CHAPTER TWO

REVIEW OF LITERATURE

2.1 Introduction

The purpose of this chapter is to outline the philosophy of the research in association to the many theoretical perspective such as Indian classical music (sangeetham), neuro-physiology, psychology and spirituality. Each of the perspective has its own underlying literature, philosophy, scientific viewpoints, biases, methodology and audience. The aim of the study is to prove a clear identity in the expressions of the philosophy of God, spiritualism, religion and science. The literature review presents various views of sangeetham, meditation, God, spirituality and psychology. With so many and varied disciplines discussing God, the task of defining and conceptualizing the concept of devotional sangeetham, neuro-science and spirituality is challenging. Each major section deals with a background summary of the main idea in the study (Gall, Borg and Gallin, 1996:21). The literature review plays a role in delimiting: a) the research problem, b) seeking new lines of inquiry, c) avoiding fruitless approaches, d) gaining methodological insights, f) identifying recommendations for further research, and g) seeking support for grounded theory (Justus J. Randolph, 2009:2).

Understanding the guideline, the researcher introduces a brief explanation of the spiritual themes of Swami Tyagaya’s compositions, Carnatic sangeetham (music) and the scientific concepts of the brain so that it effectively contributes to the understanding of this study. The literature review explains the complexity of devotional sangeetham, spirituality and neuropsychology in order to strengthen the
understanding of the study. In the modern era science has contributed profoundly for the human understanding of the insight concept of God, brain and spirituality. Science and technology alone cannot lead humanity to a contented and dignified life. Humanity should place lots of reason in high moral and spiritual standards than values on objective discoveries. Humanity owes a great deal to saints for all the spiritual realization and scientists for all the material achievements. There is a natural tendency for civilizations whether religious or nonreligious to understand the concept of spirituality and God. The meaning of God and spirituality differs from one individual to the other. The devotee’s faith and application strengthens his spiritual awareness about God. The awareness secures the mind and God becomes neurologically real. The spiritual feeling is transformed into a symbol in the brain which is represented in a wide range of personal, ethical, social and universal values. God could manifest as an auditory or a visual or an olfactory symbol. God is the most fascinating human experience to explore. Prominent scientists and researchers in U.S., Canada, Europe and India are endeavouring to understand the spiritual experiences and its dynamics in the brain of those who connect with the divine. They have made extensive researches with EEGs, fMRI, PET and other important investigatory tools. (BR Cahn, J Polich, 2006, www.psycnet.apa.org); (Mihai Popescu, Asuka Otsuka Andreas, 2004, A Dynamics of brain activity in motor and frontal cortical areas during music listening: a magnetoencephalographic study).

Spirituality has different implication in different situation and is different from individual to individual. Modern spirituality is centered on personal well-being, psychological advancement and moral personality such as righteousness, compassion, forgiveness, love, patience, tolerance and altruistic values (Readers Digest Dictionary,
Spiritual practices in the Vedantic tradition have wide range of implication in purifying the human mind and the karma (action). The goal of the karma is moksha (salvation). Moksha is the highest goal for attaining perfection and enlightenment. The spiritual practitioner should perform sadhana (penance) in various personal, religious and ritual disciplines to attain the spiritual goal. To attain a high level of spiritual success a repeated practice (abyaasa) and for perfect execution of spiritual action a good level of study (kriya) is expected. (Swami Yatiswarananda, 1998:319) Patanjali’s in his book, Yoga sutra recommends meditation (dyaaana) in addition to karma yoga, bhakti yoga, Jnana yoga and Raja yoga (Swami Yatiswarananda, 1998:319) The spiritual sadhana culminates in inner peace and happiness (Swami Yatiswarananda, 1998:303, 319, 397).

Sangeetham is also treated as a form of dyaaana. Carnatic Sangeetham (South Indian music) has had a very special charm on the human mind because of its devotional charisma and implication. The way of life, their God, their mood, their nature and their history are predicted in the quality of their music. The kritis of Sangeetham are like mantras. Aum (OM) is the basic mantra of all Sanskrit mantras. Aum is the representation of Nada Brahmam (primodial sound). Mantras are sets of sacred syllables for calling God or the divine symbols which were revealed to ancient rishis or seers of ancient India during deep meditation. In sangeetham the resonance of these suritis and swaras (micro tones and tones) attracts the mind and leads it to an inner holy experience and manifests satvic (puritanical) qualities. The experience in the brain can manifest as a visual or an auditory representation. The sangeetham represents divine feelings, emotions like pleasure, pain, love, heroism, knowledge, marriage, birth, death and Gods (Prajnananda Swami, 1973:1). Sangeetha
Retnakaram is an ancient book of Indian music and it points out that Carnatic Shastria Sangeetham is devotional, spiritual, philosophical and meditational. (Gopalan, ii). During the 17th century the great Bakthi movement in South India promoted the value of singing devotional sangeetham to attain the realisation of God. The greatest composer singer at that time was Saint Tyagaya (Gopalan, 2003:ii).

Swami Tyagaya (1767–1847) was a great teacher of mankind. He communed with God through music and had contributed a great deal for the propagation of devotional music in South India (Sambamoorthy, 2001:11). Tyagaya comprehended the cosmic laws of divine music and through his compositions he enlightened the compassionate nature of man. He advocated that the sacredness of music is beyond logical analysis but often comprehensible through personal intuition (Sambamoorthy, 2001:85). According to Swami Tyagaya’s spiritual philosophy, the mission of human life is to comprehend the Athman (soul), and work towards attaining "Moksha" (Salvation) (Sambamoorthy, 2001:47). Brahman (God) has the qualities of Sat, Chit and Ananda meaning Truth, Intelligence and Happiness respectively and Brahman is in the nature of omnipotence, omnipresence and omniscience. (Swami Yatiswarananda, 1998:302). Among the Indians, music is believed to have a divine origin because it has its roots in the supreme sound which is known as Sabta-Brahman (Prajananda, 1973:14). Swami Tyagaya believed that his sangeetham had a divine origin. He convincingly believed that “God” is comprehensible through devotional intuition and contemplation.

‘God’ is conceived as the principal object of faith among the believers. Theologians describe Brahman (God), as omniscience, omnipotent, omnipresence,
omnibenevolence, divine, eternal and beyond imagination. God is worshipped differently by different societies. (Swami Yatiswarananda,1998:379). “God” is a mental realization and the modern science associates it with Neuro-psychology. Psychology is the science dealing with mental phenomena and its processes. It is the study of emotions, perception, intelligence, consciousness, and the relationship between these phenomena (Newberg, 2009:45). Neuropsychology studies the structure and function of the brain as they relate to specific psychological processes and behaviours. It is seen as a clinical and experimental field of psychology that aims to study, assess, understand and treat behaviours directly related to brain functioning. It is scientific in its approach, making use of brain science and shares an information processing view of the mind with theology, cognitive psychology and cognitive science (Levitin, 2006:221).

Brain-Mind dynamics revolves around the science and psychology of the brain. During the twenty-first century the relationship between science and spirituality has been influenced a great deal by neuro-psychology. The debate about the ‘God spot’ in the brain or the Spiritual area in the brain is actively pursued by many famous neurologists. The modern neuro-scientists are trying to learn more about how the brain functions during reported spiritual experiences. Scientists are now able to explain the special areas in the brain system that regulates visual, tactile smell, hearing systems and the consciousness state. Neuro-psychologists are providing interesting and mysterious information on the function of the brain centres and the neural circuit. The most important investigatory tools used are the EEG, fMRI, PET and others.
Newberg, a famous neuro-psychologist says,” If you contemplate God long enough, something surprising happens in the brain (Newberg, 2009:4). “Devotional singing like meditation and contemplation of God for long enough can cause different neural circuits and synaptic connections in the brain to become activated and God becomes neurologically “real” (Newberg, 2009:4). The devotional experience transforms God into a symbol representing a personal, ethical and social value. This emotional experience encourages a religious and spiritual development (Newberg, 2009:5). This form of spiritual development and contemplative singing exercises could strengthen the neurological circuits involved with consciousness, empathy, compassion, love and tolerance (Newberg, 2009:17). Music listening, performance and composition engages nearly every area of the brain and the experience manipulates our emotions. (Levitin, 2006:9)

Generally, people lived in diverse situations, yet beneath the diversity there is an under-current for harmony and music emerges as an important media for unity, harmony and love. Devotional singing like prayer is incorporated in music and it is a form of meditation (Newberg, 2009:28). Meditation involves sustained concentration and deliberation which regulates brain action and breathing. Many studies have shown that it enhances relaxation and spiritual well-being (Newberg, 2009:160). Devotional singing in the form of prayer stimulates the cognitive circuits in the brain. The circuits are Prefrontal cortex, anterior cingulated, basal ganglia, temporal and the thalamus (Newberg, 2009:28). Devotional music involves emotions and emotions are powerful energy which governs a wide variety of activities involved with consciousness, empathy, compassion, suppression of anger and fear (Newberg, 2009:28). There are other scientists who have contributed, like Oliver Sack, Daniel Levitin, A. Patel,
Ramachandran and others. Their findings will be mentioned as the current study progresses in chapter five.

The advent of modern neurobiological methods over the last three decades has provided overwhelming evidence that it is the interaction of genetic factors and the experience of the individual that guides and supports brain development. Brain develops normally in the presence of DNA signaling and develop further in the stimulation of essential environmental input. The key to understanding the origins and emergence of both the brain and behavior lies in understanding how inherited and environmental factors are engaged in the dynamic and interactive processes that define and direct the development of the neurobehavioral system. The most detailed accounts of the function and architecture of these systems has come from animal studies especially the mice by Joan Stiles in her article Neural Plasticity and Cognitive Development (Joan Stiles UCSD, 2012). The brain cell development is called neuroplasticity. The definition of neuroplasticity is the ability for a neuron to adapt and change in response to a stimulus from its environment (Lord Watson, 1989:2). Swami Tyagaya inherited his religious qualities from his ancestors and developed his devotion for Lord Rama throughout his life.

Devotional sangeetham is a meditative yoga and is a contemplation on God. Saint Tyagaya was a Yogi and he led a righteous and religious life. He devoted his eighty years of life singing on Lord Rama. His devotion and his steadfast focus on Lord Rama is responsible for the visual imagery of God. Modern science explains that the brain of devotional singers, when in deep focus on the ‘God image’ for a long period of time will bring plasticity (growth) and neocortical development. Neural
plasticity and God cognitive development are both dynamic and adaptive and it reflects on the singer’s normal brain cell developmental processes. Thus, the melody of music and the devotional meditation activates a number of neurons in the respective special brain centers. Meditation opens the awareness to the infinite reservoir of energy, creativity, intelligence and spiritual emotion that lies deep within the body. Devotional *sangeetham* influences the way the brain processes the divine emotions.

In spirituality, the basic tool needed is the ability to perceive what is referred to as an activated Sixth Sense perception which is an ability to perceive the subtle dimension of God. It also includes the ability to understand the subtle cause and effect relationship behind many events, which is beyond the understanding of the intellect. It may be called as an extra sensory perception (ESP), clairvoyance, premonition, intuition or subtle perception ability (Swami Yatishwarananda, 1998: 260). Swami Tyagaya had the ability to understand the subtle perception of God (Lord Rama). The creation of music is a product of intelligence and the devotion elevates the emotional mind from the physical level to a metaphysical state. When such an emotional state happens, the devotional singer’s sense of self begins to dissolve and the singer feels unified with the devoted object of contemplation, (God). The singer achieves his goal to become closer to God. In the same way, Saint Tyagaya’s envisioned Lord Rama through his deep devotional singing.

The Swami Tyagaya’s *sangeetham* is spiritual in nature and is a form of meditation (V. Ragavan, 1958: 20). It is the contemplation of a higher principle which relaxes the mind against base emotions like hatred, crime and sin. The consistent practice of devotional music causes neuroplastic changes in the brain. The
brain cortical centres produce divine emotions, perception, imagination, thought and memory (Roth, 2004: 36, Becker, Shapirod, 1981). Some societies venerate music as a representation of consciousness towards divinity. Devotion to ‘Divinity’ is identical to devotion to “God”. The emotions are represented in the brain simply by activation in specialized regions. The majority of the emotions are processed by the brain’s limbic system. Divine emotions are influenced by hormones and neurotransmitters such as endorphin, serotonin, dopamines, oxytocin, cortisol and others. (Lord Watson, 1989:88). The natural blasts of oxytocin during such moments are so large and Increased Serotonin and Dopamine levels have been implicated as a mechanism in psychosis (Mark Golding, 1995). The neuro-chemical activities stimulate a creative motor-sensory system to motivate spirituality. Devotional music can transcends the limits of time and space and bring forth transcendental harmony and peace and comprehend the metaphysical aspect of God. The practise of devotional sangeetham can help the human society to be loving, tolerant, righteous and compassionate. Aristotle and Mozart were among those who did consider the songs of bird to be as musical as the compositions of humans (Levitin, 2006:258).
Research on God and emotion has increased significantly over the past two decades with many fields contributing including medicine, psychology, computer science and ultra-sound scanning like fMRI, PET, SPECT. The numerous theories that attempt to explain the origin, neurobiology, experience, and function of emotions have only fostered more intense research on this topic. Current areas of research in the concept of emotion include the development of fMRI, PET scans. Devotional sangeetham represents divinity. Music is a representation of cosmic harmony and a microcosmic representation of the macrocosm (Cook, N, 2000:75). Many sages have elevated their consciousness beyond all duality to realize the cosmic oneness through the love for devotional music. Faith in God drives the human spirit. Faith is embedded in our neurons and in our genes and it is one of the most important principles to honour our lives (Newberg, 2009:20). Devotional music increases neurologically the divine emotional perception of God. The satvic truth which is conveyed is that the combinations of meditational devotional singing and leading a righteous life can contribute to an atmosphere of spiritual elevation and celestial tranquillity.
It is apparent that society is slowly drifting away from one another as a result of diverse expressions. It is time to ignore the prophets of doom who daily forecast our inevitable demise. Humanity must take a quantum leap forward from this decadent development and change towards spirituality and righteous life. Devotional sangeetham activating a spiritual union with consciousness. Devotional music in general is love and harmony. Human beings are the most successful species the world has ever known and hence there is definite likelihood that they will accept devotional music in their lives and promote love, compassion and tolerance. Mankind need to enjoy devotional music and employ it as a loving vehicle to propagate love, devotion and peace.

The methodology adopted in this study is both conceptual and empirical. The line of investigation is by Qualitative analysis of literature and Quantitative analysis of Laboratory experiment and questionnaire survey research. The study will demonstrating that the devotional and contemplative practices will have a substantive impact on biological processes critical for physical and spiritual health. A qualitative methodology in the form of literature review will explain spirituality, neuro-psychology, the devotional life of Swami Tyagaya and his vision of God. The quantitative methodology by questionnaire survey will demonstrate the values of a survey article review. The electro-encephalogram will investigate the different areas of the brain based on an EEG research article review (A. J, Zatorre, (1999), Alfanas, Reva, (2004).

This literature study on devotional sangeetham, Swami Tyagaya, God, spirituality and neuro-psychology will provide new insights into the methods of
mental and spiritual training that have potentials to enhance human health and religious tolerance. Equally important is the ability to cultivate compassion and other positive human qualities so that an ethical foundation is laid to benefit all human societies.

**Holistic Model of Sangeetham- Brain- Spirituality.**

In the forthcoming discussion of the literatures there will be frequent references to this model which is the transformation process of the physical self to the spiritual self.

2.2 **Justification for literature review**

The justification for writing a literature review is a means of demonstrating the researcher’s knowledge about a particular field of study, including vocabulary, theories, methods, history, key variables, phenomena and experiment. Conducting a literature review also informs the important researchers and research groups in the
field. Finally, with some modification, the literature review is a “legitimate and publishable scholarly document” (LeCompte & colleagues, 2003:124). The review rationalizes that Tyagopanishad and the Shastria Sangeetham (Classical Music), can lead the spiritual path to realize the metaphysical discipline of “Brahmam”, (God). Thus, devotion, meditation and singing keerthanas give a spiritual perception. Neuroscience plays an extraordinarily significant role in teaching about the dynamics of the brain- mind physiology in the realization of ‘God’. Today, Scientists have conducted incredible researches on the brain’s neural circuit and have positive results in this subject. The literatures denote that the spiritual and emotional areas of the brain are all well documented and therefore, they validate Swami Tyagaya’s vision of ‘God’. Thus, devotional sangeetham of God Consciousness associates mankind to compassion, tolerance and love. Swami Tyagaya expounds that devotional sangeetham which brings happiness, peace and harmony to the mind.

i. The literature study validates an EEG investigation towards an empirical research on devotional sangeetham and the brain.

ii. The study investigates the brain structural factor that can contribute to “God” sentiments and proves how devotional sangeetham activates in the brain a spiritual union.

iii. The review establishes that some famous neuro-psychologists like Newberg and V. Ramachandran have researched on the brain and God module and compared it to the present thesis.

iv. The study validates that present society needs more researches to judge the absolute value of Sangeetham, neuro-psychology, God and spirituality.
v. The study justifies that Swami Tyagaya’s *sangeetham* and the dynamism of the mind is challenging and complex because it involves the mysteries regions of the Brain- Mind complexity. The mind is complex and multifaceted and is mostly scrutinized by subjective observation.

vi. The study concludes with the confidence that human beings are the most successful species the world has ever known and hence there is definite likelihood that they will accept and justify the use of devotional music in their lives and promote love, compassion and tolerance.

vii. The study justifies the challenge and motivates further studies in this area.

2.3. **Salient literature reviews on devotional music and neuroscience**

The researcher systematically reviews the different literatures with the expectation of collecting sufficient data for analysis, correlation and conclusion. On encountering an adequate literature review, examiners would proceed to look at the methods of data collection, the analysis, and the conclusions more carefully (Boote & Beile, 2005:6). Apart from the above reasons, the proof of the knowledge lies in the identification of the salient points and the scientific reasons for conducting a literature review. The relevant ideas are correlated in the form of devotional *sangeetham* and brain science. Some pertinent questions require answers from the literatures.

i. What does Swami Tyagaya’s devotional *sangeetham* (music) teach of the brain?

ii. What does the brain teach of *sangeetham*?
iii. Does modern neuroscience approve this “God image” and how?

iv. How does one attain this spiritual status and what is the benefit of spirituality to the society?

Over the past three decades, developmental neurobiologists have made tremendous progress in defining basic principles of brain development and neuron-behavioral psychology. Some important published literatures are reviewed to evaluate them according to the guiding concept of the study questions. The current study is designed and developed to understand the origin and emergence of Swami Tyagaya’s devotional sangeetham and the association to both the brain and spiritual behavior. Scientific works are reviewed to estimate the psychometric values so that it could be applied to this study. The testing provides insight into the researcher’s ability to evaluate the valuable assessment of the professionals.

The researcher endeavors to understand the devotional sangeetham and spiritual experience of Saint Tyagaya. Therefore, the researcher has reviewed extensively many books on Indian music. An important book reviewed is authored by Swami Prajnaanda. He is a savant of wide repute and an acknowledged authority on Indian sangeetham. Swami Prajnaanda (1973) mentions that Indian sangeetham is a divine art form originated from the Sama Veda and is venerated as nada Brahmaam. This idea is important since the study endorses the divine nature of Swami Tyagaya’s compositions.

Another two important books reviewed are authored by Sambamurthy on Swami Tyagaya and Swami Yatiswarananda on Vedanta. He has discussed in detail
the life and the 700 devotional compositions of Swami Tyagaya. His great work is called “Great Composers: Tyagaraja” (2001). The book says that Saint Tyagaya regarded *sangeetham* as a way to experience God’s love. His objective was purely devotional while practicing devotional music and opposed to focusing on the technicalities of classical music. The statement “*sangeetham* as a way to experience God’s love” is the anchor for this current study where the role of singing devotional *sangeetham* leads to spiritual transformation. The second book explains the Vedic spiritual concept of devotion and meditation by referring extensively on the book “Meditation and Spiritual Life” written by Swami Yatiswarananda (1998) narrates on human predicaments, the nature of ‘Ultimate Consciousness’ and the means of attaining freedom from materialism. The Swami plants the idea that the ideal of spiritual life is truly in the innermost core of life and one has to be emotionally aware of the ‘God’ within. He says that out of this realization comes the existence of various forms of human services. The study secures firmly that the practice of devotional *sangeetham* can manifest God in the brain which will give rise to spirituality. This knowledge substantiates the first objective of the study.

This study in addition offers a subjective quantitative Questionnaire survey to obtain valuable insights about devotional *sangeetham*, Swami Tyagaya’s works, neuro-psychology and spirituality. The Questionnaire survey is based on the literature guideline of a validated tool and the survey was published by Genia, V. (1991:337-347). Questions in the survey address the practice of prayer and spiritual beliefs. The results showed that there are group differences across the quality of life. There are also differences in life satisfaction and spiritual well-being. Spirituality is found to be associated with both quality of life and life satisfaction, although it is not a
significant predictor in a multivariate context. This questionnaire survey study assesses in the local society the practice of devotional *sangeetham*, the knowledge of God in Hinduism, the application of spirituality and the understanding of the brain dynamics with the guideline of ‘Spiritual Experience Index’. The survey assists in proving the second objective of the current study.

The review on recent developments in cognitive neuroscience leads to a new way of looking at devotional music and emotion. Neurologist such as Newberg, Sack and Patel state that music occupies more areas of the brain than language does and therefore, humans are primarily a musical species. Intensely pleasurable responses to music correlate with activity in brain regions implicated in reward and emotion (Blood, A. J. and Zatorre, R.J., 2001). Hits to the left, flops to the right: different emotion during music listening reflected in cortical lateralization patterns (Altenmueller, E., Schuermann, K., Lim, V.K. and Parlitz, D., 2002). An important literature review is made on Dr Andrew Newberg’s observation of the brains of Tibetan Buddhists and Franciscan nuns as they engaged in deep prayer and meditation. He explains that the outcome is to demonstrate a God module in the brain. Andrew Newberg, is a neurologist at the Hospital of the University of Pennsylvania in Philadelphia, Many references for this study are quoted from his book, “How God Changes your Brain” authored by Andrew Newberg (2010). The study makes literature review on another outstanding scientist, Daniel J Levitin in his famous book “This is your brain on music” (2006) discusses about how music engages different regions of the brain, and many of those same regions are also important in speech, movement, and social interaction. The knowledge of the above two books has guided this study to determine the effects of devotional *sangeetham* in the brain and the
spiritual emotions it creates. These literature reviews stands as a evidence for the scientific development of Swami Tyagaya’s sangeetham and the brain.

The study also makes literature reviews for the EEG experiment and a questionnaire survey. (dealt in chapter 4 and 5). In recent years electroencephalographic and neurophysiological studies focuses to understand the relationship between the brain mechanisms and consciousness. These studies give rise to the various electrographic findings with the psychological states and their behavioral correlates. The EEG research is based on the literature guideline of Akira Kasamatsumu and Tomio Hiriam; “An Electro-Encephalographic study on the Zen Meditation”, “Psychiatry neurology Journal” (1966). The literature review reveals that a series of EEG changes was observed by practising Zen meditation and EEG by Newberg University of Pennsylvania Medical Center, USA (Newberg, 2010).

This study determines the effects of devotional sangeetham in the brain through an EEG investigation with the experience of Kasamatsumu’s literature guideline. The EEG supports in proving the third objective of the current study. The overall analysis of literature, survey and EEG defends the fourth objective of the current study.

The researcher argues herein that there is a neat connection between the participation of devotional singing and spirituality. In spite of the small sample, the study concludes that devotional sangeetham strides ahead in implementing spirituality and ‘God Form’ in the brain. The researcher focuses on the limitations encountered in this study and points it out at the appropriate situation. He also
mentions some important recommendations. For instance, neuroscience on Swami Tyagaya’s *sangeetham* is a new entity and it represents a significant branch of spiritual psychology which has to be explored further. It is apparent for further understanding of the dynamics of *sangeetham* and the brain there should be more future researches on this subject.

### 2.4. The Literature review and the Questions scrutinized

The American Education Research Association (2006) explains some of the ways new research can contribute to existing research. If the study is a contribution to an established line of theory and empirical research, it should make clear what the contributions are and how the study contributes to testing, elaborating, or enriching that theoretical perspective. If a study is intended to establish a new line of theory, it should make clear what that new theory is, how it relates to existing theories and evidence, why the new theory is needed, and the intended scope of its application. If the study is motivated by practical concerns, it should make clear what those concerns are, why they are important, and how this investigation can address those concerns. If the study is motivated by a lack of information about a problem or issue, the problem formation should make clear what information is lacking, why it is important, and how this investigation will address the need for information (Jason W. Osborne, 2012:45).

With the above guideline the current study examines relevant questions such as: 1. How does Tyagaya’s devotional compositions construct in the mind and the dynamics of the brain centres? 2. The study justifies how Tyagaya’s devotional music teaches about the realization of *Brahmam*, (God) and how science reveals
about the effects of meditational music in the brain? 3. How and why did Swami Tyagaya have religious experiences? 4. Is it purely inexplicable emotional outburst or neurological or psychological disorders? 5. Is there truly sensory centres specialized in recognizing emotional or spiritual (Godly) subjects in the brain? 6. Can these issues be proved on empirical grounds? 7. What is the status of modern Neuro-Psychology here? 8. What are the salient neurological pathways and what are the scientific experiments to corroborate music’s spiritual encounters? 9. How does the musical spirit of Tyagopanishad as a spiritual practice create compassion and suppress anger and violence in the modern society? 10. Does practicing Devotional sangeetham activate faith, compassion, love and tolerance?

Some important published literatures on philosophy, neurology and music are reviewed to evaluate according to the guiding concept of the research objective (Literature review, Chapter One). Over the past three decades, developmental neurobiologists have made tremendous progress in defining basic principles of brain development and neuron-behavioral psychology. The study is designed and developed to understand the origin and emergence of Swami Tyagaya’s devotional sangeetham and the association to both the brain and spiritual behavior. Scientific works are reviewed to estimate the EEG values and to assess the questionnaire survey of many candidates.

2.5. Literature design, hypothesis and application of “Interpretative Phenomenological Analysis” IPA

The literature review based on phenomenological analysis is an important design in qualitative methodology. The current study has relied largely on qualitative
and quantitative methodology for data collection. In the qualitative methodology, the current literature reviews were designed to test the hypothesis that the meditative Sangeetham of Tyagopanishad could produce an unique spiritual response in the brain. Two quantitative methodologies are used to a limited extent. Sufficient literatures were reviewed for the objective EEG analysis and the subjective Questionnaire survey. The line of investigation is by Qualitative analysis of literature and Quantitative analysis of laboratory and survey research.

This study is examined with three guidelines.
1. By means of theoretical assimilation of literature
2. Exploratory social questionnaire survey method and
3. Electro-Encephalogram (EEG) procedure conducted in a laboratory.

The literature examination facilitates a better understanding of Saint Tyagaya’s sangeetham, devotional music and neuro-psychology of the brain. The study uses both qualitative and quantitative methods to collect primary data. The reason for doing so is to get an in-depth understanding of the responses from the quantitative method about the qualitative topic. The qualitative method is endorsed through literature reviews and the quantitative methods are endorsed objectively by laboratory Electro-Encephalogram investigations and Questionnaire survey methods.

The qualitative literature review investigates a random probe as well as triangulation of responses of the background of devotional sangeetham, Saint Tyagaya, spirituality and neuroscience. ‘Random probes provide a check on the validity of questions and yield a representative sample of verbatim comments which
can be used as illustrative quotations when writing-up the research’ (Gilbert, 1993:42). “They are useful and they provide illustrative material about what underlies in the justification of the study (Gilbert, 1993:42). However, qualitative analysis followed by quantitative investigation would endorse strong evidences and propose new evidences. These evidences will be useful for the current study and for future researches. Therefore the researcher opted to combine methods (qualitative and quantitative) in order to compensate for the inadequacies and benefit from the advantages of both of them.

As Philip (1998) argues, ‘employing a range of methodological strategies means that the researcher does not necessarily privilege a particular way of looking at the social world. I would suggest that such diversity encompasses methodological plurality as well as postmodernism encouraging different voices to be heard and facilitating the exploration of different truths’ (Seale, 2004:296). They each have distinctive characteristics that make the possibility of combining them especially attractive (Seale, 2004:296 ). The main subjects of the thesis are essentially Swami Tyagaya’s devotional sangeetham, Neuropsychology and spiritualism which is a combination of Theo-philosophy and science. The complex study necessitates the combination of methods to avoid possible misinterpretation of responses and barriers. However, the methodology designed in this study is both theoretical and experimental. These guide line methods endorse to understand the relationship between devotional sangeetham, Swami Tyagaya, the associated dynamics in the brain and spiritual experiences. An important contribution that exploratory research can make to our understanding is helping us to identify patterns and enabling us to give names to social phenomena (Thomas, 2000:170).
2.5.1 The Qualitative approach adopts the Interpretative Phenomenological Analysis (IPA)

The Qualitative methodology applied for the analysis, comprehension and conclusion is Interpretative Phenomenological Analysis (IPA). It has its theoretical origins in phenomenology and hermeneutics. The literature referred is, Stan Lester, (1999) “An Introduction to Phenomenological Research”. Phenomenological methods are particularly effective at bringing to the fore the experiences and perceptions of individuals from their own perspectives, and therefore at challenging structural or normative assumptions. Adding an interpretive dimension to phenomenological research, enabling it to be used as the basis for practical theory, allows it to inform, support or challenge policy and action. (Stan Lester, 1999:11)

A hermeneutic phenomenological research emphasizes on the metaphysical stance, methodological grounds, quality concerns and ethical issues that contribute to its paradigmatic assumptions. Finlay (2009) further states that applied to research, phenomenology is the study of phenomena: their nature and meanings. The focus is on the way things appear to us through experience or in our consciousness where the phenomenological researcher aims to provide a rich textured description of lived experience (Narayan Prasad Kafle, 2011:181)

Phenomenology is concerned with the study of experience from the perspective of the individual and it emphasizes the importance of personal perspective and interpretation. Phenomenological approaches are based in a paradigm of personal knowledge and subjectivity. Hermeneutics deals with the interpretation of wisdom literature, philosophical or religious texts. (Stan Lester, 2011:6). The goal of
phenomenological research is to arrive at the essence of the lived experience of a phenomenon. Applied as a review technique, the goal is to arrive at the essence of researchers’ empirical experiences with a phenomenon. In first-hand phenomenology, the individuals who have experienced a certain phenomenon are interviewed. In using phenomenology as a review technique, the unit of analysis is the research report rather than an individual who experienced the phenomenon. When using phenomenology as a review technique, the data come from an empirical research report rather than interview data. Not surprisingly, the steps of a phenomenological review mirror the steps of phenomenological research (Stan Lester, 2011: 2).

This IPA approach emphasizes four main levels which are as follows.

1. Identification and documentation
2. Investigation and compartmentalization
3. Interpretation and analysis
4. Integration and conclusion

2.5.2 Justification of Interpretative Phenomenological Analysis

The researcher finds it appropriate to choose “Interpretative Phenomenological Analysis” (IPA) because, it is an psychological qualitative research with an ideological focus, which means that it aims to offer insights into how a given person, in a given context, makes sense of a given phenomenon. This phenomenon can be scientifically rationalized and there are sufficient evidences to prove it right.
These phenomena is relate to experiences of some personal significance, such as a major life events, or the development of an important relationship or a major experience or a emotional perception.

IPA is distinct from other approaches because of its combination of psychological, interpretative science and ideographic components. IPA is one of several approaches and appears most appropriate to qualitative phenomenological psychology. IPA enables the researcher to elicit an in-depth understanding of meanings of human practices, culture, works of art and science texts. Phenomenological analysis is based on discussions and reflections of direct sense perception and experiences of the researched phenomenon.

Conclusion of the research will be based on IPA deductive method and scientific correlation method. The understanding is produced through systematic interpretation of the scientific and survey processes.

Therefore the selection of “Interpretative Phenomenological Analysis” (IPA) will be effective and useful for this research. Literature reviews that focus on research outcomes are perhaps the most common. In fact, the Educational Resources Information Center (1982:85) defines a literature review as an “information analysis and synthesis, focusing on findings and not simply bibliographic citations, summarizing the substance of the literature and drawing conclusions from it”. The Educational Resources Information Center suggests that, in terms of a developing a research rationale, an outcomes-oriented review may help identify a lack of information on a particular research outcome, thus establishing a justifiable need.
for an outcome study. The current literatures review are designed to test the hypothesis that the meditative Sangeetham of Tyagopanishad could produce an unique emotional response in the brain and thus connect to a higher “God Consciousness” or Brahmam Consciousness. This research is based on Hindu Theological culture, Indian devotional sangeetham, Swami Tyagaya and Brain science. The researcher has adopts a multi-method approach involving

2.5.3 Literature and Philosophy

i. Literature study will be supported by the sources of Hindu Spiritual books (Vedanta), Indian Sangeetham manuscripts and literature books on Swami Tyagaya.

ii. Science study will be supported by the secondery sources of Brain text books.

iii. Psychology text books and Scientific American journals and research publications.

The knowledge extracted from book reviews are combined with documentation, discussions and observations to gain deeper insight in devotional sangeetham, Swami Tyagaya, neuro-psychology and spirituality. The documents are also collected from reliable libraries. Thus, through the qualitative IPA method the researcher finds it appropriate to identify, analyse, report, interpret, justify and conclude the subjective literature review. The methodology adopted in this qualitative research is conceptual and theoretical and is basically assimilation through literature review involving a wide range of reference books. They are principally:

i. Tyagaya’s Musical compositions (Tyagopanishads)

ii. Books on Carnatic Sangeetham
iii. Books on Vedantic Philosophy
iv. Research books on Neuropsychology
v. Journals and Medical Text Books on the Brain
vi. Journals on Carnatic Sangeetham
vii. CDs / Internet, Utubes
viii. Devotional lectures by Swamis and Pundits.

2.5.3.1 The Theory and the Taxonomy of Literature reviews

The theory facilitates the main components of the study and the presumed relationship between them so that it provides a framework for analysis and the components are consistent. The taxonomy identifies the main subjects and their associations to the study. The theory is based on: i) Swami Tyagaya’s vision of Lord Rama and the contribution of sangeetham. ii) The association of the sangeetham in the development of ‘God Module’ in the brain and iii. How neuropsychology views the perception.

An effective method to begin planning a research review is to consider where the proposed review fits into the thesis. Cooper (1988) in his article, “Taxonomy of Literature Reviews”, suggests that literature reviews can be classified according to five characteristics: focus, goal, perspective, coverage, organization, and audience. He identifies four potential foci: research outcomes, research methods, theories, or practices or applications. Literature reviews that focus on research outcomes are perhaps the most common (Justus J. Randolph, 2009:2).
The selected significant literatures that played the pivotal role in this study can be categorized in the following categories as the theoretical framework:

i. The books on Vedanta, Sangeetham and Swami Tyagaya, were published in India. The works from India were written by great authorities in sangeetham, spirituality and Vedanta, such as P. Sambamurthy, Sri Ramanujachariar, Swami Prajnaanda and Swami Yatiswarananda.

ii. The literatures for Neurology, Psychology and the EEG were published from USA and Europe. The science literatures were written by some famous neurologists such as Dr. Andrew Newberg, Dr Oliver Wolf Sacks, Dr A Patil and Dr. Daniel Levitin.

iii. Reference articles for Questionnaire survey on God, Music, Brain and spirituality. Reference articles for EEG by Dr Kasamatsu and validated work done by Sundarachari R, Dhanasree Naidu, Kokiwar PR, Surendra BV.

iv. The study is called “Effect of Meditation on Electro Encephalography” (EEG) (Aftanas, L.I , & Golocheikine, S.A. (2001). Human anterior and frontal midline theta and lower alpha activity reflect emotional positive state and internalized attention: High-resolution EEG investigation of meditation. Neuroscience, 310, 57-60.

v. The noteworthy books chosen for literature review on sangeetham, Vedanta and Swami Tyagaya are authored by renowned scholars with vast experience in
Theology, Swami Tyagaya and Indian music. Their books are published by reputed publishers in India. These publications have created academic and devotional interest throughout the world.

2.5.3.2 Literatures Review on Vedantic philosophy and Indian music

There are many literatures on Indian music and Vedantic philosophy but the significant ones are the following which are more rationalistic and the writers are authorities in their specialty and also the books are published in India. The one of the main theme of the study is Indian *sangeetham* and therefore it is apt to review the commentaries by Indian philosophers otherwise the foreign books may contain glaring biases that may be against Indian theology. The literary works of Swami Prajananda, Swami Yatiswaranda, P.Sambamurthy, Sri Ramanujchariar and T.S. Vasudevan are reviewed.

i. Swami Prajnaanda for instance carried out an evaluation study on the history of Indian classical music and the researcher has identified what issues needed to be highlighted and he has examined further the sacred nature of *sangeetham* as well as the religious philosophy that may be useful for the study. Some of the details are from his book; “The Historical Development of Indian Music” (1973). Swami Prajnaanda is a savant of wide repute and a acknowledged authority on Indian *sangeetham*. His book denotes a short survey of Indian Dance and music, Psychology and Philosophy of Indian Music. There is a systematic and valuable study of different forms and aspects of Indian Music from religious, traditional and historical perspective including discussions on aesthetic aspects of music.
The present volume traces the historical evolution of the musical materials like microtones, tones, murchhanas, ragas, scales, gitis, prabandhas, veena, venu and mridanga, dances and hand poses, rhythm and tempo as well as the philosophical concepts that are essential for the study of history of Indian music. Swami Prajnaanda denotes that kirtans sung in particular raga and thala over a prolonged period give rise to pensive feelings. The study is trying to focus that devotional sangeetham can function as a meditational exercise and a prayer. The sangeetham when sung and contemplated over a long period of time can give rise to a mystical experience. This sacred nature of sangeetham arises from the bhakthi tradition of India.

ii. The researcher also studied on Swami Yatiswarananda’s, ‘Meditation and Spiritual Life’ (1998). Swami Yatiswarananda is a well known Vedantist and a respected missionary. He was well known in his life time as an illumined soul and an eminent spiritual figure. He was a most respected spiritual monk of the Swami Ramakrishna order. He has compiled valuable spiritual truths for those practicing Hinduism. The Swami explains the path of an spirituality and its association to Karma, Bhakti, Raja and Jnana yogas. He enlightens about the importance of spiritual life and the transformation through meditational experience. These ideas have inspired the researcher to understand Divinity and spirituality in devotional sangeetham. The researcher has gathered important knowledge and valuable guidance in referring to these two books regarding the spiritual and meditative life of Swami Tyagaya. The researcher has focused much of his knowledge for his study from these valuable books.
2.5.3.3 Review of Literatures on Swami Tyagaya and his compositions

The researcher reviews three great biographies on Swami Tyagaya and his devotional compositions. The researcher’s study found a mutually supportive relationship between righteous involvement in Swami Tyagaya’s life which played an active part in decisions about life and spirituality. These books have inspired the researcher to understand the spiritual life and the devotional *sangeetham* of Swami Tyagaya. The study scientifically rationalizes Swami Tyagaya’s visualization of God as a focal point in the brain activity and psychology. These books have inspired the researcher to understand the Divinity in devotional *sangeetham*.

The reviewed Literature on Swami Tyagaya and his devotional compositions was written by P. Sambamuthy. He is a great musicologist who has explored extensively and researched on the life of this great poet of South India. He has written extensively on saint Tyagaya. The book is called “Great Composer: Tyagaraja” (2001). In his books ‘Great Composers Book One & Two’ he praises the musical literary genius of Tyagaya. The Book Two discusses the technical and rhetorical and spiritual qualities of Tyagaya's compositions. The examination of the manuscripts points interesting details and information about Tyagaya’s life, parentage, disciples, *ragas*, *sahityas*, *sangatis* and his devotion. The professor has been a pioneer and the most active promoter of Carnatic *Sangeetham* education in South India. He was the fountainhead of all South India musicology and was also well-versed in other systems of music of the world. He has much wisdom of the theory and philosophy of South Indian music. About his work on Swami Tyagaya it is quoted thus, “His span of untiring life was devoted to the subject of musicology and he pursued this study steadfastly and conscientiously, on Swami Tyagaraja” (1994). He describes Swami as
a prolific composer, a holy man and highly influential in popularizing Carnatic sangeetham. He says that Tyagaya composed thousands of devotional kirtans in praise of Lord Rama which remain popular today. This greatness of Swami Tyagaya has attracted the imagination of the researcher.

The researcher also reviewed the book “Spiritual Heritage of Tyagaraja” authored by Sri Ramanujchiarar and V. Ragavan (1958) Sri Ramanujchiarar of the Madras University explains the varied qualities of Tyagaya's literary work in their book 'Spiritual Heritage of Tyagaya'. The reading will desire much knowledge on the fundamental faith in our culture and create a spiritual depth. The attainment of Love in God is achieved much easily by devotion, then other means, was the belief of Tyagaya. The researcher has gathered important information on Swami Tyagaya’s about 700 compositions. The book has inspired the researcher to understand the spiritual life and the devotional sangeetham of Swami Tyagaya. The thesis scientifically rationalizes Swami Tyagaya’s visualization of God as a focal point in the brain activity and psychology. The book has inspired the researcher to understand the Divinity in devotional sangeetham.

The other important literature review on Swami Tyagaya was authored by A. K. Gopalan, & T.S. Vasudevan “Sat Guru Sri Tyagaraja Kirtanaikal” (2003). Vasudevan authenticates Swami Tyagaraja’s sound knowledge in theory of music and the Hindu literature. They validate him as a truly exceptional musician of the Carnatic Sangeetham world. They say Tyagaraja has made several valuable contributions to the field of music as a teacher, musicologist and author. They say that Tyagaraja has skillfully translated poetry for the society to practice Bakthi yoga.
Swami Tyagaya has quoted in many of his poems about his divine experience and his visual image of God. The poems are, 1. Ella ni daya rathu, 2. Kannukontini, Giripai, 3. Inthakannu, 4. Nannu palimpa (A. K. Gopalan, 2003:13). The poems are illustrated in different chapters.

The researcher has gathered important knowledge and valuable guidance in referring to the above three books regarding the spiritual and meditative life of Swami Tyagaya. The researcher describes the literary works of Tyagaya as Tyagpopanishad and fondly remembers Tyagaraja as Swami Tyagaya. The reading experience is fascinating and highly rewarding. It is an intellectual insight. Tyagaya’s musical kirthana creates devotion, wisdom and intellectualism. Tyagaya preached the Upanishads through his Keerthanas and perhaps his work can be called Tyagopanishad (Purushothaman, 2003:41).

The researcher has summarized the salient features of the three books on Swami Tyagaya which has influenced the core fabric of the current study. During the 16th century period onwards, Sangeetha Sastra, (musical grammar), gradually went through radical changes. Sangeetham was evolved to a simpler, comprehensible media. Music became a source of festival entertainment and a method for prayer. In the monumental work, entitled “Oriental music in European Notation” Chinnasami Mudaliar has printed in staff notation many of Tyagaya’s kritis. (Sambamurthy, 2001:1). This book made foreign scholars understand something of the genius of this great composer. References about Tyagaya were made in the works of Fox Strangways, Poley, Miss Ethel Rosenthal and Mrs. Cousin, which has helped the
Occidentals understand the greatness of Thyagaraja as a composer (Sambamurthy, 2001:1).

India has produced from time to time great men who have revealed and restated the truths of Indian philosophy. This revealed knowledge has reminded the people of their glorious heritage. Tyagaya belongs to this noble group. He has attempted to teach the Vedic Truths in an attractive musical poetry, called Karnatic Sangeetham. His musical compositions are admired and popularly sung throughout the world even to this day. He is a Sangeetha Siddhanti, a Vagiyakara, a Sahityakara, a Chatur Vedi, a Rama Bhakta and a Swami as a Sat Guru (pioneer) Tyagaya setup musical standards for all times.

The flood of musical ideas that emanated from his imagination brought forth a surge of special charm in his compositions. Tyagaya has become one of the world's immortal Saints. His compositions have made Telugu a most lovable, fascinating and attractive language. His compositions have portrayed Lord Rama, as Ishwara and Paramatma. His compositions have produced a simpler form of the great Vedic truth for all people to understand and practice Bakti. There is a combination of tradition and individual expression in his songs. Every kind of human experience is expressed in his songs. The thought of Swami Tyagaya gives a large amount of legitimate pride to all Karnatic Sangeetham lovers. He was a Lakshna Purusha and a Lakshya Purusha. Therefore it is a privilege to call his compositions as Tygopanishads.

Tyagaya combined his literary talents with musical excellence and practised intense devotion to Lord Rama. He presented his body and his soul to Lord Rama. His
life was woven together with *Sangeetham, Ramayana, Upanishadam* and Spiritualism. His experiences of the divine *ananda* have found clear expression in his musical utterances. The Gopichandana Tripundra and the *akshaya* mark on his forehead reflect the true *Bhagavata* trait. His charisma tempted devotees to worship him. His poetry contained a wealth of musical knowledge and poetic ideas. He had reached lyrical heights of excellence in his musical compositions. He attained divine grace through music. Tyagaya lived a simple life and he denounced and renounced all forms of *boga*, (materialistic pleasures). He propagated profound *Bhakti* through his music. He was a reformer, giving spiritual training to the devotees to realize, ‘*Sarvam Khalvidam Brahma*’ which means ‘All indeed is Brahman’ (V. Ragagyan, 1958:130).

Swami Tyagaya says in his *kriti*, “*Nii bhakti bhaagya*”,

“*Only life immersed in the auspicious ocean of the devotion is life.*
*One may be born as a religious or even as a Divine Being;*
*His life is no life if he is not immersed in the ocean of devotion.*
*He is only a burden on earth*”. (Ramanujachari, 179)

Swami’s musical literature advocates the message of *Bhakti* to attain God. He sings, “*Sangita shastrajnanamu sarupya saukhyadamee manasa.*” in *Bhairavi raga*. O Mind, the gift of music and science ennobled an ocean of bliss to the full” (Ramanujachari, 1958:107). In an another *kriti* he questions, “*Sangeetha Jnanamu Bakti Vinaa sanmargamu galadee manasa*” (Tyagaya in *Danyasi raga*). Is there a higher path, O Mind than the path of devotion coupled with music (Ramanujachari, 1958:111). In another *kriti*, “*Endaromahanu bhavulu*” in *Sri raga*, he says, “Salutations to all the noble souls who have known the secrets of the *Bhagavata*, the *Ramayana*, the *Gita*, the *Vedas*, the *Sastras*, the *Puranas*, Lord Siva, the many Gods and all those who attained long life with the endless bliss of *Bhava, Raaga* and *Laya*”. 
He advises his devotees on the best way to practice Sastria Sangeetham and he encourages his devotees to learn music as a Saadhana of their spiritual effort. He advised them to consider Sangeetha Jnana as Yoga and Siddhi. His counsel paves the path for the comprehension and realization of ‘Brahman’ (Sambamurthy, 2001:28).

Swami Tyagaya says in this kriti ‘Swara Raga sudha rasa’ that Naabhi, Hrith, Kant, Rasana, and Naasa are the sources of sound which originate from the Mooladhara or the inner soul. The recognition of this Mooladhara naada is itself moksha or attaining God (Sri Ramanujchariar, 1958:594). Swami Tyagaya in his kriti, "Emijesithenemi" he says that, whatever one's learning, whatever one's wealth and comforts, whatever the yagas one may have performed, one gains no Salvation or Grace, unless one gives up kama, moha (desire and wickedness). One needs the blessing of Lord Rama (Ramanujachari, 1958:121).

Swami Tyagaya in another of his composition, "Manasu Swadeenamaina," he categorically states that nothing will prevail one unless the mind is in control. He says that there is no need for mantras and tantras for the man who has controlled and subdued his mind. There is no need to do thapas for the man who has realized that the body is not the Athman and there is no need for a man to worry about the future if he has taken care of the past and the present through good conduct. What is important is to realize Lord Rama (Ramanujachari, 1958:178). Aldoux Huxley classified prayer into petition, intecession, mediatation, and contemplation. Of these, petition, he said, was the lowest form of prayer; intercession the next best; mediation still higher and contemplation, the ideal. The quote closely follows Sri Thyagaraja Swami's views on
Swami Tyagaya stressed on purity of thought, unselfishness and un-attachment to fruits of worship, by quoting the *kirtana* “Paripalaya Paripalaya” in Reetigowlai “O: God, my pure body is your temple (Ramanujachari, 1958:176). The researcher identified the devotional issues needed to be examined and inspected many *kirtanaas* identifying the vision of God. The researcher identified the areas for further evaluation and research. Swami Tyagaya has quoted in many of his poems about his divine experience and his visual image of God. The poems are, 1. *Bhavanutha* 2. *Samaja varakamana* 3. *Sri Rama pathama* 4. *Kamalaptha kula*.

Tyagaya emphasizes the importance of *nadopasana* with pristine purity. He educated the society to sing simple devotional songs. He taught his devotees the nature and purpose of devotional *sangeetham*, music. Through devotional *sangeetham*, he urged people to acquire the wisdom of perceiving Brahman, the intelligence to experience Him, the diligence to seek Him and the patience to wait for enlightenment. He described his Rama as an embodiment of *nada*, sound. No other composer has in such a simple and appealing ways taught music as an art, science, philosophy and ultimately, as a means to salvation. No other composer has been praised so highly by so many generations of composers and savants. From his own time to this day, composers have sung in his praise and wherever Carnatic music flourishes, there are *aradhanas* conducted as a homage to him.

Swami Tyagaya contributed immensely in redefining and simplifying religion as a spiritual science. He said, “*Sangeetha Jhanam Bhakti Veena*”. (The knowledge of good music leads to spiritual devotion). Swami Tyagaya realized a higher cosmic energy, which may be called as the Absolute Consciousness, *Nada Brahmam*. Neuro-
science explains that music communicates in the brain centres causing spiritual emotion which envisions “God”. The heart of the mystery of meditational music will involve complex brain areas. Leviton quotes, “The sum total of the spiritual emotion, beliefs, desires, thoughts and feelings comes from the activities of the neurons, glial cells and atoms in the different regions of the brain” (2008:175). Tyagaya sings in his kriti “Svara Ragasudha”, “To know and realise the nature of Nada, which is originating from the Muulaadhaara, primordial Sound, is itself bliss and salvation”. A devoted devotee with the knowledge of Ragas becomes a Mukta, union with the Absolute consciousness” (Ramanujachari, 1958:109). The literature review qualifies the Phenomenological Analysis which has a psychological and ideological focus. The phenomena is relate to experiences of some personal significance, such as a major life events, or the development of an important relationship or a major experience or a emotional perception. This phenomenon can be scientifically rationalized with sufficient evidences. (These evidences will be discussed later in chapter 4 and 5.)

2.5.3.4 Modern Science, Tyagopanishad and Spirituality

Both science and spirituality are the search for truth. One is the search for the truth of the physical world and the other the search for the truth of the mental world called as God. As such there is no conflict between them. The current scientific paradigm does not include consciousness or mind as a fundamental reality, but seeks to explain everything in physical terms and therefore it finds no place or need for God (Peter Russell, 2003:26). On the other hand, Spirituality is often very unscientific in its approach to self-liberation. A personal experiment in nada-yoga or meditation practice will lead to the results of realizing God. In this respect spiritual growth is natural and scientific. Science and spirituality apparently belong to two different
realms which appears forever separate. Science belongs to the external world of outer phenomena and the spiritual science belongs to the internal world of perception. A closer examination however reveals that principles of physics and the principles of Vedanta have fundamental similarities. There are many intrinsic similarities. The knowledge of Enlightenment or knowledge of Brahman or God is acquired gradually through philosophy, theology, mysticism and rationalism. It is an illusory reality.

Tyagopanishad, Spirituality and Modern Science are a part of the same world. Swami Tyagaya’s sangeetham is a Nada-yoga which is a meditative exercise of the brain. In this respect the spiritual growth through sangeetham is also considered scientific. In addition, there are studies of the brain mechanisms related to music perception, suggesting a possible dynamic role for the sensory, motor and cerebral centres in the brain evolving to a orchestrated unit to hear a melody, rhythm and beat. Humans are unparallel in their ability to make sense of sound and music. (A. Patel, 2008:3). The understanding of the neurophysiology of how the visual centre, auditory centre, motor-sensation and cerebral cortex are coupled in meditation and devotion could elevate mind perception in the development of cognizing a higher consiousness, (Brahman), through the action of the respective neuro-transmitters.

A closer examination however reveals that a principle of Neuro-physics explains about the Spiritual centres in the brain cortex. There are many intrinsic electo-chemical factors playing a role in the brain. From the Vedantic point of view, the knowledge of Enlightenment is Brahmavidya or knowledge of Brahman. Swami
Yatiswarananda, Ramakrishna, 1998:409). The attainment is acquired gradually through meditative yoga, musical scholasticism, spiritual philosophy, devotional theology, neurological mysticism and scientific rationalism. God appears as a visual or auditory reality to the devotee.

Tyagaya says that spiritual reality is essentially an altered level of consciousness which is compared to a quantum shift in the mind. Tyagaya, the saintly composer, expounded ways through music to train the mind for spiritual realization, moksha. Naturally, the brain absorbs the devotional message of the sahithya, and the meditative nature of sangeetham creates electro-chemical actions in the brain cortex. The vibratory effects of the musical notes transform the emotional centres of the brain which in turn creates the spiritual thought. Thus the mind elevates to a higher conscious plain and exhibits a sentiment of deep devotion to the concept of ‘The Absolute Consciousness’ called Brahman. It is anticipated that through the dedicated learning of Sangeetham and Tyagopanishad, a spiritual conversion is possible.

The divine knowledge transforms the brain activity to a higher pious magnitude which transmits a quantum shift from a physical level to a spiritual reality. Consequently, the mind gets spiritually elevated to a supernatural or a metaphysical height that it can directly experience the Brahman which is the ‘Sat Cit Aananda state’, (Infinite Consciousness of Bliss). It is an extra-sensory-perception (ESR) where the mind transcend from a physical intensity to a metaphysical intensity. In this present scientific era, there are sufficient experiments to prove that music energy can communicate and bring changes in the Cerebral cortex of the brain and alter the
consciousness state through brain scan, tomogram and EEG (Andrew Newberg, 2010: 146). The Monk brain activity research by Dr Davidson - EEG facility in the Waisman Center at the University of Wisconsin-Madison (2008) and another research was done by Patel, & A.D., Gibson (1998). Processing EEG & syntactic relations in language and music: Journal of Cognitive Neuroscience.

The devotional, meditational and the musical feature of Tyagopanishad has the potentiality to illuminate the fundamental characteristics of the human brain function, including spirituality, memory, perception, language, vision, hearing, touch, emotion, coding, decoding and the processing of complex sequences that unfold in time. The neuroscientific study of music is a young discipline. Many researchers have revealed significant degree of positive findings in the dynamic processing of brain-mind complex by using methods that cover neuroimaging, neuropsychology, behavioral and perception studies. Incidentally, the object of this research paper is to establish the dynamics that Tyagopanishads in Sastria Sangeetham implicates an extra-sensory perception of realising the ‘Brahman’ (Absolute Consciousness) which means that through deep devotional meditation of Swami Tyagaya’s compositions the devotee can elevate from a physical level to a metaphysical level. The comprehension of the devotional Consciousness happens in the brain. The mind performs an intricate and dynamic task of exhibiting thought waves like a holographic paradigm and therefore undergoes a quantum shift. It is a dynamic phenomenon of the brain and mind complex to visualize God.

This amazing research binds the mind to distinguish the spiritual energy within and without the body. It binds the body to the mind and the mind to Brahman. The
Universe is Brahman. The light is Brahman. The sound is Brahman. The research explains that devotional sangeetham inspires and illuminates the intellect to rationalize the Brahman. The devotional characteristics of Tyagopanishad has the potentiality to illuminate the human brain function on spirituality, memory, perception, language, vision, hearing, touch, emotion, coding, decoding and the processing of complex sequences. The quantum phenomenon of Brahman is complicated and difficult to explain. It is mystical and contains the science of probabilities. The study has gathered important knowledge and valuable guidance in reviewing various literatures regarding sangeetham, philosophy, neuropsychology, spirituality and meditative life of Swami Tyagaya. The next knowledge on Brain and Neuropsychology is focused from these valuable books.

Tyagaya - Sangeetham - Brain - Moksha (Spirituality)

2.5.3.5 Review of Literatures on Brain and Neuropsychology

The noteworthy books chosen for literature evaluation on brain science and neuropsychology are by expert doctors and with vast experience in brain study and
music. Their books are published by reputed publishers in USA. These research publications create academic and scientific interests.

i. The researcher’s important reference book is “How God Changes Your Brain” (Andrew Newberg, 2009). This book is reviewed for the new evidences based on brain studies. The author explains about meditation and ‘God module’ in the brain. The author has done a wide-reaching survey of people’s religious and spiritual experiences. Newberg claims that spiritual practices like prayers reduce stress and slow aging process and most important of all is the contemplating by devotion to love God reduces anxiety and depression and increases feelings of security, compassion, and love (Andrew Newberg, 2009:9). These ideas are similar to Swami Tyagaya’s experience that God is great for mental, physical, and spiritual health.

Andrew Newberg continues in his book, “How God Changes Your Brain” that those who meditate have increased activity in the frontal lobe, which is the part of the brain involved in concentration and decreased activity in the parietal lobe, which gives people a sense of orientation in time and space. Newberg is using new technologies to understand spiritual experiences. He has identified areas in the brain that indicate “emotional and spiritual feelings” for the existence of God sensation.

Andrew B Newberg and others describe that kind of neurological process which are driven by the repetitive, rhythmic stimulation as typical of human ritual and which contribute to the delivery of transcendental feelings of
connection to a universal unity. For this to occur, they say there must be a blending of the rhythmic stimulation with ideas. Once this occurs, the ritual practice turns a meaningful idea into a visceral experience. Newberg says, “humans are compelled to act out myths by the biological operations of the brain on account of what they call the inbuilt tendency of the brain to turn thoughts into actions” (Andrew Newberg, 2010:42). Based on Newberg’s works, the current study examines the following breakthrough discoveries such as intense sangeetham, prayer and meditation permanently change numerous structures and neurons in the brain which can alter brain function and create the perception of God.

b. The researcher has also studied the book of Oliver Sack’s, “Musicophilia” (2007). It is a revelatory work of modern science which enhances physical and emotional health. Sacks is a British-American biologist, neurologist and writer. He says, “Music imprints itself on the brain deeper than any other human experience. Music evokes emotion and emotion can bring with it memory” (Sacks, 2007:66, 68). Furthermore, Sacks explains, “music brings back the feeling of life when nothing else can” (Sacks, 2007:297). Sacks state that music occupies more areas of the brain than language does and that humans are primary musical species. Recent developments in cognitive neuroscience have led to a new way of looking at music and emotion and spiritualism. “Neuroscientist Roger Penrose hypothesizes that quantum mechanics plays an essential role in the understanding of human consciousness and the philosopher Kant once called music the ‘quickening art. (Oliver Sacks, 2007: 140) Oliver Sacks states that music occupies more areas of the brain
than language does, and that humans are primary musical species. (Sacks, 2007:1). Dr Sacks says, “we humans are a musical species no less than a linguistic one. All of us can perceive music, tone, timbre, pitch, melody, harmony and rhythm. We integrate all of these and construct in our minds using many different parts of the brain’ (Sacks; 2007:1). The researcher of this study is encouraged by this idea because it is similar to the statement of Swami Prajnananda quoted in the literature review above. The study is based heavily on the Swami Tyagaya’s devotional Sangeetham impact in the brain.

C. The book by Dr Daniel Levitin; “This Is Your Brain On Music” which is about faith and music that is as credible as it is inspiring. Livitin says, “sound is a mental image created by the brain in response to vibrating molecules.(Livitin;22). The researcher is influenced by Dr Livitin’s statement and acknowledges the idea for sangeetham and devotion in his thesis. Dr. Daniel Levitin is a Professor of Psychology, Neuroscience and music at McGill university, Montreal and his book is “This Is Your Brain On Music”; Dutton/Penguin, 2006; London. Dr Levitin works on the basic nature of hearing and of music making to the neural impulses in the brain centres. He says that music is like thinking of a song that resonates deep down in the mind. It is like series of sounds are committed to a tape, and that particular combination of rhythms, timbres and pitches has lodged in the memory, making the pulse race and heart swell every time music is heard. (Levitin;2006;67). This study has adopted Levitin’s material as a ideal guide and has applied the reasoning to the devotional sangeetham of Swami Tyagaya. Researchers are using new technologies in probing why music has
such an intense effect in the brain are using new technologies to identify spiritual experiences in the brain.

d. Dr. A. Patel of Neuroscience Institute, San Diego, starts his book “Music, Language and the Brain; Oxford Press, 2010”, by reminding the readers that the interest in music and language relationship is more than 2000 years old from the Greek scholars and has now led the cognitive scientists to rationalize how the brain deals with music and language. He suggests that both language and music represent their sound categories bilaterally in auditory cortex. (Patel, 2010; 73). He discusses his results with Indian classical music with intended spiritual emotion. (Patel; 2010; 314). Patel’s comparative study on Indian music and language investigates how the brain plays a role in processing the sound. (Patel; 417). This study is encouraged by the research facts of Dr Patil.

e. Dr. Gottfried Schlaug a Harvard University neurologist, states that music might provide an alternative entry point to the brain. Pitch, harmony, melody, rhythm, and emotion (all components of music) engage different regions of the brain, and many of those same regions are also important in speech, movement, and social interaction. Dr Schlaug works on neuro-imaging has been inspiring and his work investigates the use of music and musical stimuli as an interventional tool for educational and therapeutic purposes and reveals the behavioral and neural correlates of singing, learning, and brain adaptation in response to changes in the environment in the developing and adult brain. Schlaug said: "Additional study is necessary to confirm causal relationships
between intense motor training for a long period of time and structural changes in motor and non-motor related brain regions. An alternative explanation may be that these musicians were born with these differences, which may draw them towards their musical gifts." There have been other findings, which suggest that the brain can be reshaped in response to repetitive tasks. "Music might provide an alternative entry point to the brain, because it can unlock so many different doors into an injured or healthy brain" (Patel, 2008:327).

f. The researcher has constantly referred to Scientific American Mind, May 2011, Issue and series of Scientific American Journals. The researcher reviewed (i) neurobiology of music perception and music making, (ii) the use of instrumental musicians and singers as a model to examine brain plasticity, and (iii) the use of innovative musical interventions including singing and music making to facilitate recovery from brain injuries and neuro-developmental disorders. The important finding in the hidden Brain is the neurons and a class of cells called glia are behind most of the brain's work and many of its diseases (R. Douglas Fields, 2011:6). The researcher finds the books and articles are all peer-reviewed manuscripts and so are highly reliable.

These scientific books have remained as a practical guide for this research study on emotional response in the brain and its connection to special areas in the brain for the cognition of “God Consciousness”. These literature evaluations have designed to test the theory that the meditative Sangeetham of Tyagaya could envisage the ‘God’ in the brain. The study has relied heavily on the scientific knowledge of Dr Andrew Newberg’s, Dr Livitin’s, Dr Patel’s observations, findings and inferences. Researchers
are using new technologies to identify spiritual experiences in the brain circuit for more evidences.

In conclusion, the review finds the books and articles and the manuscripts as reliable information to substantiate the first objective of the study. The researcher believes that physical stimulation alone is not sufficient to generate transcendental experiences but a mental experience is essential for the spiritual enlightenment. The biological and the psychological influence should go hand in hand. The saintly life and the devotional sangeetham of Swami Tyagaya contribute to the spiritual enlightenment, moksha.

**Human Brain**

2.5.3.6 Review of Literatures on Questionnaire Survey

i. The first article mentions about the method used for analyzing the findings of the survey. Jacob Cohen’s contributions to statistical analysis in the behavioral sciences reflected to help scientists answer the questions motivating human judgment. The Inferential analysis was conducted with the
methodology of Cohen, J. (1988), Statistical power analysis for the behavioural sciences (2nd Ed.). The researcher has adopted Cohen’s ‘The Null Hypothesis analysis’ which is effectively used for the analysis of the psychological questionnaire survey. Such estimates were necessarily based on the probability of rejecting the null hypothesis with an acceptably low level of statistical significance which is the central basis for interpreting the questionnaire study findings. The following set of negations may in the formation of null and alternative hypotheses.

Nul HO$_1$: There is no significant relationship between music and devotional experience among Indians.

Nul HO$_2$: There is no significant relationship between music and general perception on god, brain & devotional among Indians.

Nul HO$_3$: There is no significant relationship between traditional music and brain among Indians.

Nul HO$_4$: There is no significant relationship between devotional music and spirituality among Indians.

Nul HO$_5$: There is no significant relationship between devotional experience and spiritual among Indians.

ii. The second article reviewed was for the guidance of designing and conducting the questionnaire survey. The Questionnaire includes a validated tool and the survey was published by Genia, Vicky (1991). The spiritual experience index: A measure of spiritual maturity. *Journal of Religion and Health, 30*, 337-347. The Spiritual Experience Index was developed to measure spiritual maturity
in persons of diverse religious and spiritual beliefs. The scale was constructed from a multidimensional conceptualization of faith and spiritual life. This guideline was useful to format the questions for the survey.

The study is all about Swami Tyagaya’s spiritual experience and its relationship to brain which is a psychological proposition. The researcher adopts the methodology of V. Genia’s “The spiritual Experience Index”, to achieve the desired results. Many theoretical frameworks for defining and measuring the religious variables have been consulted. The thirty eight questions are on spiritual practice and belief related to God and the brain. The total eighty (80) questions of the questionnaire survey explores Swami Tyagaya’s devotion, sangeetham, God and its consequence in the brain.

2.5.3.7 The literatures reviewed for Electro-Encephalography (EEG)

i. Dr Akira Kasamatsmu, the Neuropsychiatrist of The University of Tokyo conducted series of EEG experiments on the mental state of Zen meditation. His work is reported as “An Electroencephalographic study on the Zen meditation” (Akira Kasamatsmu. D, & Tomio Hiraim, 1966:315). This current study has adopted the above methodology as a guideline. This study has examined the EEG changes on meditation and discussed the neuropsychological results. The subject of the present paper describes the state of the brain when the brain experiences Swami Tyagaya’s sangeetham and devotional music. The study finds the corresponding neuropsychological state of the brain closely related to the devotional music and contemplation.
ii. The second article reviewed is based on the validated work done by Sundarachari R, Dhanasree Naidu, Kokiwar PR and Surendra BV. The study by Sundarachari is called “Effect of Meditation on Electro Encephalography (EEG), Blood Pressure, Heart Rate and Respiratory rate” published MRIMS Journal of Health Sciences, Volume 1, Issue 2, July - December 2013. Dr Sundrachari is from the physiology department of Maala Reddy Medical college, Hyderabad. He and his team conducted a study on meditation and the EEG with association of the blood pressure and heart rate. The EEG aspect of their study and the mental state of meditation was associated to the present study on EEG and devotional sangeetham. The guidelines were helpful in discussing some of the electrographic characteristics.

iii. The researcher has frequently referred to the neurology text book called ‘Principles of Neurology’, Maurice Victor (2001). The main features of the reference were about the brain, the nervous system and the limbic system which supports emotion, behavior and memory. The limbic system operates by influencing the endocrine system and the autonomic nervous system. The prefrontal cortex, amygdala and the hippocampus are involved in many cognitive and emotional processes which were useful for the understanding of this thesis.

A great deal of reference was made about the EEG signals of the brain from the Neurology book. The brainwaves, Frequencies and Functions denotes that the Brainwaves may be divided into 5 categories depending on the frequency: Delta
waves (0.5-4 Hz) are dominant during coma and deep sleep. Theta waves (4-8 Hz) are associated with drives, emotions, trance states, and dream sleep. Alpha waves (8-13 Hz) reflect the brain’s idle state and are found in most people in the awake condition with closed eyes. Alpha waves are the prime indicators of conscious attention, and they represent the gate between the outer and the inner world and between the conscious and the unconscious. Beta waves (13-30 Hz) indicate an aroused, mentally alert and concentrated state. Finally, the fast Gamma frequencies (30-42 Hz) correlate with will, high energy states and ecstasy. Thus, both Delta and Theta waves reflect unconscious states, whereas Alpha and Beta waves indicate awake, conscious states. Finally recent research point to Gamma waves as the brain’s signature of higher states of consciousness (Maurice Victor, 2001:27-31).

This study has relayed heavily on the empirical knowledge of the above neuroscientists for their observations, findings and inferences. The researcher believes that physical stimulation alone is not sufficient to generate transcendental experiences but a mental experience in the form of meditation is essential for the spiritual realization. The researcher has pointed out that neuroscientists are using new technologies to identify spiritual experiences in the brain circuit for more evidences. This study is about learning what Swami Tyagaya’s sangeetham and devotional music can teach about the brain and what the brain can teach about spirituality?

2.5.3.8 The Literature correlation of Sangeetham (music)

The researcher correlates all his literature findings on the relevant subjects for a correlated understanding of sangeetham, neuroscience, God and spirituality.
From the genesis of Human history, ever since mankind started on his long journey along the path of development and civilization, music has had a very special charm on the human mind. It can very well be called the magic of sound and it has always been an important element in the culture of all tribes and all races. The way of life, their God, their mood, their nature and their history are predicted in the quality of their music. Their music represented their emotions like pleasure, pain, love, hatred, heroism, knowledge, marriage, birth, death and Gods (Prajnananda Swami, 1973:1). The creation of music is a product of intelligence. Music creates emotion. Emotion generates a psychological relationship to the special brain areas. Devotional music like Carnatic *Sangeetham* is believed to be a sacred music which produces holy emotions. Intense devotional emotion can elevate the mind from the physical level to a metaphysical state. The Godly emotional state dissolves the ego centric reliance and unifies the devotional mind to the highest level of Divine contemplation. The study examines how devotional *sangeetham* can teach us about the God concept in the brain and what the brain can teach us of the dynamics of music and spirituality?

The famous neuro-scientist Dr Livitin said, “Music listening, performance and composition engages nearly every area of the brain and music is used to manipulate our emotions” (Levitin, 2006:9). Generally, people lived in diverse situations, yet beneath the diversity there was an under-current of unity and music emerged as an important media for unity, for harmony and for devotional singing. Devotional music created holy impact in the brain and therefore that holiness created a God module in the mind which replicated spirituality. Devotional singing like prayer is incorporated in music is a form of meditation (Newberg, 2009:28). Evidence point out that meditation is an excellent exercise for maintaining an healthy brain (Newberg,
Meditation involves sustained concentration and deliberate regulation of brain action and breathing. Many studies have shown that it enhances relaxation and spiritual well-being (Newberg, 2009:160). Devotional singing in the form of prayer stimulates the cognitive circuits in the brain. The circuits are Prefrontal cortex, anterior cingulated, basal ganglia and the thalamus (Newberg, 2009:28). Devotional music involves emotions and emotions are powerful energy which governs a wide variety of activities involved with consciousness, empathy, compassion, suppression of anger and fear (Newberg, 2009:28). The objective of the literature review is to enlighten the general perception of devotional music and spiritual experiences for a better living. It shows that *sangeetham* arises from a profound intelligence and has the power to move the soul and alter consciousness. The Indians believe that *Sangeetham* is an ancient science and is the essence of *AUM*, the primal vibration which can gives rise to divine phenomena.

2.5.3.9 Literature Review on *Sangeetham* and Indian Civilization

The Readers digest dictionary defines, “Music is an art form consisting of organized tones that produce a coherent sequence of sounds intended to elicit a pleasurable response in a listener. Vocal or instrumental sounds having some degree of rhythm, melody and harmony” (Robert Ilson, 1985:1124). In sanscrit music is called as “*sangita*”. The Indian treatise on music has defined sangita as a combination of vocal, instrumental and dance. The Indians are of the view that music has its roots in the ‘primordial Sound’ known as *Sabda Brahmam* Music that evolved in Indian soil and imbibed the spirit of the people belonging to India is known as *sangeetham*. *Sangeetham* possesses a devotional vision, a special grammar and a melodious
character of its own and it differs from music of other countries in its structure, temperament and in its method of improvisation (Swami Prajnananda, 1973:14).

Spirituality has always been the prominent content of Carnatakasangeetham. The beautiful blending of melody, rhythm, sacred lyrics and symphony has made sangeetham extraordinary and divine. The basic idea behind sangeetham is its divine nature. The devotional nature allows the devotee to seek the ultimate Brahman or God. It has been told in the Vedas that the easiest and best way to attain salvation is to sing and meditate on the greatness of the Brahman. In Hindu scriptures, music and God have always been associated together. Many deities have their own musical instruments and are all portrayed as lovers of music. Lord Siva is the embodiment of nada (cosmic music) which is the first form of music. Lord Krishna is connected to the flute. Lord Rama is portrayed as the embodiment of the Sama Veda. Goddess Saraswati is always associated with the Veena as the source of wisdom.

At the beginning of the nineteenth century South Indian composers were influenced by traditional religious concepts such as temple rituals, pilgrimage and personal devotion. There were three prominent composers from the Tanjore district called Swami Tyagaya, Muthusvami Dikshitar and Syama Sastri. They advocated the Bhakthi tradition of sangeetham. They composed bhakthi kirthanas and sang them in praise of their deity. There were many composer saints who practiced the bhakthi tradition. There were the sixty three saivaite saints known as Nayanmaars and twelve Vaishnavaite saints known as Alwars who stand out for their extreme devotion and dedication to God (A.K. Gopalan, 2003:23).
2.5.3.10 Review on Swami Tyagaya

Saint Tyagaya Swami (1767 - 1847 AD) was the most celebrated Carnatic Music saint and was a great devotee of Lord Sri Rama. Tyagaya believed that God realization is best achieved through *nado-pasana* (music with devotion). His songs are filled with an intimate devotion to Lord Rama. All his compositions revealed his deep understanding of the doctrine of the *Vedas, Upanishads, Puranas* especially the Ramayana. As a great devotee of Lord Rama, he insisted that music and Bhakti, should be synonymous to realize God (Sambamurthy, 2001:11). Sri Tyagaya's life is an illustration to the dictum that music and devotion combined make the best path to the understanding of the Supreme Brahman and attaining spirituality (Sambamurthy, 2001:29). Swami Tyagaya has quoted in many of his poems about his divine experience. The poems are, 1. *Ella ni daya rathu*, 2. *Kannukontini, Giripai*, 3. *Inthakannu*, 4. *Nannu palimpa* (A.K. Gopalan, 2003:13). The saintly musician is an example for the propagation of devotional music. He was a great teacher of mankind and he communed with God through music (Sambamoorthy, 2001:11). He comprehended the cosmic laws of divine music and through his compositions he enlightened the compassionate nature of music. He advocated that the sacredness of music is beyond logical analysis but often comprehensible through personal intuition (Sambamoorthy, 2001:85).

2.5.3.11 Review on Devotion (*Bhakti*) and God

Swami Vivekananda states that bhakti is real. It is a genuine search after the Lord. A search beginning, continuing and ending in love (Swami Vivekananda, 1963:14). ‘God’ is conceived as the principal object of faith among the believers. The definition of “God” is the single supreme agency postulated in some philosophical
system to explain the phenomena of the world, having a nature variously conceived in such terms as omnipotent, omniscient, immanent vital force and infinity (The Readers Digest Illustrated dictionary, London 1985:719). The Hindus call ‘God’ as Brahmam. Bhakti-Yoga is a pure spiritual devotion and a deep love for God. It is a method to merge with the cosmic consciousness. It is a search for divine compassion and Love. One single moment of the madness of extreme love to God brings us eternal freedom. “Bhakti is strong love to God”. “When a man gets it he loves all, hates none and he becomes contented forever and this love cannot be reduced to any earthly advantage” (Swami Vivekanada, 1963:14).

Devotional music is believed to have a divine origin. Singing devotional music is a powerful way to create sacred emotions. These contemplative sangeetham can induce deep meditation, healing experiences, and intense imaginative journey in religious awareness. Sangeetham has the subtle sound combination of melody, harmony and beats. Sangeetham is like chanting the mantras. The saints believed that by repeating the sangeetham as a sacred invocation a deep meditative state is achieved and communion with God is possible. Neuro-scientists believed that meditative singing practices can bring about electrochemical and neuroplastic changes in the brain. Dr Newberg says, “Devotional singing and contemplation of God for long enough can cause different neural circuits in the brain to become activated new neurons and synaptic connections are made in the brain and God becomes neurologically real” (Newberg, 2010:1). The devotional experience transforms God into a symbol representing a personal, ethical and social value. This emotional experience encourages a religious and spiritual development (Newberg, 2009:5). This form of spiritual development and contemplative singing exercise could strengthen
neurological circuits involved with consciousness, empathy, compassion, love and tolerance (Newberg, 2010:17). The researcher believes that Swami Tyagaya should have had the visionary experience of God in his meditative state of mind.

This study attempts to show how modern Neuro-Psychology approves this “God-Image "in the brain? The devotional music is a form of meditation of a higher principle and it disciplines the mind against base emotions like felony, hatred, crime and sin and the consistent practice of devotional music causes neuroplastic changes in the brain. The brain cortical centres produce divine emotions, perception, imagination, thought and memory (Roth, 2004:36). Some societies venerate music as a representation of Consciousness. Devotion to Consciousness is devotion to God. Divine emotions stimulate a creative motor-sensory system to motivate spirituality. Devotional music can transcend the limits of time and space and bring forth transcendental harmony and peace and comprehend the metaphysical aspect of God. The practise of devotional music can help the human society to be loving, tolerant, righteous and compassionate. This study demonstrates through the EEG investigation that spiritual sangeetham plays a prominent role in the emotional centres of the brain and proves that devotional music of Tyagopanishad can create a mental imagery of God.

2.5.3.12 Review on Spirituality

Spirituality is explained as a process of personal transformation, either in accordance with traditional religious ideals, or oriented on subjective experience and psychological growth independently of any specific religious context (Robert Ilson, 1984:1611). In a more general sense, it may refer to almost any kind of
meaningful activity or blissful experience. Spiritualism has been the key content of Carnatic music. The basic idea behind *sangeetham* compositions is to understand ‘God’. The beautiful interweaving of the devotional elements and the poetic factors have made *sangeetham* perpetual. Swami Tyagaraja said that the easiest way to attain salvation is to sing the greatness of the Almighty (C. Ramanujachari and Ragavan, 1958:30). Music and *sangeetham* in particular are the most spontaneous form of human expression. The language of a song represent the meaning which brings forth the sentiments concealed in the *sangeetham*. The bhakti saints composed their devotional poems and sang them before their favorite deities. They elucidated their spiritual urge and effectively sang their kritis for personal enlightenment. Their spiritual exercise gave rise to their spiritual goal of attaining *moksha*. Therefore, *sangeetham* or devotional music has been tested and found to be the most satisfactory tool as it attracts, enchants, enthralls and easily appeals to all segments of the society to worship God.

> *Music is the mediator between the spiritual and the sensual life.* — Ludwig van Beethoven
> *Music is a moral law. It gives soul to the universe, wings to the mind, flight to the imagination, and charm and gaiety to life and to everything.* — Plato. (Robert Ilson, 1984:1303)

The evaluation of the book, “The History of Indian Music” shows that *sangeetham* is one of the most powerful gateways to connect to human spiritual nature. It is believed to be from a divine source. There is no other medium other than music that can transport the mind beyond the limits of the physical body to a higher blissful and intellectual state. *Sangeetham* can help to rescue the spirits from some of the lowest points of life and it can be the blissful sound pathway for many loving memories in life (Sambamurthy, 1994:70). Tyagaya confirms that spirituality and
sangeetham can never be separated. *Sangeetham* transformed the path of his inner spiritual journey (C. Ramanuchachari, 1958:13).

The assessment of the book “Tyagaraja” shows that the comprehension of Brahman or God is an unsolved mystery of life. Indian devotional musicological treatises incorporate the theory of sacred sound as Nada-Brahman. *Sangeetham* has a profound impact in the brain. *Sangeetham* creates a meditational effect. Thus, interpreting that devotional *sangeetham* as a spiritual practice directly manifests a ‘God Form’ experience and therefore provides an access to the highest spiritual reality of attaining emancipation (P. Sambamurthy, 2001:2). The Vedas explains that there is a perfect union of nada (music) and Paramatma (Super power), to get Nadopasana (transcendental bliss). It is remarkable to note that many Westerners also believe in this theory and have contributed to its literature. Paul Brunton, a British theosophist and spiritualist, says, “Who can respond to the genius of Bach’s Saint Mathew passion unless some awakening of spirituality is in him”! Johannes Brahms a famous German composer said, “When I reach my best in the task of composition, I feel a higher power working through me” (Derek Watson, 1994: 48, 125).

The examination of the literatures explains that the saints, seers and composers of classical music have basically composed songs only as a means of expressing their devout feelings and also to communicate with God. There are many illustration depicting great saints of music having spiritual union with God throughout the world. Music has the potential to inspire devotional excitement and gives rise to spiritual vision. Singing in praise of God awakens the singer’s consciousness to become divine and lead a righteous life. *Sangeetham*, therefore establish a direct contact between the
Athman and the Brahman. Sangeetham creates a mental connection between the physical and phenomenal worlds. The glorification of God is a devotional practice initiated by saintly composers like Swami Tyagaya, Dikshitar, Syama Sastri, Swati Tirunal, Appar, Sundarar, Manikavasagar and many others throughout the world. The current study demonstrates the spiritual dynamics of sangeetha jnanam inorder to prove that devotional music of Tyagaya can create an imagery of God in the brain.

The literature evaluation of the book “Meditation and Spiritual Life” by Swami Yatiswarananda states that spiritualism has been the key content of Carnatic music. The beautiful interweaving of the devotional element and aesthetic factor have made sangeetham ethereal and eternal. The basic idea behind compositions has been to seek God. In fact, it has been said that the easiest way to attain salvation is to sing the greatness of the Almighty. This spiritual musical practice (sadhana) culminates in inner peace, righteousness, compassion, forgiveness, love, patience, humility, tolerance and altruistic values and happiness. Spirituality is centered on personal well-being, psychological advancement and moral personality. The Rigveda says Ekam Sath Viprah Bahudha Vadanti which translates to "The truth is One, but sages call it by different Names". Consistent with this tradition, Hindu society displays tolerance towards all other faiths. Hinduism is perhaps the only religion in the world which showed remarkable knowledge on meditation and mysticism (Swami Yatiswarananda, 1998:20, 580).

The study gathers through the various literatures that Swami Tyagaya’s devotional musical compositions have a meditational consequence in the realization of
God, Lord Rama. The devotional sangeetham tends to reinforce serenity and spirituality in the brain. The philosophy of Swami Tyagaya is to infuse positive religious ideas to the brain centres and insure the brain to recognise a “Divine Power” called “Brahmam or God”. The divine experience creates a spiritual emotion in the mind as “God” and in the case of Saint Tyagaya it was “Lord Rama”. In the Hindu scriptures, music and God have always been depicted together. Many deities have their own musical instruments and are all portrayed as lovers of music. Lord Siva is the embodiment of Nada (cosmic music) which is the first form of music. The basic idea behind Indian musical philosophy is seek the ultimate Brahma or God. In fact, it has been told in Hindu scriptures that the easiest and best way to attain salvation is to sing the greatness of the Divine power. Spirituality has always been the prominent content of Carnatic music. The beautiful blending of the devotional element makes Tyagaya’s kritis extraordinary and divine. Swami Tyagaya’s vital devotional element and the vocalized glorification of God in the Carnatic tradition has contributed to a great deal to the bhakti movement of South India.

2.5.3.13 Review on the philosophy of Brain science

Music is a representation of cosmic harmony and a microcosmic representation of the macrocosm (Cook. N., 2000:75). Many sages have elevated their consciousness beyond all duality to realize the cosmic oneness through the love for devotional music. Faith in God drives the human spirit. The brain has the profound capacity to respond to the meditational value of devotional music. Faith is embedded in our neurons and in our genes and it is one of the most important principles to honour our lives (Newberg, 2009:20). Devotional music increases neurologically the divine emotional perception of God. The combinations of meditational devotional singing and leading a righteous
life can contribute to an atmosphere of spiritual elevation and celestial tranquillity. Aristotle and Mozart were among those who did consider the songs of bird to be as musical as the compositions of humans (Levitin, 2006:258).

Neuro-scientists have examined how the brain functions during reported spiritual experiences. Positive finding prove that certain neurotransmitters and specific areas of the brain are involved in the spiritual experience. Moreover, experiments have shown successful brain changes in individuals subjected to meditation, chanting, devotional singing, prayer and yoga. This research was done as “EEG Derived Neuronal Dynamics during Meditation: Progress and Challenges” (2015) by Chamandeep Kaur and Preeti Singh. Another article called “Brain mapping the Effects of Deeksha: A Case Study of Awakened Maneka Philipson” By Erik Hoffmann (2001). These results have led some leading scientists (Sach, Newbergh, Ramachandran) to speculate that spirituality may be induced artificially in the brain centres. The growing scientific interests in spirituality and devotional songs have garnered particular attention and have detected visible effects on the behavioral patterns of human beings.

The result of this literature study has led to suggest that spirituality protects the devotee’s mental health and manifest love, compassion, righteousness and tolerance. This implies that spirituality results from devotional experiences which can produce positive emotion, higher well-being and a sociable disposition. Additionally, some studies have reported the beneficial effects of music and spirituality in the lives of patients with schizophrenia, depression and other psychological disorders. In summary the scientific associations and other psychological relationships appear
complex and inspiring. Presently, the science seems to be indicating that living in spirituality can give rise to purposeful, conscientious and compassionate life. Many doctors believe that devotional music and spiritual experience can explain the health and well-being benefits.

Music, Emotion & Brain Changes

Dissonance can consistently create feelings of unpleasantness in a person. Varying degrees of dissonance causes increased activity in the paralimbic regions of the brain, which are associated with emotional processes.

Music can lower levels of cortisol in the body (associated with arousal and stress), and raise levels of melatonin (which can induce sleep). It also can cause the release of endorphins that help relieve pain.

Music effects mood. Major keys and rapid tempos cause happiness, whereas minor keys and slow tempos cause sadness, and rapid tempos together with dissonance cause fear.

The study of music promotes Spiritual, Intellectual Therapeutic Development. Music incorporated in study has shown to improve IQ in children. Devotion to God promotes God image in the brain.

Splasticity- Neuro-electrochemicals-Dopamine, Serotonin produce fascinating insight into brain changes that might underlie alterations in spiritual and religious attitudes.

(https://tackk.com/the-amazing-power-of-music)

2.5.3.14 Literature review on Neuro-psychology

Neuro-psychologists trust that they have discovered a "God module" in the brain which could be accountable for man’s natural instinct to believe in God and religion. Scientists of neurotheology say that there is a neurological and genetic basis for subjective God experiences which is traditionally categorized as religious experience. In the last ten years, neurotheology attempts to explain the neurological basis for religious experiences, such as: spiritual wonder, oneness with the universe,
trance, enlightenment and altered state of consciousness. Brain scans fMRI and PET or EEG shows more activity in the right ventro-lateral prefrontal cortex region and temporal cortex denoting spiritual emotional experiences, whereas less activity in the amygdala, a brain region involved in emotional processing of anger and fear was calmed (Andrew Newberg, 2010:2).

The literature study shows that recent advances in brain research using the brain imaging techniques such as Single-photon emission computed tomography (SPECT), Functional magnetic resonance imaging (fMRI) and Electroencephalography (EEG) can measure and record the electrical activity of the brain. Neuroscientists have indicated through recordings that the human brain is receptive to music, meditation and devotion. It seems that the brain, over millions of years of evolution, has been prepared for the experience of unity with Cosmos or oneness with God. Andrew Newberg, professor of nuclear medicine at the University of Pennsylvania, is author of the acclaimed book “How God Changes your Mind”. In an attempt to bridge science, meditation and emotion, Dr Newberg studied eight Tibetan Buddhist practitioners during meditation using SPECT scan. The images he captured showed that the brain’s prefrontal cortex during deep meditation lit up in a red color indicating an increase in blood flow and neural activity in that area.

At the same time, surprisingly, the upper rear part of the brain called the parietal area turned a dark blue shade indicating a sudden drop of brain activity in that area. Newberg theorizes that when the meditator withdraws from the outside world, sensory input to the parietal brain is blocked and the neural activity in that area is shutdown (Newberg, 2010:51). At the same time due to the intense concentration on a
devotional song or mantra, the prefrontal cortex is strongly activated and will now assume the role as the brain’s new experiential center. The parietal area gives the ability to orient ourselves in space and time and which gives our bodies a sense of physical limits and the self a sense of separateness from the rest of the universe. When the parietal brain is deactivated the physical limits of the body and the sense of separateness disappears. The brain can no longer create a boundary between self and the outside world, or locate itself in physical reality.

As a result, Newberg says, the brain has no choice but to perceive that self as endless, interwoven with everyone and everything. (Newberg, 2010:52). This is the state Newberg calls ‘Absolute Unitary Being’. The Vedanist prefer to call it the Oneness State or God state or Mukthi. Newberg’s research suggests that the fundamental change in brain function with a shift in brain dominance from the parietal to the prefrontal area. Therefore, when the over-activity in the parietal brain is decreased and the under-activity in the temporal brain is increased, there is a shift of the brain’s command center and the individual wakes up to a higher level of consciousness and to a new reality. Swami Tyagaya experienced this higher level perception. His poems claim that Swami Tyagaya visualized Lord Rama and attained enlightenment. This mental perception is primarily due to devotional transformation of the musical impulse. The transformation is biological and experiential with environmental association.

(Andrew Newberg, 2010:50)

Some of Newberg’s findings have been corroborated by neuroscientist Richard Davidson, University of Wisconsin. Davidson collaborated with Tibet’s Dalai Lama who sent eight of his most accomplished meditators to Davidson’s laboratory for a scientific study. Using both EEG and fMRI scans, Davidson studied the monks during deep meditation and found very high activity in the prefrontal cortex - especially on the left side which has to do with feelings of joy, happiness and compassion. The EEG recordings did not show detailed descriptions of the monks’ levels of spiritual development in the above studies we have no idea whether any of them were in a
permanent awakened state (Newberg, 2010: 62, 178). EEG has been helpful in understanding musical behavior because music is time based and EEG has the best resolution in the temporal cortex (Livitin, 2006:124). The relaxed brain waves during meditation, chanting and devotional sangeetham show Delta, Theta and Alpha signals in EEG graphs.

Individuals with number of years of more experience in meditation have shown more Alpha activity than those with no experience in meditation. Many empirical observations of alpha waves point out its being not of action but of hypofunction of the brain and in attempting to relate the various stages of the EEG pattern to corresponding psychological states and the behavioral correlates. (Sundarachari, R, 2013). Dr. Lindsley states that during more or less continuous relaxed state of wakefulness, amplitude modulated alpha waves are characteristic. The same concept is stated by Dr. Jasper in his sleep-wakefulness continuum. He introduces the concept of the cortical excitatory states reflected on these EEG patterns. According to Jasper's suggestion, it is said that the amplitude modulated alpha waves reflect the lowered level of the cortical excitatory states (Lindsley, 2010).

2.5.3.15 Literature review on Society and Spirituality

Spirituality in Hindu philosophy is an individual experience. Hindus believe spiritual practice as one’s journey towards moksha which is the awareness of the Brahman and the true realization of the superior cosmic truth. Hinduism identifies four ways of spiritual practice to realize the moksha. The first way is through Jnana yoga, the way of knowledge. The second way is through Bhakti yoga, the way of devotion. The third way is through Karma yoga, the way of action. The fourth way is
through Raja yoga, the way of contemplation and meditation. In the modern
civilization, spirituality and religion appears disconnected and spirituality has become
more oriented on subjective experience. The new development in the society is the
growth of secularism and decline in traditional religions. These new wave has given
rise to free expressions and a self professed view of religion.

The world communities are slowly drifting away from one another as a result
of diverse positions. Humanity must take a quantum leap forward from this decadent
development and change towards consolidation, dialogue, tolerance and righteous life.
*Sangeetham* can play a unique role of uniting people because music is admired by all
living creatures. Human beings are the most successful species the world has ever
known and hence there is definite likelihood they will accept devotional music in
their lives and promote love, compassion and tolerance. Devotional music activates a
spiritual union with consciousness. Devotional music gives rise to love and harmony.
Mankind need to enjoy devotional music or *sangeetham* and employ it as a vehicle to
propagate love and peace.

The current study shows a method towards an empirical research on devotional
*sangeetham* and the brain through EEG. The research conveys which brain structural
factor can contribute to divine “God” emotional expression. The research also assesses
how the present society judge about *Sangeetham*, neuro-psychology, God and
spirituality through a questionnaire survey. The inference of the study establishes that
the present society is favorable to spirituality, God and Devotional *sangeetham*. This
unique research has attempted to explain Saint Tyagaya’s vision of God and the
association of the brain. The direction of *sangeetham* has a meditational effect in the
brain and creates an emotional atmosphere in the fulfillment of the realization of God. The study illustrates how the brain attains this spiritual status. The end result of the study endorses the first and the fourth objectives. (Swami Tyagaya’s vision of Lord Rama and that practicing devotional sangeetham will activate faith, compassion, love and tolerance in the society).

2.6 Conclusion

The review of the various literatures on sangeetham, Swami Tyagaya, Vedantic philosophy, neuropsychology formulates the theoretical background and methodological framework of this study. The literature findings unify the conceptual reality of devotional sangeetham to the scientific reality of the brain. It adequately justifies the research method and contributes to the development of the research arguments. The literature evidences relates to the aim and objective of the study. The literature analysis substantiates Swami Tyagaya’s experience of God through devotional sangeetham. The application of “Interpretative Phenomenological Analysis” validates the first and the fourth objective of the study.