

# BRAIN TO MIND: MOVING FROM PHYSICAL TO CONCEPTUAL WORLD

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## Abstract

*The human mind is functionally evolved from the brain, which is composed of neural cells and nerve connections in the brain and the body, as the brain could control various functional organizations in the body, constituting multiple sensory-motor systems. The subcortical structures in the brain, mainly the amygdala and its adjacent systems produce emotional responses and also could initiate responses, whereas the prefrontal systems could cognitively process the inputs received, as well as conceptualized by the brain, think over and become aware of the thoughts created within, and also initiate responses, as well as actions. The emotional effects may directly affect the physical system, whereas one may first become aware of the thoughts created within unless one initiates responses or actions according to the thoughts created. The cognitive processes and the emotions created by the brain, and the accompanying awareness constitute the mind of the individual. The brain has been mentally understanding the scientific relations within the physical universe and has been using the knowledge of the scientific processes for creating new relationships over time and space, by which they could invent and create new functional systems for use in different spheres of life. The methods that were discovered through experiments by them have physical relationships, which needed understanding of the changes that occur across time and space, and it became a scientific process of understanding various physical and functional relationships in the universe. The scientific understanding formed the scientific knowledge basis, which could be used to form new physical and functional relationships across time and space, in the new physical systems created by them. Much earlier than this itself, there have been people who used their mental capabilities for self-creating and accepting spiritual powers as responsible for the creation and preservation of the universe. Many such spiritual forces were mentally created by human beings in different regions on the earth.*

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**Keywords:** Brain, Mind, Emotion, Thinking, Awareness, Self-Molding

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## THE MENTAL WORLD: INTRODUCTION

Neuroscience has been always identified with the processes of applications of biological and neuropsychological principles of brain functions for understanding the mental processes and behavior of living beings. Understanding of emotional experiences and their arousing effects on behavior, and neurocognitive modulation of various brain functions helped to understand the genesis and modulation of the mind in the human brain and its capabilities for developing extraordinary computing and control capabilities. Computing abilities lead to the creation of concepts, which helped in the construction of new physical relationships. Intense self-stimulation and support from the physical systems, facilitate the creation of the mind. The human brain has developed the capabilities for making use of the mouth, the tongue, the respiratory system, etc. for creating vocal representations with specific meaning for components (words) of vocal expressions, which could represent different ideas related to the multiple components of the universe. equivalents for creating music and ideas, which could also be physically handled by the hands and man-made machines. The man could make conceptual ideas without physical verifications (Mukundan, Kamarajan, 2022, 2021, 2020, Mukundan, Kacker, P. 2020). The human brain could conceptualize any idea and self-impose faith in the idea when the human mind would accept detecting the presence of the self-created idea, though it may not be physically present. The self-induced hypnotic effect has been a widely accepted method of self-conviction of the presence of nonphysical effects, which came to be identified as spiritual effects. This is indeed a self-assembled thought processing, involving mentally evolved complex concepts, which may essentially have spiritual components, based on faith. Human beings did not have any scientific pursuits, to begin with in the past, based on physical, biochemical, or chemical

investigations, even though logical thinking based on spiritual and biophysical needs and issues were present. Spiritual explanations were considered real and mandatory for the needs of life.

### THE ANCIENT BEGINNING

Hundreds of years before starting the practical development of scientific methods of investigations and assembly of new functional systems, man has been thinking of the presence of only such methods, which were considered spiritual manifestations. The man could imagine flying, sending weapons across the sky, etc., all labeled spiritual methods and products. Human beings believed in divine entities and their capabilities by which they could break or change natural rules or carry out functions beyond the known natural physical methods of movements and activities, that they could monitor in the world they lived in. The spiritual methods were considered to be used by both the divine forces and those considered evil. Focusing attention on the mental processes for the creation of its awareness of what is being processed is the essential feature of the efforts, which is practiced with utmost faith and focused attention when the person would accept the mind to pass through a self-convincing state and the unique experience came to be identified as a spiritual state. Through regular practice, the focused mental state may become so intense and powerful, that the individual becomes aware of only the mental force, which is taken with the evil forces fought with the divine forces when the divine forces finally won the battle. The episodes of the divine and evil forces formed parallel events to the lives of human beings, who subscribed to their commitments, which became examples and moral lessons for human beings to follow in their lives. They developed a life after death on the earth when the soul would transcend to either heaven or hell according to their actions when alive on the earth. As the foundations and principles of physical sciences were unknown to them, the explanations that were created based on the spiritual forces became their guidelines for the life of each individual. They could preserve their dependency on those thoughts only by entertaining belief in the system of thoughts regarding the presence of forces envisaged. The hypnotic effects that came to be understood and used scientifically in the later periods, were earlier applied when they could mentally create the sensory-motor effects which were considered realities.

### SELF-SUGGESTION AND INDUCTION OF CONTROLLING FORCES

Hypnosis is a mental procedure, when the mental abilities are shaped as per the suggestions, either from the self or from another person, when the changes occur as per the wishes and directions provided in the suggestions. The mental processes are tuned as per a belief entertained or suggested, the brain of the individual gets tuned to process the awareness of sensory-motor functions as provided in the suggestions entertained. Mentally altered sensory-motor functions induce the person to accept the altered effects when altered effects are accepted as realities by the person. Mentally created or altered realities are accepted by the individual as true physical realities, providing real experiences. Methods of altering mentally accepted realities have been the essence of hypnotic methods, which were practiced intensely and with great interest, as the mentally experienced realities were always accepted as real. Earlier, there were no scientific methods of verifications of realities, which became a human resource for reality verifications and for altering or creating new physical or functional realities, only in the past few hundreds of years. Accepting the presence of a spiritual power engaged in the construction and maintenance of the physical universe was indeed the only alternative method that human beings could envisage. This further strengthened their emotions of both love - affection and hatred for selected fellow beings who acted as well as critically talked about one's actions. The devotion they showed to the higher spiritual force, which created and maintain the universe became a powerful emotional force within the person. The devotion practiced from childhood, becomes a powerful emotional force within the individual, helping acceptance and support of a personal strength of the individual, which may be accepted as a divine strength by the individual.

Hypnotic methods took an independent pathway for the beneficial treatment of individuals, who needed psychological support for their physical and biological problems. Hypnosis has been considered a mental state of trance when the individual may not have normal sensory-motor functioning but would have focused attention on a theme or idea that is being personally created and mentally entertained. The person under hypnotic control would be under the influence of the mentally entertained hypnotic idea of the person. Normal and independent sensory-motor abilities would be mentally suppressed in the state. The mental state is entertained by spiritual practices when the self-induced state of the mind is created or may be induced by the self or another person when the mental state becomes under the control of the suggestions received from another person. In spiritual practice, the person has personal belief, faith in the force one would mentally focus, which becomes a mental reality for the person, as it may control all sensory-motor processing of the individual. The mental state may provide strength to carry out activities mentally supported in the individual. The hypnotic condition may be produced by guided methods as a therapeutic effort or for controlling the person or using a self-induced method for attaining self-induced mental conditions with bodily effects, which the person may consider as an induced spiritual state affecting one's mind and the body. Initially, hypnosis was called "mesmerism". In the induction of hypnosis or mesmerism, known as a sleep-like state, when the person is not able to make any critical judgments

of the sensory inputs, and the person accepts the inducements and believes that the person is experiencing the inducement (Mukundan et al.2015, 2013, 1999; Menezes et al. 2015). The self-induced suggestive effect encourages the individual to accept the inducement as a real experience occurring to the self. The self-induced states have been used for the creation of a variety of experiences, including spiritual experiences.

## MENTAL CREATION OF SPIRITUAL FORCE

It is well known that meditation is a mental practice carried out by individuals, from thousands of years back, as a spiritual exercise, by self-control of breathing and mental exercises and movements, which have been helping in the focusing of the mind on the bodily systems, as well as enhancing mental powers. Traditionally these effects have been defined as the effect of spiritual forces on the body and mind of an individual. People in different zones of the earth developed trust and faith in different divine forces, and they exercised immense faith and love in the force they conceptualized and developed, each of which was considered the master of their own life. The mind came to be identified as a spiritual source or the soul of each individual, which served as the life source in the physical body of the individual. The presence of life is still a scientific mystery and we still have no idea or rational explanation for the presence of a force like a soul and why the power of life lasts only for a limited period in all living beings, though the human soul is believed to last forever. The soul is believed to be present even after the death of a body, which is known to become alive only for a limited duration when the body is endowed with the presence of the soul. The body came to be understood as a physical reality, different from the soul. which they came to believe in, because of its universal presence for a limited duration. Man-made religions consider that the soul continues its existence in the divine world or hell. Life and the presence of mind could be scientifically explained as a physical reality, as a functional state contributed by the different components of the body, which is acquired through the physical functioning of the body parts, which also support the brain for the creation of the mind. This involves processes of creating signals representing multiples of physical functional status and the development of capability for monitoring the changes that occur as well as specific interpretive values of the physical changes contributing to the development of a value judgment system, which we call the mind. Production of the emotional state is another mystery that occurred mainly within parts of the brain, also representing the functional states within specific body parts. The system could learn to communicate with one another, the presence of the meanings created, the associated emotional effects, which is essentially a psychobiological state with capability for communicating their presence to other similar living systems, all of which came to be identified as products of the mind of the system. The mind was first identified as the source of the soul in the physical body. Scientific understanding of the brain and its functions allowed to explore and understand the brain and its functions, which came to be identified as the mind of the individual, which controlled the bodily functions, and allowed the generation of information within the brain about the sensory-motor attributes of the self and the world outside. Brain acquired and developed the capability for communication, which is used for conveying all emotional experiences, sensory-motor mental imageries, and their physical attributes as experienced, as well as physically and functionally created by the system. Human being succeeded in creating external systems for storage of all mental products, as well as their selective retrieval for mental and external applications. The development of the mind in each individual has created a unique functional system capable of generating intense emotional effects, which could mark all accompanying experiences, and even neurocognitive processing effects detected by the brain. Ages back, a man considered the mind to be the abode of supreme power, believed to govern the body as well as the universe. There are indeed still many who believe in such spiritual effects mentally generated within their body system. Human beings believed in one or more supreme spiritual forces, as their creators, whom they have been believing to determine success and happiness in life, and the living period of each person on the earth. They have been worshipping these forces, and most of them have been praying for happiness and success in life, as they believe that these effects are controlled and applied by such spiritual powers.

Spiritual devotion may be considered to imply a strong mental power, using the method of applying self-induction of devotion in strength and total faith, when the self is taken to mental processing which is believed to be governed by the qualities and capabilities assigned to the spiritual force, which one believes to control the life of every individual and the world within which they all live. Mental force is indeed a unique capability without any comparison, whether we call it spiritual or just mental capability. One learns to worship and become emotionally dependent on this spiritual force. The emotional effects and thoughts created in this process could shape and strengthen the self, and its faith in the force becomes dependent on the desired directions. Those who carry out the mental process of worshipping the force within, and with the self, enhance the strength of the self with the thoughts and devotional emotions, both of which indeed help to strengthen the self, so that each person becomes strong. The individual may experience the strength one has devoted to the master spiritual force. The person would be convinced by the strength that one acquires, by investing total physical and mental devotion on the mentally designed spiritual force. The self gets embodied in the belief system that one has mentally – cognitively and emotionally developed to which he or she has mentally attached the faith on the force. The person acquires immense emotional strength even for sacrificing oneself. As we have already pointed out, there are two

major controlling regions in the brain. The amygdala, thalamus, and associated subcortical areas directly control the emotional arousal and experiences, whereas the prefrontal cortical areas in human beings have been associated with the cognitive evaluation of the rational needs of the emotional arousal, and for their controlled use in the realm of expressive responses or behavior. The prefrontal cortical contribution became an important scientific contribution in the human brain, needed for all neurocognitive processing steps, which explained the need for specific responses to the stimuli received in the brain. Before scientific thoughts and relationships were made by human beings, they used alternate methods of explanations, which came to be identified as religious methods, where one or more spiritual forces decided the right and wrong reasons for carrying out specific responses or behavior by each person. The beginning of scientific investigations and explanations have taken place about a hundred years back only. Human beings explained the purpose of their genesis and living before the beginning of scientific explanations only from a spiritual or religious point of view, where a spiritual force, whom they have conceptualized was considered responsible for the universe and every action that took place there. The human brain can also plan and define purposes in their life when they could plan and carry out their actions only for achieving those purposes of life (Mukundan 2019, Mukundan, Dhanya 2019). Planning and creating purpose are indeed a quality achieved by the human brain and carrying out those actions for fulfilling the purposes is indeed a great achievement for each human being. Creating and maintaining purpose for actions is indeed a functional attribute of each human brain. It may have unique spiritual characteristics and spiritual explanations which may provide the need for explanations of the purpose of whatever has been happening in the universe. The purpose of an action is its consideration for execution so that it will help achieve a specific result, by which one could obtain a specific privilege or results, which are likely to enhance the lifestyle of functioning of a person or group of persons. Hence, human beings considered a purpose for their life and also ways to fulfill the purpose, and also consider what type of actions or their absence may hinder or stop attaining the purpose. Scientifically, there is no scope for such a question or issue, as scientific explanations are always about the relationship or change that may occur across units of time and space only. We may initiate the occurrence of a set of changes by facilitating a specific change, which may be automatically followed by a sequence of several further changes. Human beings who live under strict religious laws may seriously consider the purpose for all actions that they carry out, and would enjoy living only to fulfill them. A purpose or purposes could also be designed by man, even if they do not believe or accept purposes assigned to them by a spiritual advise, or merely following what many others may believe in, and make efforts to carry them (the purpose) out in their own lives. However, actions related to a purpose may have a short-long term action plan for achievement, which a human brain could plan, as well as carry out, even if it is decided purely for one's interests in life. Such plans would also initiate proposed related activities in life, with specific aims, which could lead to their accomplishment and happiness in life. A purpose with a divine aim is a self-created idea, as its divine origin can never be physically verified, though one may have had personal experiences, which one may relate to such needs when related actions are carried out or occur, which may serve self-inducements and satisfaction. Millions of people have already died, and a single person has not yet reappeared after death, though genetic transmission of qualities and habits of individuals are common occurrences, when new generations are born and grow.

### FRONTAL ACTIVATION DURING REAL AND IMAGINARY COGNITIVE PROCESSING - AND REAL CONTROLS OF BEHAVIOR

The frontal lobes of the brain are the main control centers for cognitive processing, emotions, and all behavioral expressions. The frontal lobes are also directly activated during imagination, explorative behavior, problem-solving, learning, memory, language, spontaneity and impulse control, emotions, motor programming, analytical and strategic thinking, judgment, sexual behavior, seeking and defining purposes in life, goal setting, and social behavior (Teuber 1963, 1964; Luria 1980, 1981; Lezak, 1982, 1995; Goldar et al.1993; Starkstein, Robinson 1997). The frontal lobes are connected extensively with the non-frontal cortical and subcortical areas. The non-frontal areas send inputs they receive or generate to the frontal lobes, which allow their control at the frontal lobes. The frontal lobes receive inputs from several subcortical areas, which allow frontal control of the functioning of several subcortical areas. The most obvious aspect of the brain is that it is directly controlled by the environment and it has learned to internalize and store these controls, as well as learn to use them during imagination of movements and activities and for generating controlled behavior.

### NEUROSCIENTIFIC BASIS OF MIND AND ITS PROCESSES

Neuroscience studies (LeDoux 2003, 1998, 1996; Lu et al. 1994; Luria 1981, 1980, 1969) have revealed that sensory inputs into the brain are primarily emotionally processed at the amygdala, which gives rise to primary emotional experiences and expressions. Neurocognitive processing and cognitive controls of behavioral and emotional responses could take place only when the inputs are transferred from the subcortical areas to the prefrontal cortex (Teuber 1963, 1964; Luria 1981, 1980, 1969; Lezak, 1982, 1995; Goldar et al.1993; Lu et al. 1994; Starkstein, Robinson 1997). If emotional responses have already taken place, even before cognitive processing has taken place, the emotional effects would precipitate associated reactions, which the individual



may try to justify, even if cognitive decisions of the same experiences may project differently. The small direct pathway from the thalamus to the amygdala and hippocampus could serve direct activation of survival-related emotional responses, based on familiar memory responses, provided by the hippocampus, instead of complex perceptual analysis, which would require the cognitive decisions coming from the prefrontal areas. The absence of cognitive processing at the prefrontal cortical level would result in the absence of cognitive judgments and reactions without awareness of the neurocognitive judgments, as well as the effects of the presence of related anticipations, which may prevent the occurrence of unplanned reactions. (LeDoux 1996, 1998, 2003; Morris, J.S. 1998; Whalen, P.J. 1998; Windmann, S., Krüger, T. 1998; De Gelder, B. 2005; De Gelder, B., Rouw, R 2000).

The “preattentive emotional” decisions and reactions originating at the subcortical amygdala level without engaging the neurocognitive judgmental processing may often be the aggressive emotional reaction, based on prior familiar memory, provided by the hippocampus (Pessoa 2005). The sensory-frontal circuits, on the other hand, could carry out complex perceptual analyses and decisions. LeDoux (2003, 1998, 1996) had seen that the direct short connections from the thalamus to the amygdala and hippocampus may elicit survival-related or aggressive reactions, directly from the amygdala, even when the stimulus has not reached the primary sensory cortex. Emotional experiences and expressions originating in the preattentive state may only be impulsive, as they are not preceded by conscious thinking or decision making. Astonishing involvement of the amygdala in deciding alarming features of emotional responses and experiences has been reported in the studies cited above. It was noted that negative interpretation of facial expression was associated with the activation in the right ventral amygdala, whereas positive interpretations were associated with activation of the ventral medial prefrontal cortex. A patient with a parietal lobe lesion may produce visual neglect, and would still respond to a visual emotion-provoking stimulus when the activation of the related response is associated with the direct activation in the amygdala and the orbitofrontal cortex (Vuilleumier et al. 2002) when Pessoa (2005) detected as well as demonstrated the presence of preattentive emotional responses only with detection in the amygdala.

The Supplementary Motor Area (SMA) controls the skilled sequential movements of a person (Angel, 1976). These movements would require actions with feed-forward and predictive unfolding of the related movements (Rolls et al. 1979). These skilled movements are like the skilled sequential movement of a musical instrument. Though the movements may be complex, they will hardly require visual gating. Movements are mentally executed without accompanying sequence of movements, with complex causative factors and effects. The sensory-motor schemata of the movements may be “precompiled” (Angel 1976) and then executed using a feed-forward mode, using anticipatory cues. The feed-forward and predictive unfolding of movements require their sensory-motor schemata (Rolls et al. 1979), which help in their monitoring the correct path, for detections of errors and error corrections. This schema of a sequence of movements was called by Luria (1969, 1980, 1981) “abbreviated kinetic schemas”, and the critical points in such complex scheme of movements are controlled by selected sensory inputs (Angel 1976). The ‘basal ganglia’ plays a significant role in the detection of task-relevant sensory events (Baddley, Hitch 1974). fMRI studies (Maruno et al. 2000; Dettmers et al. 2001; Lacourse et al. 2005, 2004) have revealed evidence of the presence of neural activation in the primary motor cortex during the imagined use of the amputated limb. Pineda (2005) proposed that “mu” rhythm is the link between a sensory event in the brain and its motor effects. De Lange et al. (2005) reported that the posterior parietal and precentral cortical areas showed activation during mental motor imagery, and proposed that the process of combining somatosensory and visuomotor information before the actual motor actions are initiated, as part of the mental imagery, which is required for motor planning, before execution of the motor action. Activation of the primary motor cortex was detected both during imagination and actual execution of motor movements (Caldara et al. 2004), which are needed for the execution of the primary motor cortex. Solodkin et al. (2004), Rodriguez et al. (2004), and Ehrsson et al. (2003) also have reported the activation of the primary motor cortex in imagined execution of motor acts. Activation of the posterior area of the orbitofrontal cortex has been detected during the presence of mental motor imagery, comparable with the actual actions (Jackson et al. 2003). Ross et al. (2003) found evidence of activation in the motor cortex, parietal cortex, frontal lobes, SMA, and cerebellum during imaginary or mental movements of an individual.

## IMAGERIES AND RELATED THOUGHTS IN THE BRAIN-MIND

Imaginary movements form a significant part of mental rehearsal that one may engage in for strategic and anticipated deployment of muscles before the actual execution of actions is carried out. Sperry (1950) postulated that voluntary movement control has two components, one component responsible for the use of actual effects of movement in action deployment, and the other component related to the use of anticipated effects for regulation of movements even before they are executed. Mental imagery is recreated for reliving or remembering significant action scenarios from a past life. The sense of experiential reality created during mental motor imageries makes daydreaming or fantasy enjoyable and addictive to many. Mental motor imageries appear to be used routinely by us, during learning motor skills and their later routine and normal execution. As Gentili et al. (2004) proposed, the brain appears to the first plan and practice imaginary movements on the inert limbs, and

later uses the plans and the imagined templates for the actual execution of movements. Specific electric activation in the brain has been detected when an individual remembers an experience. This is elicited in the EEG of the individual, when the individual has presented a verbal statement which helps the person to remember an action carried out by the person during a specific episode in the past (Mukundan et al. 2019, 2018, 2017, 2016, 2008; Mukundan, Kamarajan 2022, 2021; Mukundan, Kacker 2020). The changes are recorded in the delta, theta, beta 1, 2, and gamma ranges (0.1 – 85.0 Hz) activities of EEG recorded while listening to the verbal statements, without the need for any response to the probe. Each probe is auditorily presented to the subject within 3 sec duration for each auditory statement. Each probe epoch constitutes segments of a preprobe epoch, probe epoch, and post probe epoch. The probes are auditorily presented sequentially, with intervals between two sequences of probes, so that they promote remembrance of related past activity if the subject was involved in those specific activities. If the subject was not involved in the activity, there is nothing for the subject to remember. Significant changes in the different frequency ranges occur while listening to the probe and for short (5 secs) duration immediately following auditory presentation of each probe, compared to pre-probe baseline. If remembrance occurs a positivity of 3-5 secs. may occur, and further significant increases in the beta and gamma range during the following 5 secs, after the presentation of the verbal statement. Remembrance is the mental process of recalling an experience, which may have all the sensory-motor components, and hence represent a virtual-mental display of the experience. It may also arouse the accompanying emotional effects in the individual. EEG epochs related to a preprobe baseline of each channel are statistically automatically compared with the EEG epoch during probe presentation, and 5 secs of post probe epoch. The statistically analyzed results of each EEG channel are presented in tabular form, for each probe. All EEG channels are statistically analyzed automatically, and compared for each probe presentation in each channel. The positive information is presented to investigators for further forensic investigation and detection of the presence of a related action by the subject. Several hundreds of cases have been successfully investigated, where the investigators were successful in detecting the presence of remembrance of specific activities during such recording. What is currently important for us is the revelation that complex brain activity takes place during the remembrance of past activity. Such remembrance is different from pure conceptualization of activity, as individuals may enjoy remembrance of several past experiences or activities. Spiritual focusing or meditation could immensely enhance the mental activation, which may enhance neurocognitive capabilities in the individual, which may, in turn, enhance bodily regulations and controls in the individual.

## NEEDS AND CREATION OF PURPOSE

The purpose is an idea that serves a definite plan of action with a specific objective that one hopes / intend to achieve by carrying out a set of actions, as well as choosing to remain silent regarding another set of actions and responses. The purpose may serve beneficial to the self, or another person(s) or for a cause, for which one may carry out or not carry out an action or set of actions. The actions may cause almost instant results or after the successful commitment of a sequence of actions carried out over time and across spatial locations. Learning to maintain a purpose and carry out a set of works for specific periods in life, are important lessons, each person is expected to learn and practice from childhood. From a spiritual point of view, the purpose of life is an important goal, as each person hopes that he or she would carry on with life in a meaningful and disciplined way so that the person's soul will have spiritual benefits before or after death. This is considered a strong need, especially when a person believes in his or her divine goals, after completion of the current life when one is expected to die and leave the body. Having purposes in life, for which one may need to learn and work, are immensely meaningful for each person, even if one does not accept any scope of life after death. The human brain is a mysterious organ, consisting of millions of nerve cells, interconnected in groups of cells and interacting with one another. The human mind created by the brain cells is a unique functional capability of the brain, composed of signals representing millions of words and signs in different languages with specific meanings, which is assigned by the brain and which could be interpreted by the brain as well as brain made machines. Brains of animals also have sensory-motor skills, even though the language ability of their brain is nothing compared with that of the human being. Nevertheless, the esteemed language ability of the brain was developed by the continuous use of the brain functions by man and through the primary inculcation of the language functions, and exchange of ideas using language abilities developed in the brain. Using language, the brain has been capable to create language-based symbolic representations of all universal procedures, which the brain has been capable of detecting and knowing. Awareness of all that is processed by the brain is the great knowledge base developed by each brain, which constitutes the major mental attribute or the mind.

The ability to conceptualize a purpose or aims for life is the only way one could engage in activities meaningfully and with definite objectives or goals, which may require intellectual and goal-directed activities in life, which one needs to learn, plan, build and skillfully carry them out. All these engagements require intense intellectual and cognitive functioning, planning, and execution, as well as the ability to be self-critical and carry out self-molding, so that the self-engaging person could finally achieve the goals, providing emotional satisfaction in the applied efforts and the results achieved. These engagements with one own life make life immensely meaningful and

challenging for self. All these intellectual engagements in a different sequence of activities in life for achieving various goals, make living a complex and challenging activity. Such endeavors encourage the development of new intellectual methods, which may require learning newer methods as well as inquiries into various scientific relationships that control the presence and changes in multiple universal-physical folds. The need to discover and learn to control the multiple phenomena of the universe and almost continuously making further inquiries and accomplishments have been supporting enriching the purpose of living, which have changed the entire scope of life. In the past, people could find a purpose for living only for the sake of obliging, worshipping, and joining a higher spiritual power. Life became worth living because of the challenges one has been learning to face in the various pursuits of life, as well as the solutions one learns to create and employ solutions, using scientific methods, which one learns to invent, physically create with specific functional attributes. A brain is similar or closer to the properties which the human brain has never been seen in any other living being. This difference has made human beings become not just another animal in the world, but a living being with knowledge, culture and civilization, creativity, and love. The spiritual devotions mentally and occasionally helped many of those who entertained such devotion. Some use it always as a mental solution and support to the emotional problems one faces in life. They mentally entertain the related concepts, find consolation, and worship the same.

## REFERENCES

- [1] Angel, R.W. (1976). Efference copy in the control of movement. *Neurology*. 26 (12):1164 –8.
- [2] Baddley, A., Hitch, G. (1874). Working memory. In: G.Bower (ed.) *Recent Advances in Learning and Motivation*. Academic Press, New York, vol. 8: 47-90.
- [3] Caldara, R., Deiber, M.R., Andrey, C., Michel, C.M., Hauert, C.A. (2004). Actual and mental motor preparation and execution: a spatiotemporal ERP study. *Experimental Brain Research volume, 159*, 389-399.
- [4] de Lange, F.P., Peter Hagoort, P., Toni, I. (2005). Neural topography and content of movement representations. *J Cogn Neurosci*, (1):97-112.
- [5] De Gelder, B. (2005). *Nonconscious Emotions: New Findings and Perspectives on Nonconscious Facial Expression Recognition and Its Voice and Whole-Body Contexts*. Emotion and consciousness. New York, NY, US: The Guilford Press: 123-149.
- [6] De Gelder, B and Rouw R. (2000). Paradoxical configuration effects for faces and objects in prosopagnosia". *Neuropsychologia* 38.9: 1271-1279.
- [7] Dettmers, C., Adler, T., Rzanny, R., van Schayck, R., Gaser, C., Weiss, T., Miltner, W.H., Brückner, L., Weiller, C. (2001). Increased excitability in the primary motor cortex and supplementary motor area in patients with phantom limb pain after upper limb amputation. *Neurosci Lett*, 307(2):109-112.
- [8] Ehrsson, H.H., Geyer, S., & Naito E. (2003). The imagery of voluntary movement of fingers, toes, and tongue activates corresponding body-part-specific motor representations. *J Neurophysiol*, 90, 3304-3316.
- [9] Gentili, R., Cahouet, V., Ballay, Y., Papaxanthis, C. (2004). Inertial properties of the arm are accurately predicted during motor imagery. *Behav Brain Res*, 155, 231-239.
- [10] Goldar, J.C., Rojas, D., Outes, M. (1993). A neurobiological model of mind, *Acta Psiquiatr Psicol Am Lat*. 39(1): 33-44.
- [11] Jackson, P.L., Lafleur, M.F., Malouin, F., Richards, C.L., Doyon, J. (2003). Functional cerebral reorganization following motor sequence learning through mental practice with motor imagery. *Neuroimage*, 20, 1171-1180.
- [12] Lacourse, M.G., Turner, J.A., Randolph-Orr, E., Schandler, S.L., Cohen, M J.J. (2004). Cerebral and cerebellar sensorimotor plasticity following the motor imagery-based mental practice of a sequential movement. *Rehabil Res Dev*. 41(4):505-524.
- [13] Lacourse, M.G., Orr, E.L., Cramer, S.C., Cohen, M.J. (2005). Brain activation during execution and motor imagery of novel and skilled sequential hand movements. *Neuroimage*. 27(3):505-519.
- [14] LeDoux J. (1996). Emotional networks and motor control: a fearful view". *Progress in Brain Research* 107 (1996): 437-446.
- [15] LeDoux J. (1998). Fear and the brain: where have we been, and where are we going? *Biological Psychiatry* 44.12: 1229-1238.
- [16] LeDoux J. (2003). The emotional brain, fear, and the amygdala. *Cellular and Molecular Neurobiology* 23.4-5: 727-738.
- [17] Lu, M.T., Preston, J.B., Strick, P.L (1994). Interconnections between the prefrontal cortex and the premotor areas in the frontal lobe. *J. Comp. Neurol*. 341 (3): 375-392.
- [18] Luria, A.R. (1980). *Higher cortical functions in man*. Basic Books, New York.
- [19] Luria, A.R. (1969). Frontal lobe syndromes. In P.J. Vinken and G.W. Bruyn (Eds.), *Handbook of Clinical Neurology II*. New York: Elsevier.
- [20] Luria, A.R. (1981). *Human Brain and Psychological Processes*. 1966; Harper & Row.
- [21] Maruno, N., Kaminaga, T., Mikami, M., Furui, S. (2000). Activation of the supplementary motor area during imaginary movement of phantom toes. *Neurorehabil Neural Repair*.; 14(4):345-349.
- [22] Menezes, R., Kacker, P., Mukundan, C.R. (2015). Hypnosis and the Anterior Brain: Delving Into the Frontal



- Lobe. In (Eds.) V.S. Adigal and Amit Chrapani. *Innovations and Business Management Issues and Challenges*, Published by: Bharati Publications, Delhi, 350 -355.
- [23] Morris JS, Ohman, A., Dolan, R.J. (1998). Conscious and unconscious emotional learning in the human amygdala. *Nature*, 393.6684: 467-470.
- [24] Mukundan, C.R. Ramachandra, S., Sing, S., Sharma, M., Kamaraj, C. (1999). Brain mechanisms of hypnosis: P300 studies. *Indian Journal of Clinical Psychology*, 26, 1, 13-23.
- [25] Mukundan, C.R., Kamarajan, C., Ajayan, P., Roopesh, B.N., & Sharma, M. (2013). Frontal Cortex and Recognition: Neurocognitive Findings of Hypnosis. *Indian Journal of Health & Welfare*, 4 (4): 703 – 710.
- [26] Mukundan, C.R. (2016). Neurocognitive Processing Steps during Remembrance. *J Psychology & Clinical Psychiatry*, 6(6): 1 – 4, 00387. DOI: 10.15406/jpcpy.2016.06.00387
- [27] Mukundan, CR, Sumit, S., Chetan, S.M. (2017). Brain Electrical Oscillations Signature Profiling (BEOS) for Measuring the Process of Remembrance. *EC Neurology*, 8.6: 217-230.
- [28] Mukundan, C.R., Sumit, S., & Chetan, S.M. (2018). Forensic Applications of Recording the Neurocognitive Processes of Remembrance. *Peer-Reviewed J of Forensic & Genetic Sciences*, 2(3) 1-8: PRJFGS.MS.ID.000140, ISSN: 2638-6062.
- [29] Mukundan, C.R., P. Dhanya Menon. (2019). Neurocognitive Processing of Purpose In Life. In (Eds.) Jitendra Mohan, Meena Sehgal, Special Issue on Mental Health, ISSN-0019-5553, Indian Journal of Psychology, Punjab University, Chandigarh, 1 – 9.
- [30] Mukundan, C.R. (2019). Neurocognitive Process of Defining and Deploying Purpose in Life. *EC Psychology and Psychiatry*, 8-11, 21-28.
- [31] Mukundan, C.R., Kamarajan C. (2020). The real physical and the virtual mental worlds. *Journal of Psychology & Clinical Psychiatry*. MedCrave, 11(6):170 - 175.
- [32] Mukundan, C.R., Kacker, P. (2020). Brain and Mind – Created from the Brain – Dependent on Material Scientific Principles and Relationships in the Brain and on the Independently Created Mind Relationships and Principles. *GAP Indian Journal of Forensics and Behavioural Sciences*, 1 (1) 62 – 64.
- [33] Mukundan, C. R., Kamarajan, C. (2021). Brain to Mind: Creation of the Virtual World. *Advances in Social Sciences Research Journal*, 8(10). 513-544.
- [34] Mukundan, C.R., C. Kamarajan, C. (2022). Brain to Mind – Cognitive and Emotional Journey within the Human Brain. *EC Neurology*, 14-2: 01 – 8.
- [35] Pessoa, L. (2005). "To what extent are emotional visual stimuli processed without attention and awareness?" *Current Opinion in Neurobiology* 15.2: 188-196.
- [36] Pineda, J.A.(2005). The functional significance of mu rhythms: translating "seeing" and "hearing" into "doing". *Brain Res Brain Res Rev*. 50(1):57-68.
- [37] Rodriguez, M., Muniz, R., Gonzalez, B., Sabate, M. (2004). Hand movement distribution in the motor cortex: the influence of a concurrent task and motor imagery. *Neuroimage*, 22: 1480-1491.
- [38] Rolls, E.T. et al. (1979). The activity of neurons in the neostriatum and related structures in the alert animal. In I, Divac, RGE, Oberg (eds) *The Neostriatum*. Pergamon Press.
- [39] Ross, J.S., Tkach, J., Ruggieri, P.M., Lieber, M., Lapresto, E. (2003). The mind's eye: functional MR imaging evaluation of golf motor imagery. *AJNR Am J Neuroradiol*, 24: 1036-1044.
- [40] Solodkin, A., Hlustik, P., Chen, E.E., Small, S.L. (2004). Fine modulation in network activation during motor execution and motor imagery, *Cereb Cortex*, 14(11):1246-1255.
- [41] Sperry, R.W. (1950). Neural basis of the spontaneous optokinetic response produced by visual inversion. *Journal of Comparative Physiol Psychol*, 43: 282 – 289.
- [42] Starkstein, S.E., Robinson, R.G. (1997). Mechanism of disinhibition after brain lesions. *J Nerv Ment Dis.*, 185: 108-14.
- [43] Teuber, H.L. (1963). Maze perception and its disturbance after brain injury in Man, *Neuropsychologia*. 1: 47-57.
- [44] Teuber, H.L. (1964). The riddle of the frontal lobe in man. In J.P. Warren and K. Alerts (Eds), *The Frontal Granular Cortex and Behaviour*. New York: McGraw-Hill, 2009 Mar;19(1):25-46.
- [45] Vuilleumier, P., et al. (2002). "Multiple levels of visual object constancy revealed by event-related fMRI of repetition priming". *Nature Neuroscience* 5.5: 491-499.
- [46] Whalen, P.J., Rauch, S.L., Etcoff, N.L., McInerney, S.C., Lee, M.B., Jenike, M.A. (1998). Masked presentations of emotional facial expressions modulate amygdala activity without explicit knowledge. *Journal of Neuroscience* 18.1 411-418.
- [47] Windmann, S., Krüger, T.(1998). Subconscious detection of threat as reflected by an enhanced response bias". *Consciousness and Cognition* 7.4 603-633.