Talk 4: Life and Its Origin: A Sri Vaisnava Perspective
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Talk 5: The Hardware and Software of Human Cognition and Communication: A Cognitive Science Perspective of Orthodox Indian Philosophical Systems
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The comprehensive nature of information and insight available in the orthodox Indian philosophical systems like, the Upanishads, the Advaita / Visistaadvaita, Bhakti schools of thought, dvaita and the Shaddarpanas, in relation to the idea of human consciousness, mind and its functions, cognitive science and scheme of human cognition and communication are presented. All this is highlighted with vivid classification of conscious-, cognitive-, functional-states of mind; by differentiating cognition as a combination of cognitive agent, cognizing element, cognized element; formation; form and structure of cognition, instruments and means of cognition, validity of cognition and the nature of energy/matter which facilitates and also is the medium of cognition- cognizing process; and also as the container and content of cognition.

The human communication process which is just the reverse of cognizing process is also presented with necessary description and detail. The sameness of cognitive/communicative process during language acquisition and communication processes and the modes of language acquisition and communication are also given. In fine the hardware and software of human cognition and communication as envisaged in orthodox Indian spiritual and philosophical expressions are given.

In the light of the information and insight obtained as above, the axioms for human cognition/communication will be formed, framed and presented. The use of these axioms in mind-machine modelling and natural language comprehension branch of artificial intelligence will be put forward and highlighted.

Key Words: Padaartha, Upanishads, Brahmaajnaana, Sabdabrahma Siddhanta, Sphotavadaad, Vyakaranam, Advaita, Visistaadvaita and Dvaita Philosophies, Nyaaya, Vaiseshika, Yoga, Saumkhy, Poorva Meemaamsa, Uttara Meemaamsa, Vedaanta, human consciousness and mind; brain-wave modulation/demodulation model, human cognition/communication, human language acquisition/communication; axioms for human cognition/communication

Introduction
Cognitive science is the interdisciplinary study of how information is represented and transformed in the brain. It consists of multiple research disciplines, including psychology, artificial intelligence, philosophy, neuroscience, learning sciences, linguistics, anthropology, sociology and education. It spans many levels of analysis, from low-level learning and decision mechanisms to high-level logic and planning; from neural circuitry to modular brain organization.
Cognitive sciences often rediscover the philosophical analyses painstakingly. A better policy to understand and model human consciousness and mental functions would be; first to learn what philosophy (Eastern or Western) teaches us about human consciousness and mind in this regard, and then move on to experimentation and model–building within the scope of positive sciences. The information available in Indian spiritual and philosophical systems when correlated from cognitive science point of view; this Indian philosophical insight will be useful to understand and model the form, structure and functions of human consciousness and mind; and to provide as well necessary hints to software and also hardware which would model the tasks of mind.

This paper makes use of the orthodox systems and also gets the benefit of both orthodox and heterodox systems in the understanding and development of cognitive science perspective of “Padaartha” constitutes the software of mental functions.

In all orthodox systems systems, padaartha is defined and termed as raw “material” / energy constituting the consciousness/awareness, mind, cognition/communication, the instruments of cognition/communication, objects of cognition/communication, phases of mind in which cognition/communication takes place or not, functional / cognitive/communication states of mind, the tie-ups of mind with object-energy forms, storing and retrieving inner mental world through instruments of cognition/communication; [moods/senses/experiences/meanings/senses/ - feelings/thoughts/logic/sentences- utterance in expresser/teacher and in reverse order in the listener and vice versa].

Concept of mind as available in Aatma- or Brahma – Jnaana / Advaita / Visistaadvaita and Dvaita Philosophies:
Atman or Brahman is Sat-Chit-Ananda
Upanishad: poornam adaha pooram idam / poornatpoornamudachyate
Poornasya poornamaadaya / poornameva avasishyate
Isaavaasyoapanishat: Isaavaasyam idam sarvam / yatkin cha jagtyaam jagat
Tena tyaktena bhunjethaah/ maa grudha kasyavitt dhanam
Adi Sankara: Brahma sat jagat mithyaa jivo brahma eva na apraha

What is present always (in dristi and responsible for formation of dristi) is Brahman and jagat (which is moving or transient) is adhyasa (veil), over sat (Brahman); and mithya (unreal or virtual); jiva [self-consciousness or egoistic state of mind as adhyasa (super-position) over Brahman] is Brahman (pure consciousness or unoccupied awareness) Itsel, not different or separate.

Sankara followed Bhooma vidya, where as, Ramaanuja followed Saandilya vidya of the Upanishads in the interpretation and explanation of Brahmajnaana and Vedanta. He eulogized Lord Naaraayana and gave his Visistaadvaita theory. And many other philosophers commented Brahmajnaana and Brahma sutras based on many perceptions. They are Nimbaaraka, Vallabha, Madhva, Chaitanya Mahaprabhu, Vedaanta Desika, Appayya Dikshita and many like them who interpreted Vedaanta from advaita or dvaita view. Vishnu Sahasranaama reflects theosophical schools as follows:
Ramaanuja, Nimbaaraka, Madhwa, Chaitanya Mahaaprabhu, Vallabha: Saandilya Vidya:
Cognitive science aspects available in Vishnu Sahasranaama: Saguna Aspect:
Theological systems like Visistaadvaita, Dvaita followed by Ramaanuja, Chaitanya Mahaprabhu, and other schools of Bhakti equate consciousness with the Lord Vishnu or Krishna as the case may be. Vishnu Sahasranaama contains and presents the cognitive scientific aspect of consciousness (prajnaanam – Vishnu is Prajnna Ghna), individual, creation, mind, and form, functions and control of mind.

Aanadi nidhanam vishnum sarvalokamaheswaram
Lokaadhyaksham stuvannityam sarvaduukaathigo bhavet;
Meaning: Vishnu is primordial, Lord of all worlds, presides over all the creation, and is to be prayed to daily to get rid of all grief and unpleasantness.
Brahmanyam sarvdharmajnam lokaanaam keertivarthvardhanam
Lokanaadhan mahadbhootam sarvabhootabhavodbham;
Meaning: Vishnu is full of consciousness, knower of all knowledge, makes all worlds famous and popular, Lords of all worlds, the primordial element of creation, all elements originate from him.

Yataha sarvani bhootaani bhavantyaadi yugaagni
Yasmin cha pralayam yaanti punareva yuga kshaye;
Meaning: At the beginning of the creation, all the elements of creation come from Him; they constitute yuga – two – consciousness and creation; and at the end of creation all worlds will go back into Him when yoga – gets dissolved.

Yasya smarana maatrena janma samsaara bandhanaat
Vimuchyate namaha tasyai vishnave prabhavishnave
Meaning: By meditating on Whom, the devotees are released of all the afflictions and bonds due to I, me, mine and respective experiences is called Vishnu, I salute to Him.

This insight is useful to also understand aspects of cognition and communication too as all knowledge, secular or spiritual is from Him and is due to Him. It is explained during the course of this article.

Scheme of human mental acquisitions, functions and communications Indian Orthodox Philosophical Systems: The Jnaana and Bhakti Views:
While mind is functioning, there will be a differentiated perception (Triputi) of knower-knowing-known or subject-verb-object, which will be missing and absent when non-dual (advaita) awareness or pure consciousness becomes unoccupied awareness (2-16). Experiencing or understanding or getting insight of verb is state of experience and then knower-known or subject-object are not attached to the verb. Verb will be in a present continuous form or infinite form depending on it is absorption of information or understanding cognition or experiencing cognition or urge (to express or do) or intuition (result of perception or instinct took form or genetic knowledge expressed through hormones or like them) or sense or meanings of utterances received or to be expressed (12-16).

We knowingly or unknowingly alternate between non-dual (advaita) and dual (dvaita) awareness while functioning mentally. Wakeful and dream conscious states of mind represent and account for the phase of mind when functioning and then we are aware of and sense or perceive self-consciousness. Once mind ceases to function, we experience peace, bliss and silence within. If these are experienced our being aware them, the phase of mind then is known as wakeful sleep. If we are unaware, but are conscious of these, the phase of mind then is known as deep sleep. The phase of cessation of mental functions (also self-consciousness) is similar to zero in number system and vacuum in physical and biological sciences. Vacuum is inherent in matter and holds matter and is manifested when matter is missing or absent. Consciousness is awareness of mind when no mental functions are taking place. This idea is further elaborated.
Simply put, according to Upanishads, human mental functions are the forward and backward transformations of chidabhasa or maya or Sri - the carrier (in the sense of carrier radio wave in broadcasting and reception process) cognitive-energy pulse series, modulated by energies sensed through sense organs or the stored information as potential energies retrieved (as vasanas - object-experiences, which include meanings of utterances, first and then jagat [retrieved inner world by antahakaranas- manas, buddhi, ahankaaram, chittam] as feelings/thoughts/perceptions) and demodulated to give humans knowledge, experiences etc. The transformation of maya, reverse transformation of maya and cessation of transformation of maya or Sri - 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 [8]. Most of present attempts aim at modeling machine cognition as an isolated process which is the result of sensing (19).

But if human mental processes are observed, it becomes obvious that human perception is but an intermediary process which transfers sensing into sense (understanding/experience) and sense into expression. Human cognitive process can be stated sequentially as follows: (1) sensing: through sense organs (knowing), (2) perception (thinking, reasoning, decision making, etc.), (3) understanding/experience, (4) purport- meaningful experience or experienced meaning. Human mental process is generally held to be a combination and quick successive transformations of four modes i.e.,

I Speaker/Teacher: (a) Purport/Awareness (Meaningful Experience or Experienced Meaning) (b) Understanding/Experience (c) Perception/Thinking (d) Utterance/Expression

II Knower/Listener/Learner: (a) Knowing (through sense organs) (b) Perception/Thinking (c) Understanding/Experience (d) Purport (Meaningful Experience/Experienced Meaning)/Awareness.

Four conscious states of mind, which are phases (jagrat, swapna, sushupti and jagrat sushupti), five functional states of mind (annamaya, praanamaya, manomaya, vijnanamaya and aanandamayakosas) and seven cognitive states of mind: (SaptaLokas – bhooh, bhuvaha, suvaha, mahaha, janaha, tapaha and satyam- Gayaatri Mantra) (7) and four modes of language acquisition and communication are available.

Software:

Human beings know through the following means: The means of cognition are: (Hardware and Software):

1. Through sense organs: Pratyaksha pramana
   Sense organs: receiving information
   Knowing takes place through the medium of inner mental tool – manas

2. Through inference: Anumaana pramana
   Through the inner mental tools – manas, buddhi (discrimination and intellectual operations, ahankaaram (formation and collection of thoughts/feelings about the individual in attention to body gender, mental traits, social status, and the like) and chittam (collects, receives, creates, stores, retrieves, recollects object-energy created experiences simultaneous to and in tune with knowing and perceiving – which includes the meanings, senses, understanding, insight, mood, intuition, urge, physical and psychological cravings etc.,) Inner mental tools: registering and reproduction of information

3. By authenticity, authority or through faith, allegiance and obedience to earlier expressions of eminent intellectuals: Sabda (aagama) pramana. Completely based on faith the individual has for experts in the field, instinct, earlier knowledge brought down through generations through books. etc.,

The gist of all above expressions and discussions is:

Consciousness (Being-Sat)                      Awareness (Becoming-idam)

Speaker: Modulation-purodhana                

Brahman/Atman   chidaabhaasa/maya/Sriantahkarananikarmendreyani /pnaanendreyani
Import           experience/understanding/insight   feeling/thought/perception
actions/reactions/cognitions
Axioms for Cognition and Communication

The cognition- knowing, perception, storing, re-cognition, retrieval and communication are facilitated by the psychic energy released by breathing process and its transformation and transductions in forward and reverse directions.

The transformation in forward and reverse direction of reflected psychic or mental energy gives rise to dvaita state of mind when consciousness becomes seer + awareness and splits into triad as knower – knowing – known; subject – verb – object; cognizer – cognizing – cognized; communicator – communicating – communicated during cognition and communication of humans. When this transformation and reverse transformation cease to take place then the state of mind is known as advaita state, when knower and known merges into knowing; subject and object merges into verb, cognizer and cognized into cognizing, communicator and communicated starts as communication.

Thus cognition has three stages of knowing, perceiving and experiencing and all these three under the observation of the Consciousness as acts as Seer / Witness untouched by these mental happenings during the whole process of cognition, re-cognition and communication.

There is also a state or stage of no-cognition taking place, then the consciousness is pure known as pure consciousness, signifying content-free contented state, cognition and related experiences-free unoccupied awareness – experienced as bliss, peace silence, mental quietude, anxiety-, fear-, worry-, doubt-free mental state.

(c) The Formation of cognition and communication: Concept and idea of Triad (Triputi): The Triad:

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knowing – known; subject – verb – object; cognizer – cognizing – cognized; communicator – communicating – communicated; during cognition and communication of humans.

When this transformation and reverse transformation cease to take place then the state of mind is known as *advaita* state, when knower and known merges into knowing; subject and object merges into verb, cognizer and cognized into cognizing, communicator and communicated starts as communication. Thus the cognition consists of:

**(d) Structure of Cognition:**
Cognizing element/agent/subject  Instruments of cognition  object of cognition

(*impersonal*)

*Dvaita* phase of mind:
Conscious states of phases of mind when mind alternates between *dvaita* and *advaita* states during wakeful and dream conscious state of mind

**(e) Mental states of cognition: Advaita, dvaita and their simultaneous existence and working**
Types of cognition: Knowing, perception, experience / mood/sense/ meaning/ insight/intuition/ urge, craving:

Stages of cognition:
Functional – form – construction – structure – plane – level of cognition

Elements of cognition: Object energy forms (sense organs / knowing), electro-chemical (inner mental tools / perception / logic / intellectual operations /) and biochemical [experience / sense / mood etc., (inner mental tool *chittam*)] under the observation of infrasonic oscillator – the consciousness.

Forms of energies being sensed during knowing: light (eye); sound (ear); chemical (tongue - taste / nose – smell) mechanical (skin – touch) heat (skin - cold, cool, warm, hot).

Form of energy facilitating perception and other intellectual operations, sentence formations: electro-chemical.
Form of energy facilitating experience etc., biochemical.

The perception (electro-chemical) and experience (biochemical) are carried by and as the frequency modulations/demodulations of the infrasonic pulse series – the reflected mental energy pulses – the brain waves – generated by and are the result of rhythmic breathing process.

The *guna* concept of cognition: in the sense of mental tie up (*guna* also means knot). The word *guna* extensively used in Indian spiritual texts, means mental tie-up.

If the mental tie-up is with object-energy form through the means of manas, it is *tamoguna; bahirmukha dristi* (mental awareness of without body); *antarmukha dristi* (mental awareness of within of body) too.

If the mental tie-up is with inner mental world –with stored collection of information about outer physical and / or impressions created by such information it is *rajoguna. Antarmukha dristi* - Awareness of within of body.

If the mental tie-up is with experience, mood, meaning, sense, insight, understanding, intuition, urge, volition, through inner mental tool *chittam*, it is *sattvaguna. Antarmukha dristi* – mental awareness of within of mind and body.

*Prapancham* (inner mental world) is created as potential energy in the respect cortices and when this is retrieved, it is called *jagat* - the dynamical form of information as thought, feeling, perception preceded by experience, mood, sense etc., differentiated and split as knower-knowing-known or subject-verb-object,
the triad, in the *dvaita* phase of mind i.e., the *jaagrat* (wakeful) and *swapna* (dream) conscious states of mind.

**(f) Instruments of Communication:**

Inner mental tools: retrieval and reproduction of information through action organs

Action organs: reaction and responding to information. The action organs are: vaak (speech), paada (movements of legs), paani (movements of hands), paayu (movement of bowels) and upastha (movements of reproductive organs).

**(g) Human Mind: Its phases, cognitive states, functional states and functioning:**

Human mind has four modes:

Three modes of awareness in continuous consciousness:
- Mode of knowing/expression
- Mode of perception, sentence, logic, reasoning etc.
- Mode of insight, understanding, experience, mood, meaning, sense, intuition, instinct, urge, commonsense etc.

Mode of consciousness sets in when awareness has become one with consciousness: Fullness, bliss, peace, silence, meaningful experience or experienced meaning etc.

In the mode of consciousness all the remaining modes take place sequentially and reversibly to make one knowledgeable and communicate the acquired or inherent knowledge.

Mode of insight is the result of perception or intuition or instinct. State of insight is permanent once understanding sets in or experience takes place compared to state of perception.

Knowing is the result of direct sensing by sense organs. Perception is correlation of sensed information with already known and preserved information stored in inner mental world. So is understanding or experience. Insight is the fruit of understanding. Intuition is a flash arising from insight or experience. The intuition flashes as an action to be performed in the form of verb (sense). Understanding is also thus a correlation of perception with already available senses or experiences or insight within created by earlier perceptions or sense or instinct naturally possessed by the organism through genes inherited.

**(h) Validity of Cognition:**

_Pramāna_ = authority, reliability, means of cognition.
_Pratyaksha_ = Direct – through sense organs – eyes, ears, nose, tongue, skin - sensing - _vaikhari_.
_Anumaana_ = Inference- through intellectual operations like logic, reasoning, induction, reduction, analysis, discrimination – _madhyamaa_.
_Sabda (aagama)_ = recollection (creation) of meaning- _kriya_ - _pasyanti_.

All the three _pramanaas_ are having equal primacy and functioning consequentially in reversible way together they create and complete the cognition in reception and transmission. The _pramaanas_ require earlier _pramaanas_ and are consequences of one another in forward and reverse directions in completing and transmitting cognitions.

Consciousness provides the necessary mental awareness to cognize through these three means.

Consciousness is observer and facilitator of cognition through three stages both instrumentally and materially.

For pure consciousness: the objects of cognition and communication are: experience etc., biochemical forms / perception, the electrochemical form /sensing through sense organs through the medium of manas and expression or communication through action organs as mechanical energy forms - which happen through the medium of infrasonic mental energy pulse series - modulation and demodulation- respectively for communication and cognition and are manifested and reflected by and of brain wave transformations.
Conclusions
Thus Brahmajnaana contains information about cognition and communicating processes. The Jnaana and Bhakti schools of interpretation have contributed to the development of insight. All these functions are reflected as the brain waves and the brain waves are frequency-modulated and demodulated giving rise to alpha and beta waves which reflect the human cognition and communication and language and acquisition processes.

Concept Diagram II
Pictorial diagram of human cognition and communication processes- a physicochemical insight

A: **Upanishadic and Brahmajnaana insight:**

**Consciousness (Being-Sat)**

- **Speaker:** Modulation-purodhana

**Awareness (Becoming-idam)**

- Import: experience/understanding/insight, feeling/thought/perception, actions/reactions/cognitions

**Vivartanam-Reversible Becoming**

- **Bhakti**
  - Paradha pakṣa/paripakṣa
  - Ambiguity
  - Mood/urge/sense/verb, sentence/subject-verb-object, sentence in sound form

**B: Translation into modern scientific terms:**

**Consciousness (Being-Self)**

- **Infrasonic Oscillator**

**Awareness (Becoming-inner mental world)**

- **Infrasonic energy**
- ** Issuing mental energy pulses frequency 10 Hz**
- **Pulse series of frequency 10 Hz**

**Speaker:** Modulation-purodhana

**Infrasonics**

- Infrasonics/biochemical, electrochemical, mechanical/stimuli

**Bhakti**

- **Para/tatpara/Tatparyapasyantimadhyamavaikhari**

- **Purport**
  - Mood/urge/sense/verb, sentence/subject-verb-object, sentence in sound form
Listener

Mental functions take place when brain waves are modulated / demodulated and take frequencies (8 to 40 Hz) and two way energy-transactions take place.

**FIGURE I**

![Four Categories of Brain Wave Patterns](Image)

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Talk 6: Concept of Living Beings, Consciousness and Soul-Matter Interactions in Jain Philosophy

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Abstract

The Jain philosophy has been developed around the core concept of atmavad, i.e. existence of soul, which is eternal, ever existing, omniscient, all powerful and omnipotent. The universe is an interplay between soul and matter and the other four constituents (i.e., space, dharmastikaya, adharmastikaya and) of the universe are facilitators for these interactions. The salient features of Jain time philosophy, which defines Moksha as the ultimate goal of all souls, are described. The procedures for purification of soul, which has to evolve through 14 stages of spiritual evolution are described. There is much emphasis on Jnan, meditation, penances and self discipline. Some of these features are compared with modern scientific models of quantum theory, solid state physics etc. and the model given by Penrose and Hameroff.

1. Introduction

Atmavad or concept of soul is the core principle of Jainism around which the Jain philosophy has been developed. All the other principles which include Karmavad, Kriyavad, Lokavad, Anekantavad and Syadvad have been developed from this basic concept. Consciousness is the identifying property of the soul and the living universe is the consequence of interaction of soul with matter. We describe the general concept of Universe as mentioned in Jain scriptures, according to which the Universe consists of six ‘substances’ (drayyas) including soul and matter, which are distinctly different from each other. The definition of matter in Jainism (known as pudgalastikaya) is quite interesting and can throw new light on the controversy about difference between soul and matter. Jainism propounds that every event in the Universe, concerning both living and non-living, occurs according to certain laws and this philosophy has dispensed with the need of God as the creator of the universe or any such super power.

The Properties of soul are described in great detail in Jain scriptures. A pure soul has infinite properties, which are called innate powers. In the most simplified form, a pure soul is characterized by four prime properties, which are infinite knowledge, infinite power of awareness, infinite bliss and infinite potency. However a worldly soul is considered to be infected by matter which subdues these “four infinities” to different extent. The matter which infects the soul is called karma and is believed to be consisting of subtle particles, called karmam vargana (also called karmanus); In Jainism, karma does not mean activity but is a category of subtle matter which obstructs the purity of the soul and inhibits the true characteristics of a soul.