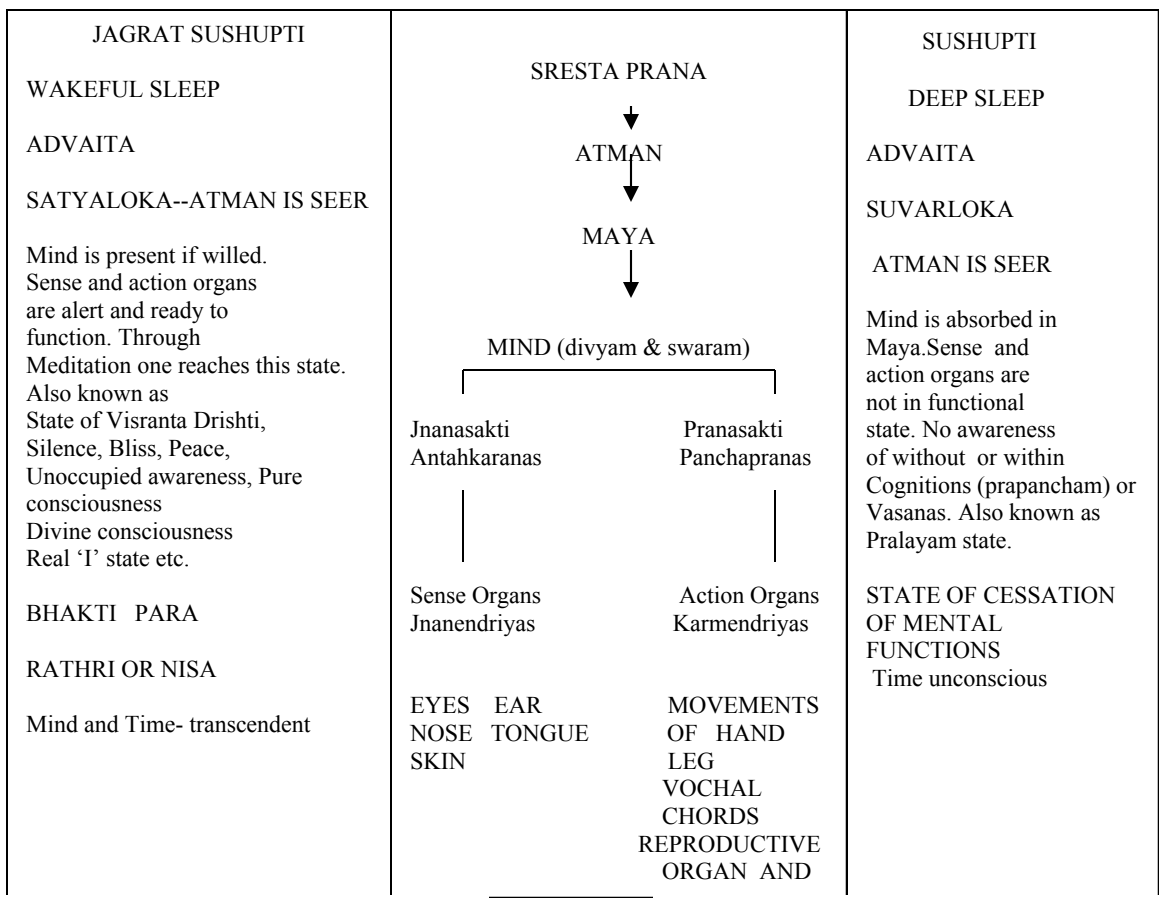
According to this theory human language communication process is a combination and quick successive reversible transformations of four modes i.e., I Speaker/Teacher: (a) Purport/Awareness (Meaningful Experience or Experienced Meaning- ***para***) (b) Understanding/ Experience/ Sense/ Mood/Volition/ Intuition (***pasyanti***) (c) Perception/Thinking/Feeling (***madhyama***) (d) Utterance /Expression (***vaikhari***) II Knower/ Listener/ Learner: (a) Knowing (through sense organs)- ***vaikhari*** (b) Perception/Thinking - ***madhyama*** (c) Understanding/ Experience -***pasyanti*** (d) Purport (Meaningful Experience/ Experienced Meaning)/Awareness-***para***.

When the physical structure of mind and its function as revealed in the *Gayatri Mantra* as *sapta lokas* (TABLE I) is compared and combined with the knowledge of conscious states/phases of mind and mental functions provided by *Upanishadic* wisdom (CONCEPT DIAGRAM I AND TABLE II) and language learning, comprehending and communication modes as worked out by Sanskrit grammarians together with *Advaita* Philosophy and *Sabdabrahma Siddhanta* (TABLES I AND II) a working model of human mind can be built.

The insights of *Upanishadic* wisdom on human cognitive processes and the physical structure of mind as revealed in the *Gayatri Mantra* as *lokas* can be used to propose a human cognitive process model; the ultimate aim being the development of a soft-ware which would perform the tasks of the mind. These understandings in modern scientific terms about mind, its phases in the form of conscious states/*lokas* can be further used to develop the software to model human mental processes and language learning/communication processes going on within us and compare and club them with the mind-machine model-building attempts and working of the bio-chemicals and the energy transitions and transformations associated with them<sup>18-24</sup>.

CONCEPT DIAGRAM I

**STATES OF CONSCIOUSNESS- PHASES OF MIND – MENTAL TIME – SPACE  
THE PHYSICAL STRUCTURE OF MIND**



**JAGRAT BHOOLOKA**  
WAKEFUL/AWAKENED

Mind is present, Sense and Action organs are active are in working state. All learnings take place in this state. Meditation starts in this state. Also known as Bahirmukha Drishti state. DVAITA Antahkarana parinama takes place. Time-conscious. Awareness of without. VIBHAKTI ANTAHKARANAS ARE THE SEER. DIVAS UNREAL 'I'

**SWAPNA BHUVARLOKA DREAM**

Mind is present. Sense organs are in dormant state. Actions organs will be functioning if necessary. Meditation becomes one-pointed in this state. Also known as Anthramukha Drishti state. DVAITA. Antahkarana parinama – vritti takes place. Time conscious. Awareness of within. VIBHAKTI. ANTAHKARANAS ARE THE SEER. ALSO MAHAH-,JANAH,-TAPO LOKAS. SANDHYA UNREAL 'I'

**JAGRAT**

Mind is present, Sense and Action organs are Active and are in working state. All learnings take place in this state. Meditation starts in this State.

Also  
Known as Bahirmukha Drishti State.

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**SWAPNNA**

Mind is present, Sense organs are in dormant state. Action organs are alert and aunction if necessary. Meditation becomes one-pointed in this state.

Also  
Known as Antarmukha Drishti State.

TABLE - I

PHYSICAL STRUCTURE AND PHASES OF MIND AS REVEALED IN *GAYATRI MANTRA*

Sapta Lokas : (Seven Conscious states of mind)

1. Seer Atman/Brahman      ADVAITA STATES      BEING

Satya loka : Aham -Ahah    Jagrat Sushupti    Wake ful Sleep    Peace Silence Bliss  
Egoless /ego-transcending conscious state.    Visranta Dristi

Awareness + Chidakasa    Maya not transformed    Srasta Rasa

Atmanubhava Samayam    Bhakti,    Para    Tatparya,    Sat-Chit-Ananda      Sat/Chit

Tapo loka : Aham+Chidabhasa    Chittakasa      Jagrat Sushupti    Maya not transformed    Samvit  
Meditative state if Mind      Antakmukha Dristi

Awareness + Icha-jnana-kriya sakti pravaham / Nirvishaya/nirvishayaanubhava pravaham

2. Seer: Antahkaranas – manas, buddhi, chittam and ahamkaram      DVAITA STATES      BECOMING

Jano loka : Aham+Vasana      Rajomayakasa    Jagrat and/ or Swapna    Wakeful/Awakened and/or Dream  
Antarmukha Dristi    State of egoistic mind.    First transformation of maya

Awareness + Mood Pasyanti    Artha    Experience    Intuition    Sense    Understanding    Urge

Maharloka : Aham+ Divya, Swara    Saktis    Jagrat and/or    Swapna    Mental state of Intellectual operations  
Antarmukha Dristi

Awareness + Akasa and Vayu    Bifurcation of maya into jnasakti and prana sakti

Survarloka : Aham+ Nirvishaya/Nirvishayaanubhavam      Sushupti    Deep Sleep

Awareness+ Tamas    Maya not bifurcated and not transformed    suddhavasana    pravaham

Bhuvarloka : Aham+Idam    Bhutakasa      Swapna    Dream    State of awareness of within

Awareness + Second transformation of maya    Srusti    Vibhakti    Madh yama

Antahkarana parimanatakes place    Only action organs are active    Sense organs are dormant

Bhooloka : Aham+Idam    Jagrat    Wakeful/awakened    State of mental cognition    knowing/Expressing  
Bahirmukha Dristi

Awareness + Bhutakasa      Second Transformation of maya /Transformation of maya into sound,  
gesture, expression etc.,      Vibhakti    Vaikhari    Both sense and action organs are active

APPENDIX I:      Measurement of Time based on Surya Siddhanta.<sup>16</sup>

1 Day= 60 Nadigas;    1 Nadiga=60 Vinadigas;    1 Vinadiga=6 Pranas;

1 Prana=10 Deerga Aksharas (Long Syllable); 1 Deerga Akshara=4 Laghu Aksharas (Short Syllable).

1 PRANA= Time taken to pronounce 40 Laghu Aksharas (Short Syllables).

Length of the Day is divided into 864,000 paarts. This corresponds to 1/10<sup>th</sup> of western second. The length of the day is equal to the time taken to pronounce **864,000** Laghu Aksharas ( SHORT SYLLABLES).



TABLE- II  
INSIGHT OF *GAYATRI MANTRA*, *UPANISHADIC WISDOM*, *ADVAITA PHILOSOPHY* AND *SABDABRAHMA SIDDHANTA* IN TRADITIONAL AND MODERN SCIENTIFIC TERMS

No	UPANISHADS	SUDDHA ADVAITA	SAKTADVAITA	SABDA BRAHMA SIDDHANTA	VARANASI RAMABRAHMAM PRESENT PRESENTATION
1.	Atman and Brahman are same	Atman, Brahman and Individual consciousness are not different	Seer 'kasyapo pasyako bhavati  Awareness'	Para Bhakti Maunam Being	Unoccupied Awareness -Bio-oscillator Satyaloka Being
2.	Maya Chidabhasa	Maya Through which object – energy forms are sensed yaya asantam pasyati sa maya - ya ma sa maya	Maya is another name for 'samvit' Maya is reflected Sat/ Chit. Maya is Chidabhasa Pranavam	Sphota Pranavam Pasyanthi Subject- Objectless Verb state Infinite/present continous	Maya is psychic Energy. Reflected Chit-energy Tapoloka
3.	Jagat is imposition on Sat. Also known as idam and Prapancham.	Jagat is not real. Has no creation. So has no dissolution.	Jagat is becoming of Chidabhasa. Jagat has origin and dissolution.	Madhyama Vibhakt Becoming	Jagat is Transformed(modulated) Maya when object-energy forms are cognized by Antahkaranas. Jagat has appearance and disappearance in the eternal Awareness Prajnanam, the Atma Drishti. Bhoorbhuvahmaharjanolokas
4.	Idam is enveloped and encompassed by Isa. What is moving (transient) in the Atma-Dristi is Jagat	Jagat is illusion in Sat and is 'seen' so as serpent is 'seen' in rope.	Jagat is 'pot' in mud. 'Ornament' in gold 'Dog' in rock (sculpture)	Madhyama Vaikhari  Vobhakti Becoming	Jagat is objective-Cognised energy form in Chida-bhasa. (Psychic energy pulse flow) Bhoorbhuvahmahatjanolokas
5	What is 'seen' is in *Sapta lokas Bhooh, Bhuvah, Suvah, Mahah, Janah Tapahah, Satyam lokas	What is 'seen' is virtual	Satya and Tapo lokas are eternal .Rest of the lokas disappear at pralayam	Madhyama/ Vaikhari  Vibhakti Becoming	Maya undergoes bifurcation and Transformation -two way becomings to facilitate cognition and cognition related actions interactions andreactions. Bhoorbhuvahmaharjanolokas
6.	Five elements are different phases of maya in the process of cognition	Five elements are different phases of maya.	Akasa and vayu are energies available even before creation takes place. Prithvi, Ap and Tejas are transformed and changed Akasa and Vayu.	Madhyama/ Vaikhari Vibhakti Becoming	In Atma awareness- (Sattva Guna) Object-Energy -Cognitions- (Tamoguna) Take place through AntahkaranaParimana-(Rajoguna) .Also known as <i>vritti</i> Five elements are five phases of psychic energy.
7,	Prajnanam is divided as Jagrat,Swapna, Sushupthi and,Jagrat-sushupthi Atma Dasa.	Same as Upanishads Names of seers change Jagrat-Vaishwanara Swapna-Taijasa Sushupthi-Prajna Manodadas.	Ishwara is Avasthatraya Shakshi	Madhyama/ Vaikhari Vibhakti Becoming	Phases of mind and States of consciousness created by Object-Cognition and eventual transformation-modulation-of psychic energy
8.	Pure Consciousness transcends Time	Consciousness of Time and Space are not real	Time and space are synonyms of energy	Madhyama /Vaikhari Vibhakti	Time and space Perceptions are relative to

and Space Consciousnesses			Becoming	conscious state.
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