EFFECTS OF MRITYUNJAYA MANTRA CHANTING ON MEMORY AND VISUAL AND AUDITORY REACTION TIME OF SCHOOL STUDENTS

By

Dr. M.K. KALAIVANI

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Under the Guidance of

Dr. S. T. VENKATESWARAN

Prof. & HoD

Department of Yoga

Government Yoga& Naturopathy Medical College & Hospital, Arumbakkam,

Chennai- 600106

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1.0 INTRODUCTION

The word 'Yoga' is derived from Sanskrit root *yuj* which means 'join' or 'unite'. This may be taken as the union of body, mind and soul. Yoga signifies 'integration of personality' at the highest level. As means, yoga includes various practices and techniques which are employed to achieve the development of such integration.[1]

1.1 Importance of Yoga

Good Health is the right of every human being. But this right depends on individual, social and environmental factors. Along with social or environmental factors to a large extent, we can develop a better immune system and a better perception of oneself so that other conditions do not affect us adversely and we can achieve good health. Health is a positive concept. Positive health does not mean merely freedom from disease, but, it also include a jubilant and energetic feeling of well-being with an amount of general resistance and capacity to easily cultivate immunity against specific offending agents. There are many modern and indigenous methods and disciplines that can help us to successfully fight with diseases. It is having its own concept of wellness which has been scientifically understood and presented by many.[2]

1.2 The Aim of Yoga in School Level

Yoga can be adopted as lifestyle for promoting our physical and mental health. Yoga, if introduced at the school level would help to inculcate healthy habits and healthy lifestyle to achieve good health. cultivating greater attention, awareness and acceptance through meditation practice is associated with lower levels of psychological distress, including

less anxiety, depression, anger, and worry[3] thus, at the school level, is to encourage a positive and healthy lifestyle for physical, mental and emotional health of children. Yoga helps in the development of strength, stamina, endurance and high energy at physical level. It also empowers oneself with increased concentration, memory, calm, peace and contentment at mental level leading to inner and outer harmony. Development of personality is an important issue. Personality starts developing since birth, but it assumes great importance during adolescence, when reorganisation of personality takes place. Personality is a very common term which is used in our day-to-day life. It tells us what type of person one is. We know that each person generally behaves consistently in most of the situations. The examples of this consistency can be seen in a person who remains friendly or a person who is generally kind or helpful in most situations. Such a consistent pattern of behaviour is termed as personality. It can be called as the sum total of behaviour that includes attitudes, emotions, thoughts, habits and traits. This pattern of behaviour is characteristic to an individual. There are various dimensions of personality. These dimensions are related to physical, emotional, intellectual, social and spiritual aspects of our behaviour. For a holistic personality development, yoga plays an important role.

1.3 Yoga and Physical Dimension of Personality

Physical dimension is related to our body. It means that all organs and systems of our body should be properly developed and function. It implies a healthy body without any disease. Yogic practices like *asana*, *pranayama*, and *bandha* play a beneficial role in

physical development of children. There is a series of *asanas* and *pranayamas* which help to improve the functioning of the body.

1.4 Yoga and Emotional Dimension of Personality

Brief meditation practices in novices, can influence areas of the brain involved in regulating attention, awareness, and emotion.[4] One key element of mindfulness is the ability to pay attention to the present moment, on purpose. Yogic practices are effective for development of emotional dimension related to our feelings, attitudes and emotions. There are two kinds of emotions–positive and negative. For example love, kindness are positive emotions, while anger and fear (exam phobia) are negative emotions. Similarly, our feelings and attitudes may be positive and negative. For emotional development, positive feelings, attitudes and emotions should be developed and negative ones should be controlled, as the negative attitudes and emotions work as a mental block for the development of personality. Yoga plays a crucial role in development of positive emotions. It brings emotional stability. It helps to control negative emotions. For students in anxious situations such as in-class tests, standardized examinations, final examinations, oral presentations, and so on, knowing this technique can be the difference between success and failure. For a nervous student or anyone who knows too well how anxiety manifests itself in the body and mind, the knowledge that something as simple as breathing differently can produce a different physical and mental response is quiet powerful. To know how to use the strength of one's own breath to calm and regulate

anxiety is valuable information and something to consider when one work's with students who exhibi*t test*-taking or language-related anxiety.[5]

Brain imaging research has found that more mindful people appear to have a greater ability to control emotional reactions in the middle part of the brain (the amygdala and the dorsal anterior cingulate cortex [ACC]) by engaging the front part of the brain (the prefrontal cortex [PFC]), which is associated with attention, concentration and emotion regulation.[6]

Yogic practices such as *yama*, *niyama*, *asana*, *pranayama*, *pratyahara* and meditation help in emotional management. For example, the principle of non-violence will protect us from negative emotions and develop positive feelings of love and kindness. Similarly, other principles of *yama* and *niyama* will help to develop positive emotions and attitudes in our personal and social life and therefore help in the management of emotions.[7]

1.5 Yoga and Intellectual Dimension of Personality

Intellectual development is related to the development of our mental abilities and processes such as critical thinking, memory, perception, decision making, imagination, creativity, etc. Development of this dimension is very important as it enables us to learn new things and acquire knowledge and skills. Yogic practices such as *asana*, *pranayama*, *dharana*, *dhyana* (meditation) help to develop concentration, memory and thereby help in intellectual development.

1.6 Yoga and Social Dimension of Personality

Primary socialisation, probably the most important aspect of the personality development takes place during infancy, usually within the family. By responding to the approval and disapproval of parents and grandparents and imitating their examples, the child learns the language and many of the basic behaviour patterns of her/his society. The process of socialisation is not limited to childhood, but continues throughout life and teach the growing child and adolescent about the norms and rules of the society in which she/he lives. Some key elements of this process include respect for others, listening carefully to other persons, being interested in them, and voicing your thoughts and feelings politely, honestly and clearly so that you can be easily heard and understood.

1.6.1 Personality Development Through Yoga

Principles of *yama* include these key elements *and* are very important as these helps us in the betterment of our relationships with our friends, parents, teachers and others.

2.0 AIMS AND OBJECTIVES

2.1 Aim

To assess the effects of Mrityunjaya mantra on memory and Visual and Auditory Reaction time of School students.

2.2 Objectives

2.2.1 Primary Objectives

Effects of Mrityunjaya mantra chanting on memory and Visual and Auditory Reaction time of school students.

2.2.2 Secondary Objectives

To make use of Mrityunjaya mantra chanting to improve memory and Visual and Auditory Reaction time of school students.

3.0 REVIEW OF LITERATURE

3.1 Mantra Yoga

Mantra yoga is an exact science. Achieved by the mental process, the root 'Man' means to think and 'Tra' means to protect "Mananat trayate iti mantrah" - by the Manana (constant thinking and recollection) of one which one is protected or is released from the round of rebirths and deaths is mantra. That is called mantra by the meditation on which the jiva or the individual soul attains freedom from sin, enjoyment in heaven and final liberation, and by the aid of which it attains in fourfold fruit-chaturvarga-i.e., Dharma, Ardha, Kama, Moksha.

A mantra when constantly repeated awakens the consciousness-chit or chaithanya. Consciousness or chaithanya is latent in a mantra. Sound exists in for, more fundamental states.

1. Vaikari or dense, audible sound, sound in its maximum differentiation.

2. Madhyama or an inner, subtle, more ethereal state at which it is inaudible to physical ear.

3. Pasyanti, a still higher, inner, more ethereal state.

4. Para which represents Iswara-shakthi and is potential state of sound which is avyakta or undifferentiated.

It is said that a yogi's ability to experience each level of sound is dependent on the refinement of his/her awareness and consciousness. Each stage is associated with a different level of existence, with vaikhari being the outermost, or gross, experience. Vaikhari is the physical consciousness and is coupled with the physical body, or sthula.

While vaikhari is traditionally associated with the throat chakra, it is also linked with jaagrat, or wakeful consciousness. It, therefore, has additional connections with kriya shakti, or the power of action.

3.2 Mantras are Used During Meditation

There are many mantras, especially in Sanskrit; one has to choose according to the need, which helps in healing the body, calms the mind and uplifts the soul. It is believed that sounds have different effects on human body and mind.

3.3 Mrityunjaya Mantra

Om Tryambakamyajaamahe

Sugandhimpushtivardhanam

Urvaarukamivabandanaan

Mrityormukshiiyamaamritaat.[8]

Try-ambakam: "The one with these Three Shaktis :" to him.

Yajamahe: "We make sacrificial offerings."

Su-gandhim: "Our lives become fragrant with meritorious deeds," So, awakens the shaktis then

Pushti-vardhanam: "Unto him who nourishes all our shaktis, strengthens and increases our devotion by His grace, and makes us advance into the spiritual dimension."

Urvarukam-iva [bandhanat]: "As a melon drops from the vine upon ripening, so also may we, upon ripening of the fruits of our actions."

Bandhanat, Mrtyoh: "From bondage that is death.

Mukshiya: "Be released, attain moksha."

Ma-amrtat: "May I never again be parted from amrta, from the immortality of Atman, the Spiritual Self, or Parama-Atman, the Supreme Self"'.[10]

3.3.1 The Story Behind the Maha Mrityunjaya Mantra

Once upon a time there was a sage named Mrikandu who dwelled with his wife, Marudmati. They did not have any son and hence decided to take upon deep and long penance to seek the blessings of Lord Shiva for getting blessed with a son. With great devotion, the **couple** underwent deep penance, as a result of which Lord Shiva got impressed with them and granted them the boon they wished for, but the blessing came backed with a condition. Lord Shiva gave them an option to choose between an

intelligent and wise son with a short life span and a foolish son with a long life. Sage Mrikandu happily accepted the boon to be blessed with an intelligent son with a short life. Soon after, they had a son whom they named as Markandeya.

Slowly and steadily young Mankandeya started growing under the love and affection of his dear parents. As his sixteenth birthday was about to approach, the parents started having butterflies n their stomach. They grew sad day by day which Markandeya could sense easily. He asked his parents the reason for their remorse and sadness to which they narrated the entire story to their son and the boon granted by Lord Shiva. Markandeya was very intelligent and devotional. He began his penance in front of a Shivling, chanting along with the Mahamrityunjaya mantra. Lord Yamaraj, the God of death, came to take Markandeya on his sixteenth birthday but Markandeya was totally engrossed with his penance. He wrapped himself around the Shivling, embracing it with his two arms, not willing to let go. However, Lord Yamaraj was too determined to take the young boy with him. Hence, he threw the noose to catch hold of him but by mistake, it got held around the Shivling. Instantly Lord Shiva appeared and since he got extremely annoyed, he killed Yamaraj on the spot.

This incident of Lord Yamaraj's death travelled across all the three worlds. All the devtas came to Lord Shiva and on their earnest request Lord Shiva revived Yamaraj but on one condition that Markandeya would now live for life long. He would remain untouched forever. Later on, as time passed, Markandeya became a great sage on whom an entire

Purana has been composed by the name of Markandeya Purana. As per the Hindu scriptures, Markandeya is alive even today.

Maha Mrityunjaya Mantra is a great death-conquering mantra, it is a verse of the Rig veda-7.59.12. It is also called the Rudramantra, referring to the furious aspect of Lord Shiva, the Tryambakam mantra, alluding to Shiva's three eye. It is also called as Mritasanjivani mantra because it is a component of life-restoring practice. The benefits of mantra, it restores physical, mental, emotional health and it is a Moksha mantra which bestows longevity and immortality.[9]

Maha Mrityunjaya mantra is utilized in Japa or Homa to get desired results. Repetition of mantra constitutes Japa, the practice of mantra develops concentration.

Japa is the repetition of any mantra or name of the Lord. In this iron age. Japa is the easiest and surest way for God-realisation. Practice of Japa removes the impurities of the mind, destroys sins and brings the devotee face to face with God. Japa must become habitual. Be regular in your Japa. The Japa of a Mantra can bring to the practitioner realization of his highest goal though he may not possess knowledge of the meaning of the Mantra. Such a mechanical Japa may take a little more time in realization than when it is practiced with a knowledge of the meaning. There is an indescribable power or Achintyasakthi in the mantra.

Indu Sharma- Lecturer Dep. of Yogic science and Human conscious, Dev Sanskrit vishwavidhayala, and Banu joshi studied the effect of Maha Mrityunjaya mantra on self inferiority and depression. Prof.Harid-1951 has observed at a study that there is a deep relationship between the addiction and mental diseases caused by self inferiority. It has been observed that during the state of depression the feelings of negativity is maximum and the person feeling loneliness, dullness, thoughtless and feeling of insecurity and regression. the person who does not take interest inaction or he become tied in less activities in the words of Kaimeron neuroticism depression are such a problem which leads a person towards self inferiority. It has been observed that the feelings of guilt is the main cause behind it. To combat these problems we need to go to yoga practice. Maha Mrityunjaya mantra has been taken as independent variable. It has been written in yogic scriptures that with the practices of Maha Mrityunjaya mantra japa Lord Shiva gives a blessing of peace in harmony to the sufferer, the practitioner can attain the immortality even.[10]

3.4 Sound and Image

Sound are vibrations. They give rise to definite forms. Each sound produces a form in the invisible world, and combinations of sound create complicated shapes. The text-books of science describe certain experiments which show that notes produced by certain instruments trace out on a bed of sand definite geometrical figures. It is thus demonstrated that rhythmical vibrations give rise to regular geometrical figures The Hindu books on music tell us that the various musical tunes, ‘Ragas’ and ‘Raginis’, have

each a particular shape, which these books graphically describe. For instance, the Megha-Raga is said to be a majestic figure seated on an elephant. The Vasanta-Raga is described as a beautiful youth decked with flowers. All this means that a particular *Raga* or *Ragini*, when accurately sung, produces serial etheric vibrations which create the particular shape, said to be the characteristic of it. This view has recently received corroborations from the experiments carried on by Mrs. Watts Hughes, the gifted author of "Voice Figure". She delivered an illustrated lecture before a select audience in Lord Leighton's studio to demonstrate the beautiful scientific discoveries on which she has alighted, as the result of many years' patient labour. Mrs. Hughes sings into a simple instrument called an 'Eidophone' which consists of a tube, a receiver and a flexible membrance, and she find that each note assumes a definite and constant shape, as revealed through a sensitive and mobile medium. At the outset of her lecture, she placed tiny seeds upon the flexible membrane and the air-vibrations set up by the notes she sounded danced them into definite geometric patterns. Afterwards she used dusts of various kinds, copodium dust being found particularly suitable. A reporter, describing the shape of the notes, speaks of them as remarkable revelations of geometry, perspective and shading: "Stars, spirals, snakes and imaginations rioting in a wealth of captivating methodical design." Such were what were first shown. Once when Mrs. Hughes was singing a note, a daisy appeared and disappeared and "I tried," She said, "to sing it back for weeks before; at last I succeeded." Now she knows that precise inflections of the particular note that is a daisy, and it is made constant and definite by a strange method

of coaxing an alternation of crescendo and diminuendo. After the audience had gazed enraptured a series of daisies, some with succeeding rows of petals, delicately viewed, they were shown other notes and these were daisies of great beauty. “How wonderful! How lovely!” were the audible exclamations that arose from the late Lord Leighton’s studio, and exquisite form succeeded exquisite forms on the screen! The flowers were followed by sea-monsters, serpentine forms of swelling rotundity, full of light and shade and details, feeding in miles of perspective. After these notes came there forms of other trees, trees with fruits falling, trees with a foreground of rocks, trees with sea behind. “Why”, exclaimed the people in the audience, “they are just like Japanese landscapes.” While in France, Madame Finlang’s singing of a hymn to Virgin Mary “O Ave Marium” brought out the form of Mary with child Jesus on her lap and again the singing of a hymn to ‘Bhairava’ by a Bengali student of Varanasi studying in France, gave rise to the formation of the figure of Bhairava with his vehicle, the dog.

Thus, repeated singing of the Name of the Lord builds up gradually the form of the Devata or the special manifestation of the Deity whom you seek to worship, and this acts as a focus to concentrate the benign influence of the Divine Being, which radiating from the centre, penetrates the worshipper. When one enters the state of meditation, the flow of the inner Vritti is greatly intensified. The deeper one goes into meditation the more marked is the effect. The concentration of the mind upwards sends a rush of this force through the top of the head and the response comes in a fine rain of soft magnetism. The

feeling arising from the downward power sends a wonderful glow through the body, and one feels as if he is bathed in a soft kind of electricity.

The above experiments demonstrate the following facts:

1. Sounds produce shapes.

2. Particular notes give rise to particular forms.

3. If you want to generate a particular form, you must produce a definite note in a particular pitch.

The repetition of the Panchakshara Mantra, 'Om Namah Sivaya' produces the form of Lord Siva. The repetition of 'Om Namo Narayanaya,' the Ashtakshara Mantra of Vishnu, produces the form of Vishnu. Ina Mantra, the vibrations to be produced by the notes are all important. Much emphasis is laid on the pitch (Svara) as well as form (Varna) of a Mantra. Varna literally means colour. In the invisible world all sound are accompanied by colour, so that they give rise to many-hued shapes. In the same way colours are accompanied by sounds. A particular note has to be used to produce a particular form. Different notes in different pitches give rise to different shapes. In the science of Mantras, we use different Mantras for the purpose of invoking different gods. If you worship Lord Siva you use 'Om Namah Sivaya,' but in worshipping Vishnu or Sakti you will have to change the Mantra. What happens when a Mantra is recited? The repeated recitation of the Mantra produces in the mind the form of the Devata or the Deitym connected with the Mantra which is your Ishta, and this form becomes the centre of your consciousness when you directly realise it. It is, therefore, said that the Mantra

of the Deva is the Deva himself. This may explain the much misunderstood dictum of the Mimamsa philosophers that the gods do not exist apart from the Mantras (*Mantratmako Devah*). This really means that when a particular Mantra appropriated to a particular god is properly recited, the vibrations so set up, create in the higher planes a special form which that god ensouls for the time being.

3.5 Om Chanting

The practice of *Om* chanting in a traditional way can be used as one of the powerful means in calming down the mind, enhancing memory. Beneficial effects of OM chanting on depression, anxiety, stress and cognition in elderly women with hypertension.[11]

Repetition of OM or AUM dissolves the mind in its divine source.[12]. If you chant OM several times out loud it is said to purify the atmosphere and connect you to the universal life force of all creation vibrating at the same wavelength. Before some decades, Yogis and meditating professional affirmed that chanting. Mantra improves our concentration, gives peace and steadiness to our mind, reduces the mental stress and clears all worldly thoughts. Although, it's required to verify importance of mantra chanting systematically, no schemes have demonstrated yet. In this research work, we have confirmed the significance of OM chanting. To systematically understand the meditative chant, termed the divine sound OM, is the endeavor of this research work. Spectral analysis has been carried out for OM mantra to study its structure and to identify the factors, which have been found to influence the human nerve system. By this analysis, we could conclude stress gets minimized after OM chant.

The EEG frequency spectra constituted a continuum with increasing theta and delta activity and decreasing alpha activity as the participants tended to fall asleep. The frequency spectrum during TM corresponded to a spectrum situated between that of wakefulness and drowsiness and remained virtually unchanged during the 20 min of meditation.[13]

3.6 Gayathri Mantra

The Gayatri mantra (GM) has been mentioned in the Rig Veda. The GM was revealed to the sage Vishwamitra. It is also called Savitṛ mantra since it concerns the deity Savitṛ (Sun) According to the Indian tradition, GM initiated to a student before starting his/her formal education. It is said that chanting GM will bring the improvement in the *dhī śakti* (the power of intellect).

Scientific investigation also found that yoga mantra (sutras of scriptures) and religious chanting (prayers) had positive influence on many physiological and psychological functions of the body. For example, during both prayers and mantras, there was an increase in the synchronicity of cardiovascular rhythms when they were recited 6 times a minute. There was also an increase in baroflex sensitivity. These findings suggested that the recitation of the rosary and certain yoga mantras, at specific frequencies, induce favorable psychological and physiological effects. The significance of recitation of "Om" in twelve experienced meditators found subtle changes in mental state indicated by reduction in the skin resistance. The different types of meditation in Japanese

Buddhism showed different brain regional activation. The recitation of Buddha name (Nenbutsu) activated the prefrontal cortex, and the Buddhi sutra activated the left dorsolateral prefrontal cortex and right parietal cortex.[14]

Mantras are considered words of power and as such are considered to have healing properties. The presiding deity of the Gayatri Mantra is Lord Sun. Gayatri is personified as a goddess, the consort of Brahma (Sarasvati) and mother of the Vedas. The Gayatri Mantra is never chanted for the purposes of material gains, physical or otherwise. It is a prayer to manifest as pure wisdom in our life. The Gayatri Mantra is one of the oldest available Divine hymns. In the ancient Vedic literature, this mantra is dedicated to the deity Sun. This mantra is sung in the Vedic-meter called Gayatri. This is considered to be the most important mantra written out in Gayatri meter, and therefore, by tradition, this mantra has come to be known as Gayatri. It has actually been observed that by the repetition of this Gayatri Mantra with the right understanding of its sacred meaning, the ordinary negative tendencies in the human mind can be erased out to a large extent. It's very invocation which concludes with an appeal to the pure Consciousness to illumine more our heart- The present results revealed that practice of the efficacy ―Gayathri Mantra and meditation resulted in a significant decrease in obese, hypertension, sugar, weakness, and spondylitis. The results support the view that the conscious meditation practice could lead to a generalized modulation of processing of signals, i.e., even in neural systems not involved in breathing regulation. As a technique. As respiratory and cardiovascular systems have similar control mechanisms, alteration in one system will

modify the functioning of the other. During slow and deep breathing lung inflates to the maximum. This stimulates pulmonary stretch receptors which bring about withdrawal of sympathetic tone in skeletal muscle blood vessels leading to widespread vasodilatation and decrease in peripheral resistance and thus decrease diastolic blood pressure. While practicing meditation one concentrates on the act of breathing which removes attention from worries and de-stresses him. This stress-free state of mind evokes relaxed responses in which parasympathetic nerve activity overrides sympathetic activity. Meditation with Gayathri Mantra modifying the state of anxiety reduces stress induced sympathetic over activity thereby decreasing arterial tone and peripheral resistance resulting in lowering of diastolic blood pressure and heart rate. Regular practice of meditation has showed improvement in baroreflex sensitivity and decrease in the sympathetic tone thereby restoring blood pressure to normal level in patients of essential hypertension. Finally, these results and their explanations would justify the incorporation listing to Gayathri Mantra‖ and meditation as part of our lifestyle in promoting health and thereby preventing age related diseases.[15]

3.7 SADHANA

3.7.1. Need for a Guru

A Guru is necessary. The spiritual path is beset with many obstacles. The Guru will guide the aspirants safely and remove all sorts of obstacles and difficulties. Guru, Isvara, Brahman, Truth and OM are one Serve the Guru with intense Bhakti (Guru Seva). Please him in all possible ways. Have the mind fixed on Guru as Atman (Atma-Lakshya). Obey

him implicitly. His words must be gospel truths for you. Then only you will improve. You will get His Grace. There is no other way. You will have to deify your Guru. You must superimpose all the attributes of Isvara and Brahman on him. You must take him as an actual God incarnate. You must never look into his Doshas or defects. You should see only the Divinity in him. Then only you will realise Brahman in and through the Guru. The physical form of the Guru will slowly vanish. You will realise the Vyapaka (all-pervading) Atman in and through him. You will see your Guru in all forms, animate and inanimate. There is no other way for overhauling the vicious worldly Samskaras and the passionate nature of raw, worldly-minded persons than the personal contact with and service of the Guru. An aspirant who, with great devotion, attends on his Guru in his personal services, quickly purifies his heart. This is the surest and easiest way for self-purification; I assure you boldly. It is better if you get your Mantra from your Guru. This has a tremendous effect on the disciple. The Guru imparts his Sakti along with the Mantra. If you cannot get a Guru, you can select any Mantra according to your own liking and taste and repeat it mentally, daily, with Sraddha and Bhava. This also has a great purificatory effect. You will attain the realisation of God.

3.7.2. Meditation Room

Have a separate meditation room under lock and key. Do not allow anybody to enter the room. Burn incense there in the morning and in the evening. Keep a picture of Lord Krishna, Lord Siva or Sri Rama or Devi in the room. Place you Asana in front of the picture. When you repeat the Mantra, the powerful vibrations set up by it will be lodged

in the ether of the room (Akasic records). In six months' time you will feel peace and purity in the atmosphere of the room. There will be a peculiar magnetic aura in the room. You will actually feel this if you are sincere in your practice. Whenever your mind is much disturbed by antagonistic worldly influences, sit in the room and repeat the Name of the Lord for a least half an hour. Then immediately you will find an entire change in your mind. Practise this, and feel the soothing spiritual influence, yourself. Nothing is so great as spiritual Sadhana. You will find, as a result of this, a local Mussoorie (a hillstation) in your own house without any expense. Repeat the Name of the Lord with devotion in your heart. You will realise God quickly. This is the easiest method in this age. There must be Niyama (rule) in Sadhana. You must systematically and regularly do this. God does not want precious presents. Many people spend milions of rupees in opening hospitals and reading houses. But they do not give their hearts. A Bhakta (devotee) should have in his heart the all-pervading Rama, though he may see outside the concrete form of Rama with bow and arrows. Rama, like OM, is all-pervading. God is Dhyana-Gamya (obtainable through meditation) and Anubhava-Gamya (can be realised by spiritual experience or direct perception or realisation). He is Japa-Gamya (obtainable through Japa).

3.7.3. Brahmamuhurta

Get up at 4 0' clock in the morning, at Brahmamuhurta, which is very favourable for spiritual contemplation, and start doing Japa. In the early morning, after slumber, the mind is clam, pure and quite refreshed. The mind is like a blank sheet of paper and

comparatively free from worldly Samskaras (impressions of Vyavahara) then. It can be moulded very easily at this time. The atmosphere also is charged with more Sattva at this particular time. Wash your hands, feet and face with cold or warm water, if you find it difficult to take a bath. This will suffice. Now, start doing Japa.

3.7.4. Selection of Ishta Devata

You can select your Ishta Devata- Siva, Krishna, Rama, Vishnu, Dattatreya, Gayatri, Durga or Kaali- according to the advice of your own inclination or on consultation with a good astrologer who will select the Deity according to the nature of your planet and sign of the zodiac. Every one of us has done worship of some Devata in our previous births. The Samskaras are in the subconscious mind. So naturally, everyone of us has an inclination towards a particular Devata. If you had worshipped Lord Krishna in your previous birth, naturally you will have an inclination to Lord Krishna in this birth also.

When you are in great agony and distress you will naturally utter a certain Name of God. This will give you the clue to find out your Ishta Devata. If a scorpion ha stung you severely, you may utter 'Hey Rama'; another may utter 'Hey Krishna'; while a third may utter 'Hey Narayana'; and a fourth may utter 'Hey Siva'. The calling of a particular Name is due to Purva Samskaras. If you had worshipped Rama in the previous birth, naturally you will utter 'Hey Rama' when you are stung by a scorpion, and so on.

3.7.5. Asana for Japa

Sit on Padma, Siddha, Svastika or Sukha Asana for half an hour to start with. Then gradually increase the period to three hours. In one year you can have Asana-Siddhi

(perfection in posture). Any easy and comfortable posture is Asana. Keep the head, neck and trunk in one straight line. Spread a fourfold blanket on the ground, and over this spread a piece of soft, white cloth. This will be quite enough. If you can get a good tiger-skin, complete with claws, etc., it is all the more better. A tiger-skin has got its own advantages. It generates electricity in the body quickly and does not allow leakage of electric current from the body. It is full of magnetism. Face the East or the North while you are on the Asana. A spiritual neophyte should observe this rule. By facing the North you will be in communion with the Rishis of the Himalayas and will be mysteriously benefited by their spiritual currents.

3.7.5.1. Padmasana

Sit on your seat. Keep the left foot over the right thigh and the right foot over the left thigh. Keep the hands on the knees. Sit erect. This is Padmasana, highly suitable for Japa and Dhyana.

3.7.6. Where to Concentrate

Concentrate gently either on the lotus of the heart (Anahata-Chakra) or on the space between the two eyebrows (Ajna-Chakra). Ajna-Chakra is the seat of the mind, according to the Hatha Yogic school. The mind can be controlled easily if anyone concentrates on this Ajna-Chakra. Sit on your seat, close your eyes and begin to the Japa and meditation.

Fixing one's eyes between the eyebrows is called Bhrumadhya-Drishti. Sit on padmasana, Siddhasana or Svastikasana, in you meditation room and practise this gaze

gently from half a minute to half an hour. There must not be even the least violence in this practice. Gradually increase the period. This Yogic Kriya removes Vikshepa or tossing of mind and develops concentration. Lord Krishna prescribes this practice in Chapter V-27 of the Bhagavadgita; "Having external contacts excluded, and with gaze fixed between the eyebrows", etc. This is known as the "Frontal Gaze", because here the eyes are directed towards the frontal bone or the bone of the forehead. Sit on your seat and fix the gaze on the tip of hte nose, from half a minute to half hour. Do this practice gently. Do not strain the eyes. Gradually increase the period. This is Nasal Gaze or nasikagra-Drishti. Youcan select for yourself either the Frontal or the Nasal Gaze. Even when you pass along the road, practise the gaze. You will have wonderful concentration. The Japa can go nicely even while you are walking. Some students like to concentrate with open eyes, while someothers with closed eyes, and again some ohter with half opened eyes. If you meditate with closed eyes, dust or foreign particles will not fall into your eyes. Some students whom lights and jerks trouble, prefer concentration with open eyes. Some, who meditate with closed eyes are overpowered by sleep within a short time. If beginners start concentrating with open eyes, the mind will wander to objects. Use your common-sense and adopt that method which suits you best. Overcome other obstacles by suitable intelligent methods. Remember the story of "Bruce and the Spider." Be patient and persevering. Struggle hard, and win the spiritual battle. Become a spiritual hero, and wear the spiritual laures round your neck.

3.7.7. Three Sittings for Doing Japa

There is a special, mysterious spiritual force or wonderful magnetic power at hte Sandhi or junction of time, at sunrise and sunset. The mind then will be elevated quickly and filled with Sattva. Concentration at this will come by itself without any effort. Japa should be done at the Sandhis. Now the mind is quite clam and refreshed. You should catch the meditative wave now; meditation is more important than anything else. After this, you can take up the Asanas and Pranayama and finish up the full course by another short sitting for doing Japa and meditation. As there is always some sort of drowsiness when you start the practice, it is desirable to do some Asanas and a little Pranayama, at least for five minutes, just to drive off this drowsiness, and to make you fit for Japa and meditation. The mind acquires one-pointedness after the practice of Pranayama. Therefore you will have to take to Japa and meditation after Pranayama is over. Pranayama, though it is concerned with the breath, give good exercise to the various internal organs, and the whole body. It is the best form of physical exercise every known. If you are tired of repeating the Mantra at one stroke, have 3 or more sittings, say, in the morning from 4 O'clock to 7, in the evening from 4 to 5, and at night from 6 to 8. Repeat the Mantra very, very quickly for sometime, when you find that the mind is wandering much. The golden rule is to repeat the Mantra neither too slow nor too quick. Observe the happy medium. The Aksharas of the Mantra should be pronounced properly. And also, the Mantra should be repeated Akshara-Laksha. If there are 5 Aksharas or letter in the Mantra it should be repeated 5 lakh times. This is Akshara-Laksha repetition. If you sit by the side of a river, lake or well, in a temple, at the foot or top of a mountain, in a

lovely garden or solitary room, the mind will be focused quite easily, without much effort. If you repeat the Mantra, when the stomach is overloaded, you will feel drowsy. Take light Sattvic food. Repeat any prayer and then sit for Japa. The mind will then be elevated. You will find it pleasant to rotate the beads easily. You must use your common-sense throughout your spiritual practice. For sometimes you can visit holy places like Rishikesh, Haridwar, Varanasi, etc., and there you can do Japa on the banks of holy rivers like the Ganga. You will find marked improvement. As the mind, while in such sacred places, is free from business, worries and family-anxieties, you can have an efficient turn of Japa owing to good concentration there. Record the Japa in your spiritual diary.

Keep a diary to record the number of Japa daily. When you roll the beads do not use the index finger. Use the right thumb and the middle finger. Cover your fingers with a pieces of cloth of a towel or a specially made cap. Others should not see you rolling the beads. Introspect. Look within. Watch the mind and its Vrittis (thought-waves) carefully. Sit in a solitary room for sometimes. Just as the mind wants variety in eating, it wants variety in Japa also. When it gets tired of Manasika Japa, when you notice that it has begun to wander about, take to loud repetition. The ears also will hear the Mantra. There will be more concentration now for sometimes. One disadvantage in loud repetition is that you get tired of it after about an hour. You will have to combine the three methods, viz., Manasika Japa, Upamsu Japa and Vaikhari Japa to the best advantage. Use your common-sense. A beginner with a coarse and gross mind (Sthula-Buddhi) will find it

difficult to do Manasika Japa to start with. Manasika Japa of Rama-Mantra can be associated with the breath as in "Soham" Japa or Ajapa-Japa. A Japa that is done without moving the lips is Ajapa. When you inhale the air repeat mentally 'Ra'; when you exhale repeat mentally 'Ma'. Keep up the practice even during walking. For sometimes, this method would appear easy. During meditation inside the room you can have this practice. This is the Ajapa way of doing Rama-Mantra-Japa.

3.7.8. Need for a Maala

You must have a rosary or Japa-Mala always in your pocket or neck and underneath your pillow at night when you go to sleep. It will remind you of God when you forget Him owing to the force of Maya or Avidya (ignorance). At night when you get up for micturition, the Mala will remind you to roll it once or twice. A Mala is a strong weapon, as it were, to annihilate the mind. It is a powerful whip to goad the mind towards God or Brahman. A Rudraksha-Maala or A Tulasi-Mala of 108 beads can be used while doing Japa. Just as the ideas of courts, cases, documents and clients get associated with your mind when you see or think of a lawyer, just as the ideas of dispensary, patients, drugs, chemicals, diseases and hospitals get associated when you see or think of a doctor, so also the ideas of Sanctity, Purity, Divinity, Divine Glory, Divine Splendour, Divine Wisdom, Divine Power, Divine Love, Omnipotence, and all such Divine attributes get associated with the mind when you see or think of a Maala. Therefore wear the Mala always round your neck and do Japa with it. Do not feel shy to wear this, O educated persons! This will always remind you of God and God-realisation.

3.8 Mantra Chanting

This is repeated and continuous chanting may have influenced the increase in the level of attention by activating the cells in the brain. Better verbal and spatial scorings and decrease in total time taken, reduction in total errors could be related to the fact that reduced anxiety can improve performance on tasks requiring learning and memory. Anxiety reducing effect of yoga practice, and the anxiety reducing reducing effect of meditation are also well known. Reduced anxiety and calmness of mind combined with active cells due to rhythmic vedic chanting could have facilitated in improving memory and sustained attention. Chanting influences both hemispheres of the brain resulting in good memory and attention. Even though sound is the gross form of chanting its effects can be seen in subtle areas like brain cells. Hence the practice of Vedic chanting in a traditional way can also be used as one of the powerful means as any other yogic practices like Asanas, Pranayamas or meditation in calming down the mind, enhancing memory and in effective improvement of attention.[16]

Chanting meditation means keeping a not-moving mind and perceiving the sound of your own OM. Perceiving your voice means perceiving your true self or nature. Then you and the sound are never separate, which means that you and the whole universe are never separate. Thus, to perceive our true nature is to perceive universal substance. With regular chanting, our sense of being centered gets stronger and stronger (Khalsa, 2000). However, when we do chanting meditation correctly, perceiving the sound of our own voice, we learn that chanting meditation is not for our personal pleasure, to give us good

feeling, but to make our direction clear. At the moment of true perceiving, there is no thought, no separation, only perceiving sound. This is the crucial point (Andersen, 2000).

3.9 Chitta

Chitta is termed as the mind-stuff or mental substance. It is the ground floor, as it were. From it proceed the three Vrittis, viz., Manas, Buddhi and Ahankara. This word belongs to the Rajayogic terminology of Maharshi Patanjali. Also in the Gita, Lord Krishna uses the term Chitta in various places.

Chitta is a separate faculty or category in Vedanta. Sometimes it is Antargata, comes under Mind. In Sankhya philosophy, it is included in Buddhi or Mahat-Tattva. The Chitta of Patanjali Rishi's philosophy of Raja Yoga

"Yogas-chittavritti-nirodhah"[7] corresponds to the Antahkarana of Vedanta.

Subconscious mind is termed 'Chitta' in Vedanta. Much of your subconsciousness consists of submerged experiences, memories thrown into the background but recoverable. The Chitta is like a calm lake and thoughts are like waves upon the surface of this lake and name and form are the normal ways in which these waves rise. No wave can rise without name and form. The functions of the Chitta are Smriti or Smarana, Dharana, attention and Anusandhana (enquiry or investigation). When you repeat the Japa of a Mantra, it is the Chitta that does the Smarana. It does a lot of work. It turns out better work than the mind or Buddhi.

3.9.1The Field of Subconscious Mentation

The mental processes are not limited to the field of consciousness alone. The field of subconscious mentation is of a much greater extent than that of conscious mentation. The mind is not conscious of the greater portion of its own activities. As man can hold in consciousness but one fact at a time, only a fraction of our knowledge can be in the field of consciousness at any one moment. Only ten per cent of mental activities come into the field of consciousness. Ninety per cent of the mental activities takes place in the subconscious mind. Messages, when ready, come out like a flash from the subconscious mind to the surface of the conscious mind through the trapdoor in the subconscious mind. We sit and try to solve a problem and fail. We walk around, try again and again fail. Suddenly an idea dawns on us that leads to the solution of the problem. The subconscious processes were at work. You repeatedly fail at night to get the solution for a problem in arithmetic or geometry. In the morning, when you wake up, you get a clear answer. This answer comes like a flash from the subconscious mind. Even in sleep, it works incessantly without any rest. It arranges, classifies, compares, sorts all facts and works out a proper, satisfactory solution.

Sometimes, you go to sleep at 10 p.m. with the thought, “I must get up at 2 a.m. in the morning to catch a train.” This message is taken up by the subconscious mind and it is this subconscious mind that wakes you up unfailingly at the exact hour. Subconscious mind is your constant, trustworthy companion and sincere friend.

With the help of the subconscious mind, you can change your vicious nature by cultivating healthy, virtuous qualities that remain dormant in every human heart. If you

want to overcome fear, mentally deny that you have fear and concentrate your attention upon the opposite quality, the ideal of courage. When courage is developed, fear vanishes by itself. The positive always overpowers the negative. This is an infallible law of nature. This is Pratipaksha Bhavana of Raja Yogins. You can acquire a liking for distasteful tasks and duties by cultivating a desire and taste for them. You can establish new habits, new ideals, new ideas and new tastes and new character in the subconscious mind by changing the old ones.

3.9.2 Music therapy

Music therapy probably began when the earliest humans stomped or clapped to involve healing spirits or to exercise a sick person's demons. Greek myths contain metaphors for the healing power of music, and musical cures were part of many ancient cultures and religions. The healing effects of music on all aspects of mind/body function are universally accepted but not scientifically understood. Music is the universal language of the soul's devotion.[1] Music that is saturated with soul force is the real universal music, understood by all hearts. Chants bring ineffable joy, and are proof that God has answered. Popular songs are usually inspired through sentiment or passing interest. These songs are like wet matches that do not produce any spark of divine realizations[1] But the Gayatri mantra born out of depths of true devotion to God, brings boundless joy and is a spiritualized song (mantra, chant). Such songs like live matches produce the fire of God awareness, whenever they are struck at the foundation of devotion. There has been considerable interest in how background sounds may influence an individual's

performance on various cognitive and work tasks[2]. In a study by Smallwood and Schooler (2006) [3], they discover mind wandering occurs when the executive components of attention appear to shift away from the primary task, leading to failures in task performance and superficial representations of the external environment. This study provided the framework for future studies on cognitive distraction. With the framework in place it is possible to branch out into other interesting studies that focus on musical influence on cognition involving distractions and reaction times. Is it possible classical music can increase productivity and cause one to focus, besides boosting cognitive recall for students studying? Does music really help students boost their cognitive functioning? Reaction speed is the ability to quick motor response to definite stimulus, while the time that elapses.

3.10 Classification of Memories

We know that some memories last for only a few seconds, whereas others last for hours, days, months, or years. For the purpose of discussing these, let us use a common classification of memories (Figure 1) that divides memories into

3.10.1 ***Short-term memory***, which includes memories that last for seconds or at most minutes unless they are converted into longer-term memories.

3.10.2 ***Intermediate long-term memories***, which last for days to weeks but then fade away.

3.10.3 ***Long-term memory***, which, once stored, can be recalled up to years or even a lifetime later. In addition to this general classification of memories, we also discussed earlier (in connection with the prefrontal lobes) another type of memory, called "working memory," that includes mainly short-term memory that is used during the course of intellectual reasoning but is terminated as each stage of the problem is resolved.

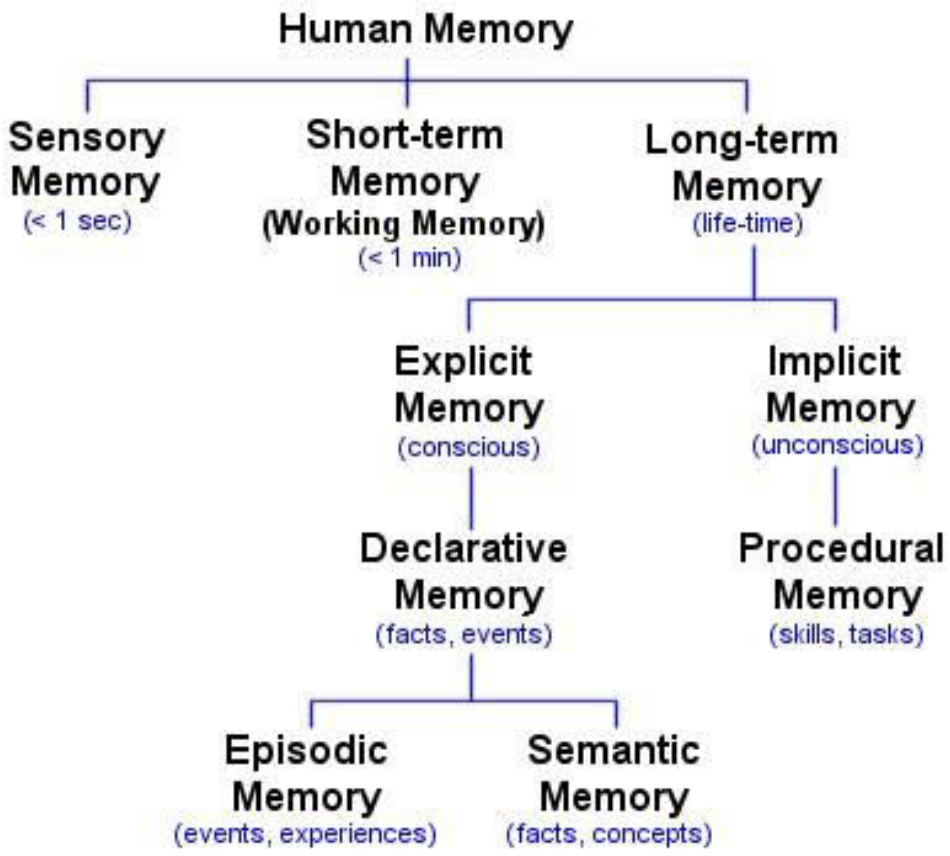

Figure 1: Types of Memory

Memories are frequently classified according to the type of information that is stored. One of these classifications divides memory into *declarative memory* and *skill memory*, as follows:

3.10.4 Declarative memory basically means memory of the various details of an integrated thought, such as memory of an important experience that includes

(1) memory of the surroundings,

(2) memory of time relationships,

(3) memory of causes of the experience,

(4) memory of the meaning of the experience, and

(5) memory of one's deductions that were left in the person's mind.

3.10.5. **Skill memory** is frequently associated with motor activities of the person's body, such as all the skills developed for hitting a tennis ball, including

automatic memories to (1) sight the ball, (2) calculate the relationship and speed of the ball to the racquet, and (3) deduce rapidly the motions of the body, the arms, and the racquet required to hit the ball as desired—all of these activated instantly based on previous learning of the game of tennis—then moving on to the next stroke of the game while forgetting the details of the previous stroke.[16]

3.10.1 Short-Term Memory

Short-term memory is typified by one's memory of 7 to 10 numerals in a telephone number (or 7 to 10 other discrete facts) for a few seconds to a few minutes at a time but lasting only as long as the person continues to think about the numbers or facts. Many

physiologists have suggested that this short term memory is caused by continual neural activity resulting from nerve signals that travel around and around a temporary memory trace in a *circuit of reverberating neurons.* It has not yet been possible to prove this theory. Another possible explanation of short term memory is *presynaptic facilitation or inhibition*. This occurs at synapses that lie on terminal nerve fibrils immediately before these fibrils synapse with a subsequent neuron. The neurotransmitter chemicals secreted at such terminals frequently caused facilitation or inhibition lasting for seconds up to several minutes Circuits of this type could lead to short-term memory[17].

3.10.2 Intermediate Long-Term Memory

Intermediate long-term memories may last for many minutes or even weeks. They will eventually be lost unless the memory traces are activated enough to become more permanent; then they are classified as long-term memories. Experiments in primitive animals have demonstrated that memories of the intermediate long-term type can result from temporary chemical or physical changes, or both, in either the synapse presynaptic terminals or the synapse postsynaptic membrane, changes that can persist for a few minutes up to several weeks. These mechanisms are so important that they deserve special description. Memory Based on Chemical Changes in the Presynaptic Terminal or Postsynaptic Neuronal Membrane.

Kandel and his colleagues that can cause memories lasting from a few minutes up to 3 weeks in the large snail *Aplysia*. In this figure, there are two synaptic terminals. One

terminal from a sensory input neuron and terminates directly on the surface of the neuron that is to be stimulated; this is called the *sensory terminal.* The other terminal is a *presynaptic ending* that lies on the surface of the sensory terminal, and it is called the *facilitator terminal*. When the sensory terminal is stimulated repeatedly but without stimulation of the facilitator terminal, signal transmission at first is great, but it becomes less and less intense with repeated stimulation until transmission almost ceases. This phenomenon is *habituation*, as was explained previously. It is a type of *negative* memory that causes the neuronal circuit to lose its response to repeated events that are insignificant. Conversely, if a noxious stimulus excites the facilitator terminal at the same time that the sensory terminal is stimulated, then instead of the transmitted signal into the postsynaptic neuron becoming progressively weaker, the ease of transmission becomes stronger and stronger; and it will remain strong for minutes, hours, days, or, with more intense training, up to about 3 weeks even without further stimulation of the facilitator terminal. Thus, the noxious stimulus causes the memory pathway through the sensory terminal to become *facilitated* for days or weeks thereafter. It is especially interesting that even after habituation has occurred, this pathway can be converted back to a facilitated pathway with only a few noxious stimuli[18].

3.10.2.1 Molecular Mechanism of Intermediate Memory

Mechanism for Habituation At the molecular level, the habituation effect in the sensory terminal results from progressive closure of calcium channels through the terminal membrane, though the cause of this calcium channel closure is not fully known.

Nevertheless much smaller than normal amounts of calcium ions can diffuse into the habituated terminal, and much less sensory terminal transmitter is therefore released because calcium entry is the principal stimulus for transmitter release. Mechanism for facilitation. In the case of facilitation, at least part of the molecular mechanism is believed to be the following:

1. Stimulation of the facilitator presynaptic terminal at the same time that the sensory terminal is stimulated causes *serotonin* release at the facilitator synapse on the surface of the sensory terminal.

2. The serotonin acts on *serotonin receptors* in the sensory terminal membrane, and these receptors activate the enzyme *adenyl cyclase* inside the membrane. And, finally, the adenyl cyclase causes formation of *cyclic adenosine monophosphate* (*cAMP*) also inside the sensory presynaptic terminal.

3. The cyclic AMP activates a *protein kinase* that causes phosphorylation of a protein that itself is part of the potassium channels in the sensory synaptic terminal membrane; this in turn blocks the channels for potassium conductance. The blockage can last for minutes up to several weeks.

4. Lack of potassium conductance causes a greatly prolonged action potential in the synaptic terminal because flow of potassium ions out of the terminal is necessary for rapid recovery from the action potential.

5. The prolonged action potential causes prolonged activation of the calcium channels, allowing tremendous quantities of calcium ions to enter the sensory synaptic terminal. These calcium ions cause greatly increased transmitter release by the synapse, thereby markedly facilitating synaptic transmission to the subsequent neuron. Thus, in a very indirect way, the associative effect of stimulating the facilitator terminal at the same time that the sensory terminal is stimulated causes prolonged increase in excitatory sensitivity of the sensory terminal, and this establishes the memory trace. Studies by Byrne and colleagues, also in the snail *Aplysia*, have suggested still another mechanism of synaptic memory. Their studies have shown that stimuli from separate sources acting on a single neuron, under appropriate conditions, can cause long-term changes in *membrane properties of the post-synaptic neuron* instead of in the presynaptic neuronal membrane, but leading to essentially the same memory effects.

3.10.3 Long-Term Memory

There is no obvious demarcation between the more prolonged types of intermediate long-term memory and true long-term memory. The distinction is one of degree. However, long-term memory is generally believed to result from actual *structural changes*, instead of only chemical changes, at the synapses, and these enhance or suppress signal conduction. Again let us recall experiments in primitive animals (where the nervous systems are much easier to study) that have aided immensely in under structural changes occur in synapses during the development of long-term memory electron microscopic pictures taken from invertebrate animals have demonstrated multiple physical structural

changes in many synapses during development of long-term memory traces. The structural changes will not occur if a drug is given that blocks DNA stimulation of protein replication in the presynaptic neuron; nor will the permanent memory trace develop. Therefore, it appears that development of true long-term memory depends on physically restructuring the synapses themselves in a way that changes their sensitivity for transmitting nervous signals.

The most important of the physical structural changes that occur are the following:

1. Increase in vesicle release sites for secretion of transmitter substance.

2. Increase in number of transmitter vesicles released.

3. Increase in number of presynaptic terminals.

4. Changes in structures of the dendritic spines that permit transmission of stronger signals.

Thus, in several different ways, the structural capability of synapses to transmit signals appears to increase during establishment of true long-term memory traces. Number of neurons and their connectivities often change significantly during learning during the first few weeks, months, and perhaps even year or so of life, many parts of the brain produce a great excess of neurons, and the neurons send out numerous axon branches to make connections with other neurons. If the new axons fail to connect with appropriate subsequent neurons, muscle cells, or gland cells, the new axons themselves will dissolute

within a few weeks. Thus, the number of neuronal connections is determined by specific *nerve growth factors* released retrogradely from the stimulated cells. Furthermore, when insufficient connectivity occurs, the entire neuron that is sending out the axon branches might eventually disappear. Therefore, soon after birth, there is a principle of "use it or lose it" that governs the final number of neurons and their connectivities in respective parts of the human nervous system. This is a type of learning. For example, if one eye of a newborn animal is covered for many weeks after birth, neurons in alternate stripes of the cerebral visual cortex—neurons normally connected to the covered eye—will degenerate, and the covered eye will remain either partially or totally blind for the remainder of life. Until recently, it was believed that very little "learning" is achieved in adult human beings and animals by modification of numbers of neurons in the memory circuits; however, recent research suggests that even adults use this mechanism to at least some extent.

3.11 Consolidation of Memory

For short-term memory to be converted into long-term memory that can be recalled weeks or years later, it must become "consolidated." That is, the short-term memory if activated repeatedly will initiate chemical, physical, and anatomical changes in the synapses that are responsible for the long-term type of memory (Figure 2). This process requires 5 to 10 minutes for minimal consolidation and 1 hour or more for strong consolidation.

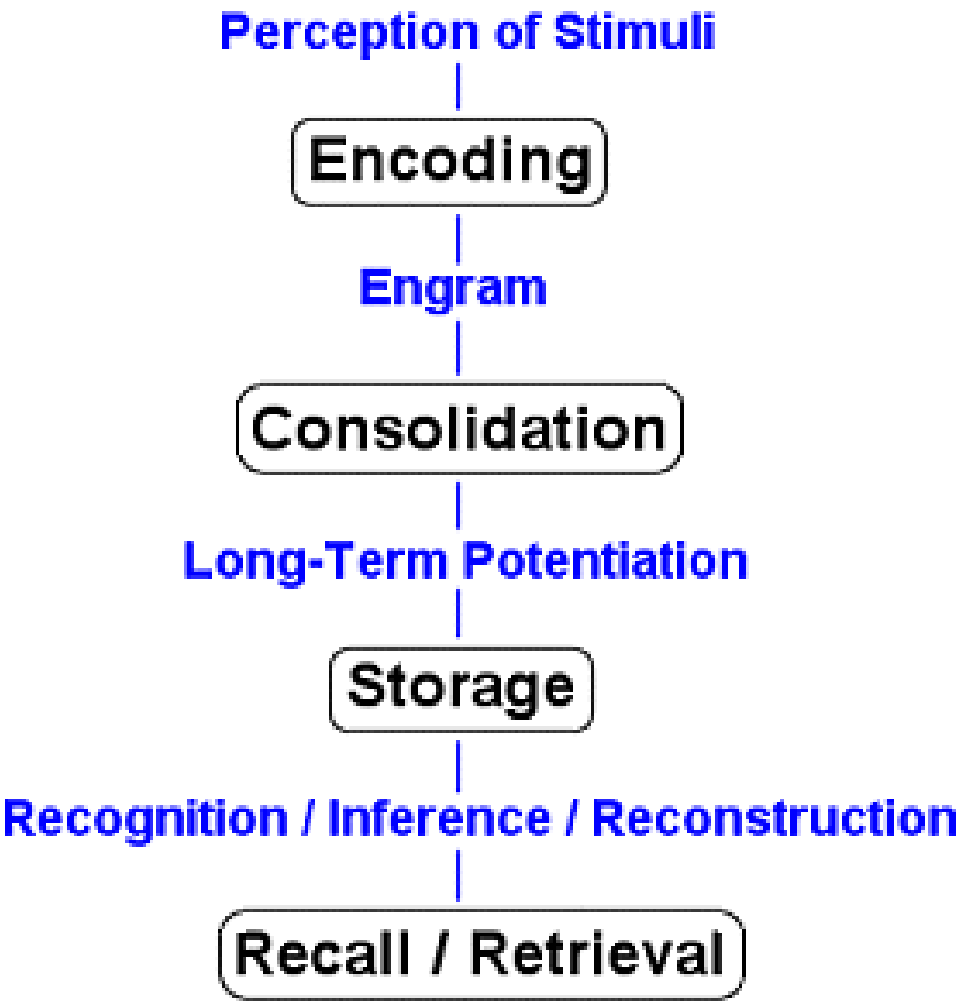

Figure 2: Process of Memory

For instance, if a strong sensory impression is made on the brain but is then followed within a minute or so by an electrically induced brain convulsion, the sensory experience will not be remembered. Likewise, brain concussion, sudden application of deep general anesthesia, or any other effect that temporarily blocks the dynamic function of the brain

can prevent consolidation. Consolidation and the time required for it to occur can probably be explained by the phenomenon of rehearsal of the short-term memory as follows. Rehearsal Enhances the Transference of Short-Term Memory into Long-Term Memory. Psychological studies have shown that rehearsal of the same information again and again in the mind accelerates and potentiates the degree of transfer of short-term memory into long term memory and therefore accelerates and enhances consolidation. The brain has a natural tendency to rehearse newfound information, especially newfound information that catches the mind's attention. Therefore, over a period of time, the important features of sensory experiences become progressively more and more fixed in the memory stores. This explains why a person can remember small amounts of information studied in depth far better than large amounts of information studied only superficially. It also explains why a person who is wide awake can consolidate memories far better than a person who is in a state of mental fatigue.

New Memories Are Codified During Consolidation. One of the most important features of consolidation is that new memories are *codified* into different classes of information. During this process, similar types of information are pulled from the memory storage bins and used to help process the new information. The new and old are compared for similarities and differences, and part of the storage process is to store the information about these similarities and differences, rather than to store the new information unprocessed. Thus, during consolidation, the new memories are not stored randomly in the brain but are stored in direct association with other memories of the same type. This

is necessary if one is to be able to "search" the memory store at a later date to find the required information. Role of Specific Parts of the Brain in the Memory Process. Hippocampus Promotes Storage of Memories. But why are the hippocampi so important in helping the brain to store new memories? The probable answer is that the hippocampi are among the most important output pathways from the "reward" and "punishment" areas of the limbic system, Sensory stimuli or thoughts that cause pain or aversion excite the limbic *punishment centers*, and stimuli that cause pleasure, happiness, or sense of reward excite the limbic *reward centers*. All these together provide the background mood and motivations of the person. Among these motivations is the drive in the brain to remember those experiences and thoughts that are either pleasant or unpleasant. The hippocampi especially and to a lesser degree the dorsal medial nuclei of the thalamus, another limbic structure have proved especially important in making the decision about which of our thoughts are important enough on a basis of reward or punishment to be worthy of memory.

3.12 Memory Assessments

To more fully assess the complex and multifactorial structure of learning and memory, a number of relatively comprehensive memory batteries have been developed. Among the oldest, and certainly the most frequently used, is the Wechsler Memory Scale (WMS), which was revised in 1987 (Wechsler Memory Scale-Revised) and again in 1997 (Wechsler Memory Scale III). The WMS-III has eight primary indexes, assesses both verbal and visual-spatial functions, includes a delayed recall component, and takes

approximately 45 minutes to administer. Additional relatively comprehensive batteries include the Rivermead Behavioral Memory Test, Memory Assessment Scales, Wide Range Assessment of Memory and Learning, and the Denman Neuropsychology Memory Scale. One important distinction is between attention versus memory and learning. In some ways, this distinction is inappropriate because attention is a prerequisite for learning to occur. A person who is easily distracted does not effectively learn and remember relevant information or events. Attention is, therefore, closely linked to learning. However, in other ways they do represent distinct functions. In particular, it is important to distinguish whether a person is capable of learning but is easily distracted, or whether, even under circumstances in which the person fully attends to a task, he or she still cannot learn very efficiently. This sometimes happens when clients state that they have a memory problem, but, despite their symptom description, they perform learning and memory tasks quite well under the ideal circumstances that often characterize assessment procedures. In contrast, real-world situations frequently mean that they need to exclude a number of distractions and carry on two or more activities simultaneously. Under these conditions, they might have distinct difficulties dividing their attention and, therefore, might not be able to learn and remember particularly effectively. Interviewing them regarding situations in which they do versus do not remember effectively might help the practitioner to understand this issue better. In addition, their test performances would be expected to be lower on tasks that load more heavily on attention (Trails B, Arithmetic, Digit Span, serial sevens or serial threes) than

those that are more pure tests of learning (Rey Auditory Verbal Learning Test, repeating paragraphs/ stories, Bender Gestalt memory). A good beginning place to assess memory is in the interview. Details regarding basic information such as personal, family, educational, and employment history can be pursued. Interviewers might request dates when the client began or finished employment or education, parents' or children's birthdays, or details related to medical history. Some of this information might be compared with more objective sources to determine its accuracy. In addition, behavioral observations such as pauses, expressions of uncertainty, or confusion might suggest difficulties with retrieval.

3.11.1. Screening and Assessing for Neuropsychological Impairment

Current research consistently indicates that there is a mild to moderate relationship between memory impairment and depression. An extensive meta-analysis by Burt et al. (1995) found that memory impairment was most clearly associated with inpatients (versus outpatients) and mixed bipolar and unipolar patients (versus purely unipolar).

In addition, negative affective information was more likely to be remembered accurately than material with a positive or neutral emotional tone. However, memory impairments were also present among populations of schizophrenics and mixed groups of psychiatric patients but not among patients diagnosed with either anxiety disorders or substance abuse. Interestingly, the association between memory and depression was stronger among younger than older persons. This is probably because early onset depression is likely to be more severe and younger persons have a greater amount of memory to lose

(greater “ceiling” and “floor “) than older persons (narrower range between ceiling and floor). Despite these findings, it should also be stressed that the link between memory impairment (and other forms of neuropsychological functioning) and depression is typically of quite a small magnitude. For example, dementia typically accounts for a far larger proportion of the variance in neuropsychological functioning than depression. The tests recommended in this subsection provide a useful slice of memory functions relevant to populations with CNS deficits. The WAIS-III /WISC-III subtests of Digit Symbol-Coding (incidental learning), Information, Digit Span, and Letter-Number Sequencing (WAIS-III only) include potentially valuable information related to learning and memory. However, Digit Span and Letter-Number Sequencing are primarily attentional tasks rather than pure learning tests. In addition, the Rey Auditory Verbal Learning Test is a relatively brief, well-researched, frequently used, individually administered test that assesses short-term verbal memory, the ability of the client to learn new material, the extent to which interference disrupts learning, and the ability to recognize information that might have been previously learned. As the name suggests, however, it is verbally oriented. To include at least some visual-spatial memory assessment, the memory version of the Bender Gestalt is recommended. If a more thorough assessment of visual-spatial memory is required, clinicians might consider the Benton Visual Motor Retention Test, the visual portions of the WMS-III (Faces, Family Pictures, Visual Reproduction), or the Rey-Osterrith Complex Figure Test.

3.11.2 Rey Auditory Verbal Learning Test

The Rey Auditory Verbal Learning Test (RAVLT) uses a simple format in which the client is asked to remember a list of 15 unrelated words (List A) repeated over five different trials. The client is then presented with another list of 15 unrelated words (List B), which serves to potentially interfere with previous learning, followed by a request to recall as many of the words from the original list as possible. After a 30-minute delay, the client is again asked to recall words from the original list (List A), following which he or she is asked to recognize as many words as possible in a list that includes words from the original list. As a result, a wide diversity of functions can be assessed. These include short-term auditory-verbal memory, rate of learning, learning strategies, retroactive and proactive interference, presence of confabulation or confusion in memory processes, retention of information, and differences between learning and retrieval. The entire procedure takes 10 to 15 minutes. One past difficulty with the RAVLT was the lack of a manual with standard administration and scoring procedures. This has now been amended with the publication of a manual along with meta-norms by M. Schmidt (1996). Several authors have developed alternative lists for examiners wishing to conduct follow-up evaluations and avoid the difficulties of practice effects. These lists are available for the original list (List A) and the interference list (List B), as well as the longer lists used for the recognition task. In addition, D. M. Shapiro and Harrison (1990) have developed four alternative sets of lists that have been found to be equivalent to the original RAVLT.

For testing children, a simpler Children's Auditory Verbal Learning Test (CAVLT) that uses the same format as the RAVLT is commercially available with a manual, scoring keys, and set of children's norms (Talley, 1990). Another commercially available variation of the RAVLT is the California Verbal Learning Test (CVLT; Delis et al., 1987). Instead of the RAVLT's list of unrelated words, the CVLT uses more conceptually consistent items that might be found in a typical shopping list. While scoring can be quite complex, there is a computer program to help with calculating some of the more elaborate scores. The test is well normed and has been found sensitive to important clinical areas such as the early effects of Alzheimer's disease and the differential diagnosis between various types of dementias.

3.11.3 Reliability and Validity

Test-retest reliability of the RAVLT over a one-year interval was a somewhat moderate .55. The highest reliability was .70 for the total number of words recalled for the five trials of List A. In contrast, the lowest reliability was .38 for recall of List B. The importance of using alternate forms is highlighted by the finding that practice effects for the same form over a 6- to 12-month retesting period were small but significant (1 to 2 words per trial. In contrast, no differences were found when alternate forms were used. Consistent with expectations, patients with left hemisphere damage have been found to have lower performances than those with damage to the right hemisphere. In addition, the RAVLT has been found to be sensitive to the effects of different memory disorders.

Heavy drinkers scored poorly on the RAVLT even if they did not have signs of neurologically related disease. As would be expected, Korsakoff's patients did consistently poorly on each of the five trials but, when presented with a recognition format after each of the first five trials, their performances increased. In a similar administration format, frontal lobe patients had poor recall over the five trials of List A, but when asked to recognize which words had been on the list using a recognition list, their performances were near normal. This suggests that their difficulties were mainly due to retrieving, organizing, and keeping track of the answers related to any potentially learned material rather than to their not having learned it. Finally, patients in the early stages of Alzheimer's disease showed a slow learning curve in which they recalled an average of only 6 of the 15 words following the fifth trial of List A. They also had far more words intruding between the A and B lists than other diagnostic groups. When the disease progressed to a moderate level, the number of words recalled for the fifth trial dropped to approximately 5, and for severe cases only an average of 2.6 words were recalled. Further support comes from correlations ranging from .50 to .65 between RAVLT factor groupings and other learning instruments. A factor analytic study with normal indicated that the tests measured the functions of acquisition, storage, and retrieval. It doesn't matter in what order you repeat them. Just try to remember as many words as you can." Each word in List A should be read with a one-second interval between the words.

No feedback should be given regarding whether they have given correct responses, repeated words, or included words not on the list. However, clients can be encouraged for their efforts on this, as well as additional trials. The order in which the words are recalled can be indicated by numbering them on the scoring sheet. When the client indicates that he or she is unable to think of additional words, Trial 2 for List A can be given with the following instruction.

3.12. Mantra Chanting and Memory

The goal of Om chanting is calm mind and relaxed body. Om chanting is the instrument of the mind which unfold the hidden powers of the mind and awake these powers. S.G. Kulkarni and Bera T.K. (1999) studied the effect of Om chanting on biochemical and hemoatological parameters and found significant reduction in R.B.C. and marginal decrease in cholesterol when meditation is preceded by Omkar.[19]

Gregg Jscobs an Assistant Professor of Psychiatry at Harvard Medical School who has published several studied on how brain waves change during meditation. Berrettini (1976) has done a study that by practicing (Om chanting) meditation college students were able to enhance their ability to focus attention, the spontaneous organization of memory and short term recall was also better. Ganguly. S.K. (3 Oct 2005) observed in a study that meditation (Om chanting) improve the concentration power and reduce stressful condition.[20] Sowak Rolf (Phy Dip. Directed of Himalaya Institute New York) found in his research work that Om chanting in morning and evening liberate you from mental disorders and give mental peace.

3.12.1 Causes of Memory

Suppose you have received a nice fan as a present from your amiable friend. When you use the fan, it sometimes reminds you of your friend. You think of him for a Smriti-Hetu (cause of memory). If your brother is a tall man, the sight of a similar tall man in another place will bring to your mind the memory of your brother. This is memory due to the similarity of objects (Sadrisyata). Suppose you have seen a dwarf at Madras. When you see a very tall man or Patagonian, this will remind you of the dwarf whom you saw at Madras. The sight of a big palace will remind you of a peasant's hut or a Sannyasin's grass hut on the bank of Ganga. This memory is due to dissimilarity in objects (Viparitata).

When you walk along the road on a stormy day, if you happen to see a fallen tree, you conclude that the tree has fallen owing to the storm. In this case, the memory is due to the relation between cause and effect (Karya-karana-sambandha). The new Samskaras wash away the old Samskaras. If the Samskaras are fresh and recent, it is easy to recall them back quickly. They come up again from the depths of the subconscious mind to the surface of the conscious mind. Revival of old Samskaras takes place. If you visit once the college wherefrom you received your education, ten years after you became an officer in the Government, all the previous Samskaras of your college days will be revived now. You will remember now your old professors, old friends, old books and various other things.

3.12.2 Characteristics of a Good Memory

The following are the four good characteristics of a good memory: (1) If you read once a passage and if you can reproduce the same nicely, it is a sign to indicate that you have a very good memory. This is termed Sugamata. (2) If you can reproduce the same thing without increase or decrease, addition or substraction, it is called Avaikalya. (3) If you can preserve a fact or passage or anything for a very considerable period, it is called Dharana (retentive memory). (4) If you can reproduce a passage at once without any difficulty when it is needed, it is called Upaharana.

3.12.3 The Process of Recollection

When you desire to remember a thing, you will have to make a psychic exertion. You will have to go up and down into the depths of the different levels of subconsciousness and then pick up the right thing from a curious mixture of multifarious irrelevant matter. Just as the railway sorter in the Railway Mail Service takes up the right letter by moving the hand up and down along the different pigeon-holes, so also the sorter subconscious mind goes up and down along the pigeon-holes in the subconscious mind and brings the right thing to the level of normal consciousness. The subconscious mind can pick up the right thing from a heap of various matters.

In a big surgical clinic, the assistant surgeon allows only one patient to enter the consultation room of the senior surgeon for examination. Even so, the mind allows one idea only to enter the mental factory at a time through the mind door (Manodvara). The

subconscious mind brings to the threshold of the conscious mind, during an act of Smriti (memory), the right thing at the right moment, suppressing all others. It serves the part of a censor and allows only relevant memories to pass by. What a wonderful mechanism it is! Who is the driver for these dual minds? Who created these? What a magnanimous Being He must be! My hairs stand on their ends when I think of Him! My pen quivers when I write. Don't you like to dwell with Him? What a great privilege and joy it is to be in communion with Him!

When you try to remember something, sometimes you cannot remember. After some time, the forgotten something flashes out to the conscious mind. How do you explain this? It is a slip of memory. The Samskaras of the particular thing has sunk deep. The Chitta, which is the storehouse of Samskaras (and whose function is memory), has to exert a bit, to analyse and sort and bring it to the surface of the conscious mind through the trapdoor. After some exertion, revival of the old Samskaras takes place and the forgotten idea, or name of a person, which you wished to recollect sometime back, suddenly flashes to the conscious or objective mind. There ought to have been some congestion in the brain, which might have prevented the revival of a forgotten thing, idea or person. As soon as the congestion is relieved, the forgotten idea floats on the surface of the mind. When the mind is calm, memory becomes keen.

3.12.4 Power of Memory

Those who overwork mentally, who do not observe the rules of Brahmacharya and who are tormented by many cares, worries and anxieties, lose their power of memory soon. When you show symptoms of losing your memory, as you grow old, the first symptom is that you find it difficult to remember the names of persons. The reason is not far to seek. All the names are arbitrary. They are like labels. There are no associations with the names. The mind generally remembers through associations, as the impressions become deep thereby.

Even in old age, you can remember old events, as there are associations with events. You can remember well in old age some passages that you read in schools and colleges. But, you find it difficult to remember in the evening a new passage you read in the morning. The reason is that the mind has lost its Dharana Sakti (power of grasping ideas). The brain cells have degenerated.

In early boyhood, the power of grasping in the mind is very marked. But, there is no power of understanding. In 16, 18, 20, the power of understanding becomes manifest. The power of retentive memory is also great in this age. The mind becomes settled only after 30. Below 30, there is much Chanchalatva (wandering nature). A man below 30-in the vast majority of cases-is not able to think and decide for himself. He has no power of judgment.

After 45, power of grasping begins to decline. Memory also begins to decline. He has power of retention for what he has learnt before. He cannot learn new sciences.

Brahmacharya helps a lot to develop the power of retention and various other psychic power.

A central executive network supports top-down mechanisms of attentional control and working memory allowing stable engagement with appropriate exteroceptive/ interoceptive input for proper goal-directed behavior followed by self-correction if needed. AFPCN supports executive monitoring, meta-awareness, reappraisal, and Response inhibition mechanisms. A moral cognition network supports positive form so fre-appraisal, as well as motivation and intention setting associated with self-care and prosocial behavior. Attentional orienting, and engagement. HPA axis communication with brain stem vagal efferents support parasympathetic control, diaphragm strengthening, and homeostasis across systems. A striatopallidal–thalamocortical network is responsible for facilitating extinction learning and reconsolidation of maladaptive habits into behavior that is aligned within tensions and outcomes into adaptive habits.

There is growing scientific evidence that yoga practice has an effect on cognition and processes underlying its regulation. For example, several studies have examined whether yoga can improve attention in children and adults. Ten days of uni-nostril or alternate nostril breathing resulted in increased spatial memory in children (Naveen et al., 1997).[21] Adults showed improved performance on the letter-cancelation task after right and alternate nostril breathing.[22]

A study of adolescents found that a 7-week yoga program improved memory and concentration[23], and a study demonstrated acute improvement on speed and accuracy in math computations in a sample of 38 adults who participated in a 20-min Tai chi/yoga class; the authors attributed the improvement to the observed increased relaxation in the sample, although they did not test for mediation. On a more physiological level of bottom-up sensory processing, an EEG study revealed decreased P300 latency following alternate nostril breathing and increased P300 peak after breath awareness in an auditory discrimination task. These findings were interpreted as decreased time needed for discrimination and increased availability of neural resources respectively[24]. A recent fMRI study with older adults found that age related decline in fluid intelligence was offset in long-term yoga practitioners and that yoga practitioners had more efficient functional brain networks than carefully matched controls Potential self-regulatory mechanisms of yoga for psychological health.[25]

According to United Nations children and adolescents around the world spend an average of 10 to 15 years at school. As a result, schools hold the potential to teach about healthy habits for man early age and promote children's health and well-being. For children who have to deal with stressors, anxiety, traumas, abuse, learning disabilities, and even bullying, the discipline developed by practicing contemplative techniques could be the difference between failure and success, both in their professional and personal life.

Furthermore, according to Noggle et al., the age of onset of most mental health disorders in adults occurs during childhood and adolescence, with around 7.5% of adolescents meeting DSM-IV-TR criteria for one or more mental health conditions. The solution for dealing with stressors, anxiety, and learning disabilities certainly depends on many factors; however, evidence suggests that some of these problems may be eased by mind-body practices, which have been shown to redirect attention, improve concentration, increase self-control, and provide people with reliable and healthy coping mechanisms. Yet, the efficacy of such practices among children is unclear and evidence is insufficient. A review conducted by Galantino et al. found that there was evidence for the benefit of yoga in the pediatric population in physical rehabilitation, but a recent meta-analysis concluded that the data on the clinical applications of yoga among the children are uncertain Authors state that while most studies were suggestive of benefits, results were based on low quality trials. Studies utilizing yoga in school settings have been shown to benefit children and adolescents. According to Khalsa et al., a yoga program might help children recover their self-esteem and confidence, restore their mental health, promote positive attitudes, improve concentration, and reduce stress and anxiety. Unfortunately, traditional curricula focus primarily on intellectual development, and schools have progressively been losing the capacity to adopt health-focused programs. The ability to cope with stress and anxiety (due to psychosocial demands) and to maintain physical and mental health is priceless in any spheres of an individual's life, including education.

Students must be healthy in order to learn, and academic accomplishment has been shown to be related to health status. Consequently, there is urgent need to develop and investigate cost-effective and evidence-based wellness programs that can be delivered in school settings. Therefore, the primary goal of this study was to systematically examine the available literature on yoga interventions exclusively in school settings. The objective of this report was to review methodological quality among selected studies, exploring the evidence of yoga-based interventions regarding academic, cognitive, and psychosocial benefits, and to contribute to the study of low-cost, health-focused alternative programs for children and adolescents in school settings.[26]

The self-control study on thirty normal subjects of both genders were taken in a self-control study group and were tested for three types of Nostril breathing practices and Breath Awareness (BA) effects. Namely verbal recall performance of numerical data such as Digit Span Forward (DSF) and Digit Span Backward (DSB) as well associate learning memory function using Wechsler Memory Scale. The interventions included Right Nostril Breathing (RNB), Left Nostril Breathing (LNB), Alternate Nostril Breathing (ANB) and Breathe Awareness for duration of 30 minutes daily, four consecutive days.

The Repeated Measure ANOVA analysis revealed a significant increase in both DSF and DSB recall performance due to RNB at $P<0.001$ level and increased DSB score due to ANB at $P<0.014$ level with a non- significant increase due to LNB suggests that the RNB facilitates both DSF and DBF recall performance. However, the LNB effect on left

hemisphere helps to restore the memory function of right hemisphere. This study concludes that the RNB enhances numerical data retrieval mostly as a result of left brain activation.[27]

Dr. Kanjan Joshi studied the effect of Nadishodhana pranayama and Om chanting on Memory enhancement of college students. Nadishodhana Pranayama 20 min & Om chanting 10 min. Tool used to measure the variables of this study. P.G.I. memory scale contractual by Dwarkaprasad and N.N.Wig. In this study t-test has been used for statistical analysis. Result of the present study shown that there is a significant changes. Hence Nadishodhana Pranayama & Om chanting cause a significant positive effect on memory of the students.[28]

3.13. Reaction time

Reaction time is one of the important methods to study a person's central information processing speed and coordinated peripheral movement response. Visual choice reaction time is a type of reaction time. The average reaction time for humans is 0.25 seconds to a visual stimulus, 0.17 for an audio stimulus, and 0.15 seconds for a touch stimulus.

3.13.1 Yoga and Reaction time

Yoga technique Duration -30 min

1. Mukh bhastrika
2. Bandh trayam
3. Nauli
4. Talasan

5. Trikonasan

6. Ardhmatsyendrasan

7. Supt vajrasan

8. Ushtrasan

9. Paschimottanasan

10. Shirshuttanasan

11. Pavanmuktasan

12. Sarvangasan

13. Halasan

14. Matsyasan

15. Navasan (supine)

16. Navakasan (prone)

17. Bakasan

18. Shavasan

The effect of yoga training on the central nervous mechanisms could be due to i) greater arousal and faster rate of information processing and ii) improved concentration power and ability to ignore and/or inhibit extraneous stimuli. Yoga practitioners are known to have better attention and less distractibility. It has been reported that yoga practice results in a decrease in mental fatigability and an increase in performance quotient (1). The present study confirms that yoga training leads to a significant reduction in visual and

auditory RTs. Hence, RT can be used as a simple, quantitative and objective method for monitoring the beneficial effects of yoga practice.[29]

3.13.2 Gayathri Mantra and Reaction Time

The mantra was listened early morning. Our hypothesis is that stimulating music, such as Gayathri mantra will shorten the reaction time to visual stimuli, while without music, the reaction time will be longer.

They are several factors that influence the reaction time, such as age, gender, left handedness vs right, practice, exercise, type of personality, the use of stimulant drugs, hypothyroidism and hyperthyroidism, brain injury and illness. Music helps promote brain development[8]. It is well known that music is used to manage organic disorders such as pain, and for rehabilitation after a stroke or a serious accident. It helps improve coordination and alleviates perception of pain by stimulating an increase in endorphins especially in polio patients. The aged and patients with Parkinson's disease, improve coordination and learn to walk with a steadier gait by exercising to music. Singing or playing certain musical instruments may contribute to improved lung function. Singing is also used to overcome speech disorders.[30]

3.13.3 Diabetes Mellitus and Reaction Time

Diabetes mellitus is a disease of insulin deficiency leads to micro and macro vascular disorder. Neuropathy is one of the major complication of chronic uncontrolled Diabetes affecting the Reaction time.

Impairment of sensory motor function of peripheral nervous system is more in chronic diabetic with less glycemic control ie., $HbA_1C>7$ who have shown increased Auditory and Visual Reaction time than chronic DM with $HbA_1C<7$.Severity of Peripheral neuropathy in Type II Diabetics could be due to elevated HbA_1C.[31]

4.0 METHODOLOGY

4.1 Materials and Methods

Study Design: Prospective study.

Study population: 40 Healthy school students aged between 11-13 years.

Venue: Vallalar High school, Dindigul.

Duration: Twelve sessions over a period of one month.

Ethical Committee Clearance

Clearance from institutional ethical committee was obtained before the commencement of the study.

Informed Consent

All details about the study procedure were explained in detail and informed consent was obtained from the school Principal.

Selection of Subjects

Taking the subjects who are satisfying the following inclusion & exclusion criteria

Inclusion Criteria:

- Students of age group: 11 to 13 years
- Both sexes
- Persons who are ready to give their consent

Exclusion Criteria:

Participants will be excluded if they have

- Systemic issue
- Under medication
- Chronic illness
- Regular practice of yoga for the past 3months
- Recently hospitalize
- Refractory errors

4.1.1 Data collection and analysis

4.1.1.1 Measurement of the anthropometric indices

Standing height: Measuring tape was used to measure the standing height in centimeters.

Weight: Weight was recorded in kilograms using the portable weighing machine.

Body Mass Index: BMI was calculated by using the formula.

BMI= weight (in kg) /ht in m^2

Pre test:

Memory test:

To test memory recall test will be used. The test material projected on the screen allowing ten seconds for each slide. After ten slides were shown a mathematical problem was projected on the screen and the participants will be asked to recall and write down.

Reaction time: is a non- invasive tool can be measured as the interval between the applications of stimulus like, light, sound. etc., and appearance of appropriate voluntary response in a subject.

Reaction Timer:

The device is a PC1000 reaction timer used to measure Auditory and visual reaction time. PC1000 is a 1000 hertz square wave oscillator which has a soft key for 'start 'and 'stop' function. This instrument has two components (A&B) connected to each other. Component (A) has a start button and it was handled by the examiner only, second component (B) has a stop button which was handled by the subject small red LED since Red light persists for a long time in retina & head phone (1000Hz tone) which receives the Visual & Auditory stimulus respectively. These two components are connected to a Personal computer which has audacity software installed in it. Audacity software records the reaction time in 0.001sec accuracy in wave format.

4.1.1.2 Visual Reaction Time (VRT) Measurement

When the Examiner pressed the 'start' button in the component (A) which was out of the view of the student and the student was instructed to press the 'Stop' button in component (B) with the right index finger first as soon as he/she sees the red light in the instrument. Reaction time was recorded in audacity software.

4.1.1.3 Auditory Reaction Time (ART) Measurement

When the Examiner pressed the 'start' button which was out of the view of the student and the student was instructed to press the stop button with the right index finger first as soon as he hears the sound (1000 hertz's tone) through the head phone connected to it. Reaction time is recorded in Audacity software.

Mrtyumjaya Mantra Chanting:

- Selected student were made to sit comfortably in Ardha Padmasana.
- Deep breathing was given to relax their mind with closed eyes, hands on chin mudra.
- Yoga expert was made to chant the mantra, students were asked to repeat the mantra chanting followed by the Yoga expert.
- 10 times repetition mantra was made for each session.
- After twelve sessions over a period of one month post data recorded.

5.0 RESULTS

The present study was conducted to assess the effects of Mrityunjaya mantra on memory and Visual and Auditory Reaction time of school students aged between 11-13 years and whether had any influence in the outcome variables.

5.1 Statistical Analysis Plan

Data was expressed as Mean and SD. Pre post data comparison was done using paired t - test by R statistical free software version 3.1.0.

Results were compared within groups, wherein data was extracted at both baseline and post-intervention.

Data expressed as Mean & SD. Comparison of mean was done by paired t test using R statistical software version 3.1.0. $P<0.05$ set as a significant. Table 1 shows the base line characteristic of study participants.

Table 1: Base line characteristic of Study participants

Variables	**Yoga Group**
Age (yrs)	13.74±3.93
Height (cm)	143.12±10.12
Weight (kg)	44.28±9.53
BMI (kg/m^2)	19.44±4.07

Table 2 shows the comparison of memory test before and after the intervention and the results are significant (P<0.04).

Table 2: Comparison of Memory test before and after the intervention

Variable	**Yoga Group**		**P value**
	Before	After	
Memory test	4.80± 1.23	8.90± 3.20	0.04

Table 3 shows the comparison of Visual and Auditory Reaction time test before and after the intervention. The results are statistically significant.

Table 3: Comparison of Visual and Auditory Reaction time test before and after the intervention

Reaction time (msec)		**Yoga Group**		**P value**
		Before	After	
ART	Right	188.62± 8.66	164.57± 9.92	0.02
	Left	218.36± 7.49	187.18± 5.70	0.04
VRT	Right	227.48± 6.80	202.92±8.46	0.02
	Left	226.71±19.63	209.38±8.60	0.02

6.0 DISCUSSION

It is evident from the result that students who were exposed to Mrityunjaya mantra Chanting exhibited enhanced Memory and reduced Auditory and Visual Reaction time. Repeated and continuous chanting may have influenced the increase in activation of brain cells, thus results in enhanced Memory and Speedy response. The results are in true with the previous Researches that Vedic chanting on sustained Attention and Memory.

According to Kanchan Joshi, practice of Nadishodhana Pranayama & Om chanting is quite effective to enhance the memory of college students[32].

According to Ashok et al., Mantra recitation is the part of process of speech. Physiological factors Vata Dosha and Agni, psychological factors Manas and Buddhi perform the function of speech. The consequence of divine Mantra facilitates advance the excellence of functions of all these factors. All these entities play decisive responsibility in all other body activities[33]. Therefore, it is suggested that Mantra chanting should become a regular feature of the school curriculum.

7.0 CONCLUSION

The practice of Mrtyumjaya mantra chanting can be used as one of the powerful means enhancing Memory and Reaction time of school students. We recommend further detailed studies for further supporting traditional Vedic chanting and to recommend it to include in our daily life style.

8.0 LIMITATIONS

The sample size is relatively smaller. Hence, generalizing the study outcomes to a larger population would not be definitely conclusive.

2. Duration of the practice is limited; longer exposure to the practice is needed.

3. Other naturopathic treatments acted as confounding factors during the study.

8.1 Direction for future research

1. This study should be replicated with a larger sample size.

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