Chapter I

INTRODUCTION

What a child learns in the womb cannot be learned on earth

- Veda

"It is every mother's dream to have a beautiful, intelligent and healthy child! Yet mothers need to understand that 90% of their opportunity to influence a child's development occurs while the child is still growing within the womb. After birth, the influence of parents and educators on the child's development is comparatively minimal. Careful preliminary training is needed, ideally for both parents. For example, before beginning her work, a mother can learn how to provide her child with the best possible "raw materials" for "building" its physical and psychic bodies. She can be educated in directing her mind consciously, so that she can symbolically "cover" her future child with "gold."

Becoming a parent is truly a life-changing event, opening us to awareness of new dimensions of life and ourselves. Prenatal Education helps integrate these enormous new feelings and experiences so we can make the most of our time together in life. The promise of a brighter future for humanity is closely linked with prenatal education. Through appropriate prenatal education our current violence-oriented society can gradually be transformed into a saner, better balanced and more creative generation of human beings…"

During pregnancy, Prenatal Education help with balance and inner peace through these big physical and emotional changes. They can help relieve fears, doubts, fatigue, and mood swings. They encourage positive attitudes and behaviors. Prenatal Education can open us to connecting in new and wonderful ways with

partners, parents, unborn children, our own bodies, and the blessing of bringing new life into the world.

In our culture, the majority opinion is that parenthood starts after birth. This view has been fostered by medical scientists who define a baby as physical matter, especially brain matter, which they believe is insufficient to register or process memory, learning, trauma, emotion, or any truly human experiences until months after birth. This effectively excludes the period of life in the womb from active parenting. Hence, we have a widely-shared cultural delusion that "early" parenting begins after the child is born.

Considering all we know today about the realities of life before birth, we are obliged to set back the clock of parenthood. The new facts plead for parental involvement and participation in the matrix of intimate interactions in the womb. Parents are creators and creating starts very early, ideally before the conception itself, when "quality control" efforts can spare the baby from a lifetime of sickness or handicap. Just one example from recent research: When fathers are cigarette smokers, they damage their sperm and pass to their offspring a higher risk of childhood cancer. As many as 15% of childhood cancers could be due to smoking by fathers. The cancer risk is proportional to the number of cigarettes smoked per day. Parent smoking also plays a role in sudden infant death syndrome and in production of smaller babies. How many mothers and fathers would deliberately create cancer in their children if they knew how to avoid it?

Creating is what early parenting is about creating a physical body and brain, creating emotional foundations for living, and establishing a rich connection with the prenatal self.

"Of all the rights of women, the greatest is to be a mother." This famous saying clearly indicates that the mother is the greatest gift and life is mother's gift to everyone. Pregnancy is a beautiful celebration and natural condition. Nine transformative months full of excitement, planning and peering at the awesome unfolding of life. (Shirley V 2002). Comfort is an interesting concept in the context of the pain of childbirth. The feeling of comfort is the expression of having met present or impending needs or desires in three domains: body, mind and spirit (Lowe NK 2002).

Developmental psychologists and neurobiologists agree that the developing mind is astonishingly active and self-organizing, creating new knowledge from everyday experiences. Newborns crave novelty and become bored with familiarity, so their eyes, ears, and other sensory organs are attuned to events from which they can learn. A few months later, the infant mentally clusters objects together that are similar in shape, texture, or density, and explores gravity and causality as crackers are dropped from the high chair. A toddler categorizes faces, animals, and birds according to their properties, and by age 3 or 4, children make logical inferences about new members of a group, such as appreciating that a dolphin breathes like the mammal it is rather than the fish it resembles. Just as the developing brain is expanding its interconnections, the developing mind is making connections between the new knowledge it discovers and creates.

1.1 GARBHA UPANISHAD

It expounds the details of what human consciousness goes through, while it still resides in the womb, in the form of a fetus.When the brain of the fetus forms, its active mind is more active than that of children and or adults. The reason is that while

in the womb, the fetus is not distracted by the senses, and its connection with the attractions and distractions of the outside world.

1.2 PRENATAL

"Your spirit as a woman has all the knowledge and power you need to give birth and to nurture your baby. It is in your genes. it has been there since you yourself were conceived. You can trust its wisdom." - Gurmukh Khalsa

The prenatal period is one of the most fascinating, yet least well understood, stages of development. Its end is marked by a beginning; the birth of a newborn baby. In most societies the newborn is given an age of zero, as if to imply that nothing of importance has occurred before this. But, the prenatal period is important for development. The prenatal period encompasses the most rapid phase of development of life, beginning as a single cell and ending as a newborn baby emerging into the world. For many years the period was viewed as simply one of growth and maturation, a time during which the body and organs were formed. In this context the term "maturation" refers to those aspects of development that are primarily under genetic control. Thus, development during this time was considered as proceeding largely under genetic control and immune to external influences. However, as technology has advanced and scientists have become more sophisticated in examining the fetus, it has become apparent that development during this time is far from a simple question of genetically determined growth. Environmental agents may adversely affect the development of the fetus, and moreover the environment may determine the functional capacity of the organs of the body. The actions and reactions of the baby will shape its own development.

1.2.1 PHYSICAL DEVELOPMENT

The prenatal period, beginning at conception and ending at birth, is divided into three stages: the conceptual or germinal period, the embryonic period, and the fetal period (Moore & Persuad, 2003).

1.2.2. THE GERMINAL PERIOD

The germinal period begins with the fertilization of the egg by the sperm and concludes with the establishment of the pregnancy, approximately two weeks later. At ovulation a mature egg is released from the ovary and enters the fallopian tube. Sperm travels up the tube to meet the egg, and fertilization takes place in the fallopian tube. The fertilized egg (the zygote, a single cell) now begins to divide. The first division to produce two cells takes place 24–36 hours after fertilization. The cells divide, first to form a ball of cells (the morula) and then, with the formation of a cavity within the morula, the blastocyst. The cells, in the course of dividing, travel down the fallopian tube and enter the womb where the blastocyst implants itself into the wall of the uterus (5–6 days after fertilization). During the next 5–7 days the blastocyst establishes a primitive placenta and circulation, thus ensuring the supply of nutrients and oxygen essential for continued development.

Two weeks after fertilization, pregnancy is established. As well as developing a placenta the blastocyst must also ensure pregnancy continues, and it secretes hormones: first, to prevent menstruation and thus stop the shedding of the uterine lining and consequent loss of the pregnancy; and, second, to prevent the mother's immune system from attacking the embryo or fetus.

1.2.3 THE EMBRYONIC PERIOD

The embryonic period begins during the middle of the second week and concludes at the end of the eighth week, at which time the physical appearance of the

embryo is clearly human. It is during this time that all the major organs of the body begin to form. It is a time of specialization where cells divide and differentiate to form specific organs, e.g., the heart and lungs.

One of the mysteries of development is how cells 'know' to become a heart or lung cell, given that they are all identical at the start of the differentiation process. The local environment of surrounding cells and chemical messages is undoubtedly important, but exactly how one cell becomes a toenail, another a hair, is unknown. During this period the individual is called an embryo. The heart, although only two-chambered, begins to beat and blood is circulated around the embryo by the end of the third week. This enables the removal of waste and the acquisition of nutrients. As all the body's organs begin to form during this period, it is considered the most critical stage of development.

1.2.4 THE FETAL PERIOD

The fetal period follows from the end of the embryonic period, beginning at nine weeks and ending with the onset of labor and birth of the baby. The individual is referred to as a fetus during this period. The period is marked by the continued development and differentiation of structures that emerged during the embryonic period. Basic structures that were laid down in the embryonic period are refined and grow to their final form. Very few new structures appear. Particularly noticeable is the rapid rate of growth during the third and fourth months, with the fetus growing from about 2.5 cm(1 inch) at 8 weeks to 13–15 cm (5–6 inches) at 16 weeks. It is during this period that the origins of motor, sensory, and learning behavior are to be found.

1.3 BRAIN DEVELOPMENT

The brain begins its development at 18 days after fertilization. It is one of the slowest organs to develop, with development continuing for many years after birth. The relative proportion of brain to body decreases as development proceeds; the brain comprises some 25% of body weight in the 9-week fetus, 10% in the newborn, and only 2% in the adult. The brain develops from a layer of cells from the embryonic disc, the neural plate. This plate folds to form the neural tube, which closes, beginning in the middle and progressing to each end. Neural tube defects,e.g., spina bifida or anencephaly, arise as a result of the failure of the neural tube to close properly. The neural tube has closed by the fourth week and the walls begin to thicken (Muller & O'Rahilly, 2004). The walls of the neural tube contain progenitor cells which will give rise to the neurons and glia cells of the brain.

The development of the brain may be considered at two levels. First, at the gross level considering how the neural tube develops to form the main structures of the brain, hindbrain, midbrain, and forebrain. The brain begins its development following the closure of the neural tube. The rostral end, destined to become the brain enlarges to form three swellings: the forebrain, the midbrain and the hindbrain. During the fourth week the forebrain further subdivides into the diencephalon and telencephalon.

Towards the end of the fourth week, the hindbrain divides into the metencephalon and myelencephalon. By the fifth week this 5 part structure of the brain is clearly visible. Although much more complexity is added as the brain develops, this basic 5 part organization remains throughout the rest of life. By the 11th week the telencephalon has greatly developed and covered the dienecephalon to form the cerebral hemispheres. Although initially smooth in appearance, future

development will see a massive increase in the surface area of the cerebral hemispheres which become folded and assume their adult like appearance with many grooves (sulci) and convolutions (gyri).

Micro level examination shows how the complex organization of cells within the brain is achieved. At the gross level the hindbrain, the midbrain, and the forebrain are formed during the fourth week as one end of the neural tube expands to form three primary vesicles (Muller & O'Rahilly, 2004).

The forebrain further subdivides during the fifth week into the telencephalon and diencephalon. The telencephalon gives rise to the neocortex (cerebral cortices). The hindbrain and brain stem develop first, followed by the midbrain and later the cerebral cortices (Mai & Ashwell, 2004), development of which continues after birth. This probably reflects the need for basic biological functions, controlled by the hindbrain and forebrain, to be operational at birth, e.g., breathing and digestion. The cerebral cortices involved in mental processing (often called the gray matter) develop later, a process that continues well into postnatal life

At the micro level, all the neurons we will ever possess have been generated by the end of the second trimester (Caviness et al., 1996). Between the 10th and 26th weeks, cells are produced at an extremely rapid rate; up to 2,50,000 cells are produced each minute. The adult brain contains an estimated 100 billion cells. Initially there is massive overproduction of cells, and part of the development of the brain includes natural cell death. Although mainly occurring after birth this cell death (pruning or apoptosis) is a key element of the developmental process, removing neurons that have not made connections or have made inappropriate connections. It is estimated that up to 50–70% of brain cells initially produced are pruned in the postnatal period.

Although development is often seen as an additive process, the development of the brain involves cell death as a central element in its ontogenesis (Oppenheim, 1991).

1.3.1 THE CELLULAR DEVELOPMENT OF THE BRAIN COMPRISES THREE MAIN STAGES:

Proliferation, the production of nerve cells, is completed by the end of the second trimester.

The migration of cells. Cells are formed from progenitor cells in the wall of the neural tube and move from here to their final location. Other cells, the radial glia cells, are produced alongside the neurons and serve as guides forming pathways along which the nerve cells migrate to their final position (Hatten, 1999). Migration takes place between the fourth and ninth months of gestation.

The final stage involves myelinization and synaptogenesis. Myelinization is the process whereby the nerve cell is insulated from other cells by the development of a fatty sheath, myelin, around it. This greatly enhances the transmission of nerve impulses along the nerve. Synaptogenesis is the process by which nerve cells communicate with each other or with end organs, e.g., muscles to enable the transmission of neural impulses across the brain and from the brain to other organs and vice versa. These latter processes continue for some time after birth.

The development of the brain is a highly complex process in which timing of events is crucial to ensure that development proceeds normally (Mai & Ashwell, 2004). Numerous factors control the organization of neural development, with it being largely under genetic control. Some of the genes involved are now known (e.g., des Portes et al., 1998), but our understanding of the processes that enable the progenitor cells in the neural tube to form the most highly complex organ in our body—the brain—are poorly understood.

"Brain development is basically determined by its genetic disposition, but its individual structure depends on its use. The brain develops according to how we use

it. All experiences are stored in the brain and influence its neural structure." - Wilfried Gruhn,

Dr. Carista Luminare-Rosen explores the universal forces underlying conception and shows parents how they can optimize their child's physical, emotional, mental, and spiritual health by considering a host of important issues well in advance. Weaving together modern preconception and prenatal health knowledge with ancient wisdom, the author guides parents through a unique holistic program designed to prepare them for the myriad changes, adjustments, and joys that accompany the major transition to parenthood. Dr. Luminare-Rosen helps readers consider their own readiness for parenthood--physically, psychologically, and spiritually--so that when the child of their dreams arrives, they are fully prepred to welcome this new being--body, mind, and soul.

1.4 WOMB WISDOM

For years, scientists have been hard at work perfecting techniques of genetic modification. The goal: to make what they consider to be "*better grain,*" "*better plants,*" and "*better animals.*" The question quietly before us now is whether the tools of genetics and other new technologies should be used to create what some consider to be "*better*" human beings.

Lightening-fast developments in the fields of biotechnology, robotics, and nanotechnology are opening up prospects for the engineering of children — and the re-engineering of the human species. What are the implications of these new technologies for mothers and fathers? For children? For the human family? And the human future? These new technologies raise profound moral and ethical questions — and call for wisdom. They force us to confront the fundamental question of what it means to be human.

The next great journey of discovery for humankind will not be in outer space, but in the inner space of the human brain.

The very young human brain is universal greatest wasted natural resource.

Expectant mothers could program to the unborn children to have positive attitudes that led to their later success and happiness. New research reveals that unborn child is not only growing physically but also intellectually and psychologically. A host of learning and conditioning occurs during the nine months in the womb, learning that may be just the magical pill to the Fetus that they will need in later life.

Learning in the womb works much the same way in children. Recent studies provide conclusive evidence that a fetus in the womb can and does react to both physical stimuli, such as sound, and the moods or emotional responses of its mother. In a very real sense then, it is experiencing joy and sorrow, and learning about rhythm and sound long before birth. Humans learn how to deliberately and carefully reach for things while still in the womb, says an Italian team of scientists.

While it is generally believed babies only show planned reaching behaviour at 3 or 4 months old, the researchers think they may start before they are born. Zoia told the Fremantle conference how the team took ultrasound movies of eight fetuses in women 14, 18 and 22 weeks into their pregnancy. They then digitised the information and analysed it with a specially designed program. Upto 18 weeks gestation the hands of the fetuses appeared to move towards the face randomly, says Zoia. But by 22 weeks the movement showed evidence of planned movement towards the eyes and mouth, she says. Learning to reach with care her team is now using the same method to study the movement of newborns in their first year of life.

She says that a previous study has shown that newborns reach more when there are interesting objects around to reach for, suggesting it is a skill that could be encouraged. Zoia's research has been published online ahead of print publication in the journal Experimental Brain Research. (The Nobel Prize in Physiology or Medicine 2002).

1.5 FETAL LEARNING

The ability of the fetus to learn is perhaps the most fascinating of all fetal abilities, because learning is often seen as the pinnacle of adult achievement. The ability to learn also has implications for the functioning of other abilities, e.g., it requires a sensory system able to detect and discriminate stimuli and a memory system able to store information.

1.6 BABY LEARNS LIFE'S FIRST LESSON IN THE WOMB

"Recent studies and numerous experiments scientifically demonstrate that the unborn child, even before birth, is capable of SEEING, HEARING, FEELING and even LEARNING, even while it is in the uterus. During the third trimester, the fetus is capable of recording a sound, relating that sound with one that it has heard previously, and interpreting its significance." - Dr. Sheila Woodward, Chair of Music Education and assistant professor of music education, University of Southern California.

When a mother actively engages her unborn baby in prenatal communication and stimulation, she is actually creating a conducive womb environment that will create a positive influence on her baby's future life.

According to Dr Thomas R. Verny – the world's leading expert on the effects of prenatal and early postnatal environment on personality development – prenatal stimulation bodes well for healthy fetal development.

"Every minute, there are new brain cells being formed in the unborn child. And as the new brain cells are being formed, pathways or circuits are being formed along the lines that help assist communication for whatever the child needs. For example, the child will obviously need to breathe, the child will need to move when

he is born, the eyelids will need to open and close; so all these organs and all the nervous tissue that supply these organs has to start developing long before birth.

It is the same thing with the brain circuits. The more you stimulate a child's skin, or the more you stimulate its auditory nerves (hearing), the more those pathways will develop and become stronger so that when the child is born, he or she is better prepared for the world."

The human brain begins forming very early in prenatal life (just three weeks after conception), but in many ways, brain development is a lifelong project. That is because the same events that shape the brain during development are also responsible for storing information—new skills and memories—throughout life. The major difference between brain development in a child versus learning an adult is a matter of degree: the brain is far more impressionable (neuroscientists use the term plastic) in early life than in maturity. This plasticity has both a positive and a negative side. On the positive side, it means that young children's brains are more open to learning and enriching influences. On the negative side, it also means that young children's brains are more vulnerable to developmental problems should their environment prove especially impoverished or un-nurturing.

1.7 EXPOSURE LEARNING

Most studies examining fetal learning have studied whether the newborn responds differently to sounds it has been exposed to before birth compared to sounds it has not been exposed to (Hepper, 1996).

Music Newborns prefer music they have heard prenatally compared to that which they have never heard. Interestingly, this preference can be observed at 36

weeks of gestation but not 30 weeks of gestation, which may indicate that learning of familiar sounds or tunes occurs after 30weeks (Hepper, 1991).

1.8 HABITUATION

The presentation of a loud, discrete sound initially elicits a large reaction (change in heart rate or movement) in the fetus but as this sound is repeated the fetus's response wanes and eventually disappears—this waning of response is termed habituation. The fetus habituates to auditory stimuli from around 22–24weeks of gestation, and female fetuses have been observed to habituate faster than male fetuses at any particular gestational age, a finding which may indicate that females fetuses are developmentally more advanced than male fetuses (Hepper & Leader, 1996).

1.9. ENVIRONMENTAL INFLUENCES ON DEVELOPMENT

Prenatal physical development appears to proceed largely under instruction and direction from the individual's genes. However, this does not mean that it is immune to external influences that may alter the course of development.

Environmental factors may influence the individual's ontogenesis and indeed may be crucial for establishing the functional capabilities of the various organs of the body.

1.10. NATURE (GENES) OR NURTURE (ENVIRONMENT)

Genes and environment interact at every step of brain development, but they play very different roles. Generally speaking, genes are responsible for the basic wiring plan—for forming all of the cells (neurons) and general connections between different brain regions—while experience is responsible for fine-tuning those connections, helping each child adapt to the particular environment (geographical, cultural, family, school, peer-group) to which he belongs. An analogy that is often

used is wiring a phone network: genes would specify the number of phones and the major trunk lines that connect one relay station to the next. Experience would specify the finer branches of this network: the connections between the relay station and each person's home or office.

For example, each of us is born with the potential to learn language. Our brains are programmed to recognize human speech, to discriminate subtle differences between individual speech sounds, to put words and meaning together, and to pick up the grammatical rules for ordering words in sentences. However, the particular language each child masters, the size of his vocabulary, and the exact dialect and accent with which he speaks are determined by the social environment in which he is raised—that is, the thousands of hours he has spent (beginning even before birth) listening and speaking to others. Genetic potential is necessary, but DNA alone cannot teach a child to talk.

1.11. EXPERIENCE CHANGE THE ACTUAL STRUCTURE OF THE BRAIN

Brain development is "activity-dependent," meaning that the electrical activity in every circuit—sensory, motor, emotional, cognitive—shapes the way that circuit gets put together. Like computer circuits, neural circuits process information through the flow of electricity. Unlike computer circuits, however, the circuits in our brains are not fixed structures. Every experience—whether it is seeing one's first rainbow, riding a bicycle, reading a book, sharing a joke—excites certain neural circuits and leaves others inactive. Those that are consistently turned on over time will be strengthened, while those that are rarely excited may be dropped away. Or, as neuroscientists sometimes say, *"Cells that fire together, wire together."* The elimination of unused neural circuits, also referred to as *"pruning,"* may sound harsh,

but it is generally a good thing. It streamlines children's neural processing, making the remaining circuits work more quickly and efficiently. Without synaptic pruning, children wouldn't be able to walk, talk, or even see properly.

1.12. CRITICAL PERIOD IN BRAIN DEVELOPMENT

Pruning or selection of active neural circuits takes place throughout life, but is far more common in early childhood. Animal studies have shown that there are certain windows of time during which the young are especially sensitive to their environment: newborn mice must experience normal whisker sensation in the first few days of life or they will develop abnormal tactile sensitivity in the face region; cats must be allowed normal visual input during the first three months or their vision will be permanently impaired; and monkeys need consistent social contact during the first six months or they will end up extremely emotionally disturbed. Many of the same critical periods appear to hold for human development, although we are less certain about their exact length. Thus, babies also require normal visual input or they may suffer permanent impairment; children born with crossed or "lazy" eyes will fail to develop full acuity and depth perception if the problem is not promptly corrected. Language skills depend critically on verbal input (or sign language, for babies with hearing impairments) in the first few years or certain skills, particularly grammar and pronunciation, may be permanently impacted. The critical period for language-learning begins to close around five years of age and ends around puberty. So individuals who learn a new language after puberty almost always speak it with a foreign accent.

1.13. WHEN IS THE BRAIN FULLY DEVELOPED?

"The brain of an eight-month-old human fetus is actually estimated to have two to three times more nerve cells than an adult brain does. Just before birth, there is

a massive death of unnecessary brain cells, a process that continues through childhood and then levels off."(Colin Blakemore 1985)

"50 to 75 percent of neurons are lost during prenatal development, and loss continues at a reduced rate in early life."(Marian Diamond 1987)

Our brains are continually re-shaping themselves to meet the demands of everyday life, even throughout adulthood. However, there are certain aspects of brain structure and function that do level off during development. For example, the number of neurons peaks even before birth; some 100 billion are formed during just the first five months of gestation. (Recent evidence suggests that new neurons are produced throughout life, though far less rapidly, and probably in numbers sufficient only to replace those that gradually die off.

In spite of the great number of neurons present at birth, brain size itself increases more gradually: a newborn's brain is only about one-quarter the size of an adult's. It grows to about 80 percent of adult size by three years of age and 90 percent by age five. This growth is largely due to changes in individual neurons, which are structured much like trees. Thus, each brain cell begins as a tiny sapling and only gradually sprouts its hundreds of long, branching dendrites. Brain growth (measured as either weight or volume) is largely due to the growth of these dendrites, which serve as the receiving point for synaptic input from other neurons.

Another way of measuring brain development is to look at the speed of neural processing. A newborn's brain works considerably more slowly than an adult's, transmitting information some sixteen times less efficiently. The speed of neural processing increases dramatically during infancy and childhood, reaching its maximum at about age fifteen. Most of this increase is due to the gradual myelination of nerve cell axons (the long "wires" that connect one neuron to another neuron's

dendrites). Myelin is a very dense, fatty substance that insulates axons much like the plastic sheath on a power cable, increasing the speed of electrical transmission and preventing cross-talk between adjacent nerve fibers. Myelination (the coating or covering of axons with myelin) begins around birth and is most rapid in the first two years but continues perhaps as late as 30 years of age.

Synaptic development is a more complicated issue. Synapses are the connecting points between the axon of one neuron and the dendrite of another. While information travels down the length of a single neuron as an electrical signal, it is transmitted across the synapse through the release of tiny packets of chemicals or, neurotransmitters. On the receiving (post-synaptic) side, special receptors for neurotransmitters change the chemical signal into an electrical signal, repeating the process in this next neuron in the chain. The number of synapses in the cerebral cortex peaks within the first few years of life, but then declines by about one third between early childhood and adolescence

1.14. THE HISTORY OF PRENATAL ENRICHMENT

The concept of prenatal stimulation has been around for centuries - records show it was practiced in ancient civilizations such as India, Greece, Rome, China and native tribes in Asia and South America - it is only in the last twenty years or so that the Western world in particular has come to accept that prenatal stimulation can be of huge benefit to the unborn baby and his future.

1.14.1. ABHIMANYU

The legend of Abhimanyu in the Indian epic Mahabharata may be first reference to fetal learning (or programming).While he was still in his mother's womb, Abhimanyu learned from his father Arjuna, the secret art of penetrating the deadly chakravyuha, or circular formation of infantrymen, archers, horse-drawn chariots and

elephants in battles. Arjuna was describing this secret to his pregnant wife and midway through the narration she dozed off. This the fetus could not learn how to get out of the chakravuyuha. Years later, this half knowledge would cost young Abhimanyu his life. In the great battle, Abhimanyu penetrates the circular formation, but, not knowing how to get out of it, he is trapped and killed by the enemy.

1.14.2. PRAHALADAN

When Hiranyakasipu left his kingdom and went to the mountain known as Mandaracala to execute severe austerities, all the demons scattered. Hiranyakasipu's wife, Kayadhu, was pregnant at that time, and the demigods, mistakenly thinking that she carried another demon in her womb, arrested her. Their plan was that as soon as the child took birth they would kill him. While they were taking Kayadhu to the heavenly planets, they met Narada Muni, who stopped them from taking her away and took her to his asrama until Hiranyakasipu's return. In Narada Muni's ashrama, Kayadhu prayed for the protection of the baby in her womb, and Narada Muni reassured her and gave her instructions on spiritual knowledge. Taking advantage of those instructions, Prahlada Maharaja, although a small baby within the womb, listened very carefully. The spirit soul is always apart from the material body. There is no change in the spiritual form of the living entity. Any person above the bodily conception of life is pure and can receive transcendental knowledge. This transcendental knowledge is devotional service, and Prahlada Maharaja, while living in the womb of his mother, received instructions in devotional service from Narada Muni. Any person engaged in the service of the Lord through the instructions of a bona fide spiritual master is immediately liberated, and being free from the clutches of maya, he is relieved of all ignorance and material desires. The duty of everyone is to take shelter of the Supreme Lord and thus become free from all material desires.

Regardless of the material condition in which one is situated, one can achieve this perfection.

1.14.3. ASTAVAKARAR

Rishi Shukdev gained the precious Supreme Knowledge when still in an embryo state. The Sage Astavakara imbibed the knowledge of all four Vedas suspended in the embryonic fluid in his mother's womb. In fact one day when his father, a famous sage, recited a Mantra incorrectly, he bellowed loudly in protest from inside the womb.

1.14.4. BUDDHA

Queen Mâyâ and King Suddhodhana did not have children for twenty years into their marriage. One day however, according to legend, Queen Maya dreamt of a white elephant entering her side, and became pregnant. According to Buddhist tradition, the Buddha-to-be was residing as a Bodhisattva, in the Tusita heaven, and decided to take the shape of a white elephant to be reborn, for the last time, on Earth. Maya gave birth to Siddharta (c. 563 BCE).

1.14.5. VIVEKANANDA

Before Vivekananda was born, his mother, like many other pious Hindu mothers, had observed religious vows, fasted, and prayed so that she might be blessed with a son who would do honour to the family. She requested a relative who was living in Varanasi to offer special worship to the Vireswara Siva of that holy place and seek His blessings; for Siva, the great god of renunciation, dominated her thought. One night she dreamt that this supreme Deity aroused Himself from His meditation and agreed to be born as her son. When she woke she was filled with joy. she devoted her spare time to sewing and singing, being particularly fond of the great Indian epics, the Ramayana and the Mahabharata, large portions of which she had memorized. She

became the special refuge of the poor, and commanded universal respect because of her calm resignation to God, her inner tranquillity, and her dignified detachment in the midst of her many arduous duties.

1.14.6. SHIVAJI

The pregnant Jijabai prayed to the eternal Bhavani Ma to give her a good (suputra) son. On April 10, 1627, in Shivneri fort, the pratipalak the great king Shivaji was born. Even when he was in her womb, Jijamata taught Shivaji. She made sure that there was a proper (sanskarprad) cultural environment in the house, conducive to the young Shivaji's character formation even while he was still in her womb.

1.14.7. GANDHI

Mohandas Karamchand Gandhi was born on October 2, 1869, at Porbandar, a small town on the western coast of India, which was then one of the many tiny states in Kathiawar. Gandhiji was born in middle class family of Vaishya caste. His father, Karamchand Gandhi, was a Dewan or Prime Minister of Porbandar. His mother, Putlibai, was a very religious lady and left a deep impression on Gandhiji's mind. Gandhiji was a mediocre student and was excessively shy and timid.She was a superstious lady and follower of saturmasaya viratha at that time she used to eat after seeing the sun on a rainy day if she is not able to see the sun she would today GOD does not want me to eat.

500 BCE

Confucius suggests that the fetal environment can determine behavior.

450 BCE

Chinese culture formalizes special childbearing treatment, thereby acknowledging health, dietary, emotional, and stimulatory effects—including music—upon the fetus.

400 BCE

Plato asserts that vibration is the primary cosmic principle.

350 BCE

Prenatal receptivity to external factors was surmised by Aristotle

400

The surgeon Susruta of India believed that the unborn child begins seeking sensation late in the first trimester, its mind at work by five months

600

Talmudic writings refer to fetal awareness

1000

Japan adapts Chinese prebirth arts to its society, institutionalizing stimulation as taikyo; over time, this focus shifts from superstitious precautions to a theistic and then imperial rationale, by the 20th century amalgamated with an overtly educational approach.

1510-1512

The foetus in the womb, Leonardo da Vinci (c.1510-1512)

1690

An Essay Concerning Human Understanding, by the British philosopher, John Locke, contains the presumption that a fetus is capable of thought, and its ideas can be specifically influenced from outside the womb.

1881

William Preyer, in The Mind of the Child, claims that cerebral functions are initiated before birth.

1890

As the Quing dynasty of China was forming a republic, the civic expectations for progeny further standardized ancient in utero stimulation techniques, centering upon utopian aims.

1924

Albrecht Peiper, Leipzig University pediatrician, visually confirms prenatal response to outside stimuli by observing distension from kicking in the maternal abdomen after an automobile horn is sounded.

1920s-50s

Increasing evidence of second-trimester audition and multisensory fetal reaction to the maternal environment, within utero learning are suggested by psychologist David Spelt; psychologist Donald Hebb, McGill University, Montreal, posits a neurogenetic hypothesis that early enrichment produces physiological changes in the brain which promote reasoning abilities.

1960s

New York psychologist, Lee Salk, conducts several investigations of prenatal imprinting from the mother's blood surging past the placenta, identifying various permanent behavioral indicators; neuroanatomist Marian Diamond at the University of California, Berkeley, begins three decades of research which show stimulating maternalenvironments alter brain physiology in rat offspring, and improve their learning skills.

1962

Ashley Montagu's Prenatal Influences summarizes the expanding information about fetal life.

1970s-80s

Technology provides more accurate monitoring of gestational processes, including photographic images which enhance public perceptions of the unborn child.

1971

Prenatal psychology commences as a scientific discipline with the Vienna founding of its first professional organization, another group beginning in Toronto a decade after.

1980

Introduction of the portable audiocassette player, the Sony Walkman; parents worldwide begin applying headphones to the maternal abdomen, producing fetal movement and claims for infant benefits.

1980s

Anthony DeCasper, a University of North Carolina psychologist, determines that newborns exhibit preference for speech patterns heard before birth, favoring the maternal voice; at the Eastman School of Music in Rochester, New York, Donald Shetler has pregnant students provide recorded classical music to the womb through adjacent headsets, with their children exhibiting early musical skills.

1981

In The Secret Life of the Unborn Child, Toronto psychiatrist Thomas Verny and co-writer John Kelly compile anecdotes of assorted fetal effects upon later life.

1982

Media reports about Americans Joseph and Jitsuko Susedik stimulated their four daughters before birth and throughout childhood during the prior decade with mixed means, all girls demonstrating giftedness; Brent Logan proposes curricularized

variations of maternal in utero heartbeat sounds as an auditory cirriculum. This initiates comprehensive theoretical research, and he invents the earliest prenatal education technology.

1984

Upon learning from his patients about fetal responsiveness to abdominal touch, California obstetrician Rene Van de Carr develops a stimulation methodology of tactile manipulations paired with words describing these actions.

1986

Brent Logan presents prelearning theory before professional congresses, then inaugurates in utero pilot studies to verify his contention; Rene Van de Carr publishes the first clinical evidence showing neonatal and infant assets from prenatal stimulation.

1987-88

The first babies prenatally experiencing an imprintable sonic progression under Brent Logan's projects are born; he begins a series of related articles in academic journals.

1989-90

Commercialization of fetal enrichment technology was created by Brent Logan commences, and 3000 children were benefited.

1990

Numerous studies link the earliest sonic influences to youth and adult proficiency; Brent Logan designs a second-generation prenatal stimulation product, tradenamed BabyPlus, with extensive donations of units to developing countries, resulting in tens of thousands of children from every socioeconomic background benefited.

2003

The first comprehensive resource on prenatal enrichment was published by Brent Logan's Learning Before Birth: Every Child Deserves Giftedness.

2006

Over 1,00,000 BabyPlus children are born, worldwide; November 11th, Hong Kong proclaimed the worlds first PRENATAL EDUCATION DAY honoring the progressive nature of the BabyPlus Prenatal Education method and the work of Dr. Brent Logan.

1.15. PRENATAL STIMULATION

Today's children are tomorrow's society. By sharing your love with the unborn child you contribute to the foundation of a more peaceful and loving society.

The newest models of neuroscience tell us that sounds, rhythms, and other forms of prenatal stimulation reaching the unborn child are not merely imprinted on the brain but literally act to shape it.

Geniuses are almost made, and not born - that what we believe! However, recent research findings provide us invaluable clues on how parents can make their children smart and intelligent. In fact, to make your child fully equipped with necessary brain skills and techniques, you will need to help him or her with loving life, secure parenting base and strong parental bond. To develop your child's brain and its functions, you will need to ensure that the mental development is "completely brained" by stimulating various areas of brain by using a number of activities and play.

Most parents think that parenting only starts after the baby is born, but current research is proving otherwise. From the moment you learn that you are pregnant, you can start to stimulate and communicate with your baby.

Think of the womb as your child's first world, so whatever he experiences in the womb will shape his expectations of life after birth. This means that the prenatal period (time between conception and birth) is the critical time to establish the basic architecture of the brain and build the foundations for its future potential.

Also, research in the field of prenatal stimulation found that external stimulation such as stroking the unborn baby through the belly, playing soft and melodious music, as well as light and vibrations are pleasurable to the baby.

The idea of stimulating the child prenatally during the different stages through pregnancy is to help in fact encourage cognitive development, not to create a genius.

1.16. YOGIC PRACTICES

Indian tradition, scientific research and clinical experience all point out that yogic practices are probably the most important and effective self-help tools available to man. It appears that the Indian practitioners of psychotherapy, who have been looking for a conceptual framework and a set of procedures which are not alien but intimate to the Indian mind would definitely find an alternative in yoga. The importance of yoga is coming into light in the west in the comparative analysis of different systems by psychologists to find out meaningful answers to some problems of life. The main principle of yoga therapy is that it seems to establish the homeostasis in the organism as a whole. As yet, however, it has not been established exactly how this is accomplished. But when proper investigation along scientific lines has been set up in several places throughout the world, yoga therapy will be properly recognized as a valid form of treatment. The doors of yoga therapy have already been knocked and opened up. Only earnest research and therapeutic pursuits by scientists and clinicians may perfect the ages old yoga and make it more and more refined and suitable to people all over the world.

"Boost your baby's potential,"the first priority being to provide "a stimulating environment for your baby" to control this process of cell death. The rationale here is that "saving" more brain cells is equated with more neural connections and greater child potential. In addition to talking, touching and playing music to the fetus, Transmit to the fetus rhythms based on the maternal heartbeat. If an increased number of neurons (brain cells) and their beginning connections (axons and dendrites) are engaged during their most plastic and receptive developmental stage - the prenatal period - greater strength in the structure will result, much like exercising a muscle. The goal of prenatal stimulation is to withstand the normal process by which at least 50% of all fetal brain cells atrophy before birth. (Logan 2002)

1.16.1. PRANAYAMA TRAINING

Breath is the life force that sustains life. Nobody can survive more than a few minutes without air. When the breath stops, life ends. The Forefathers of yoga developed a special system- 'Pranayama' to increase, develop and control this life force. Normal breathing uses only a fraction of our potential respiratory capacity. Pranayama helps to control this life force in a superior and extra ordinary way to reap maximum benefits.

Basically, yoga depends on eight pillars; one of them is breathing or what is called Pranayama in Sanskrit. Yoga looks at breathing as an art that needs training as yoga teachings emphasize that breathing in the right way is the perfect method to synchronize all the organs of one's body. "Prana" means life force and "anayama" means control. Pranayama means mastering the life force within. When consciously controlled, it has a powerful vitalizing effect on the body, mind and spirit.

Our lifestyle and unhealthy habits cause restriction in our breathing pattern. Poor posture (hunching, slouching) reduces lung capacity. This results in fatigue

caused by the decrease in blood circulation and insufficient supply of oxygen to the blood cells. We need to breathe slowly and deeply. Quick, shallow breathing results in oxygen starvation, which leads to reduced vitality, premature ageing, a poor immune system and fatigue. No one can live for more than a few minutes without breathing, yet how many of us are even aware of the importance of proper breathing. On the physiological level, pranayama was designed by our yogis by watching nature. They noticed how animals, whose breath was slow and steady, like the elephant and tortoise, lived longer. They also noticed that animals that breathed fast and erratically, like hunting lions or dogs, had a short lifespan. Further, they realised mental control could be achieved by reining in the breath as it linked body and mind. One simple illustration: when one exhale after prolonged breath retention, one goes beyond the habit of the mind, the desperation of the body (for a deep breath). One calmly tells one's mind and body to follow one's command. Akthar, (Nov, 2010)

Years of shallow breathing also take their toll on the lungs and roughly one third of the lungs remains unutilized. By following the deep breathing techniques taught in Pranayama, one can utilize all of the lungs to breathe effectively. This helps to energize the body as more oxygen is available to parts of the body that were previously deprived of it. When the supply of oxygen to the body is increased, all the various organs and systems work much more efficiently. This helps to increase the metabolic rate. Thus, the body burns fat more efficiently and digestion is also improved. The increase in flow of oxygen and blood also strengthens the immune system.

Pranayama also helps to connect the body to its battery, the solar plexus, where tremendous potential energy is stored. When tapped through specific techniques this vital energy, or prana, is released for physical, mental and spiritual

rejuvenation. Regular practice removes obstructions, which impede the flow of vital energy. When the cells work in unison, they bring back harmony and health to the system. 20 to 25 minutes (every morning or evening) of pranayama practice increases lung capacity, breathing efficiency, circulation, cardiovascular efficiency, helps to normalize blood pressure, strengthens and tones the nervous system, combats anxiety and depression, improves sleep, digestion and excretory functions, provides massage to the internal organs, stimulates the glands, enhances endocrine functions, normalizes body weight, provides great conditioning for weight loss, improves skin tone and complexion Sugumar and Raghavan, (2010).

Breathing is like any other technique: it needs a lot of training over a long period of time before one can master it. With yoga, the best thing is, one can start anytime and anywhere and within a short period of time you will be able to tell difference. This also explains why it is so beneficial for patients of chronic respiratory disorders like asthma Adkins and Boychuck, (2006).

There are many known benefits to the regular practice of yoga, which would help to minimize many of the problems associated with aging. Regular exercise (asana) can help to maintain muscle strength and tone and bone density, joint flexibility, and improve posture, balance and maintain mobility. Combined with pranayama, regular practice can help to maintain circulatory and respiratory health. Yoga has also been shown to be beneficial in the management of stress, anxiety and depression, aiding in the maintenance of mental health. (Anon 2005).

When one's breathing becomes short and shallow one are creating an oxygen deficit. One may feel light headed, dizzy, anxious and nervous as experienced earlier. This lack of oxygen affects reflex time, hand and eye coordination, visual acuity,

balance, movement and judgment. As stressors build we sometimes slip out of deep abdominal breathing, which only serves to complicate the situation (Patrica 2009).

The versatility of yoga practice makes it an activity in which nearly anyone can participate, including pregnant women. In Western cultures, yoga has become a popular activity to promote health and wellness during pregnancy. Yoga is posited to contribute to prenatal comfort and support for childbirth in several ways. The gentle stretching that occurs during yoga asanas (postures) helps relieve musculoskeletal discomforts of pregnancy and prepares the pelvic and lower extremity muscles for childbearing (Collins, 1998). The breathing and relaxation techniques of yoga promote improved respiratory capacity that alleviates pregnancy-related shortness of breath and enhances breathing during labor (Narendran, Nagarathna, Narendran, Gunasheela, & Nagendra, 2005).

Many of the techniques used in childbirth preparation classes have roots in yoga (Collins, 1998). Yoga practice may contribute to greater self-efficacy during labor (Sun, Hung, Chang, & Kuo, 2009). In addition, yoga may contribute to higher birth weight, lower incidence of preeclampsia, decreased risk for preterm birth, less likelihood of urgent cesarean birth, and reduced risk of fetal demise (Narendran, Nagarathna, Narendran, et al., 2005). Improved maternal comfort in labor and facilitation of labor progress has also been reported (Chuntharapat, Petpichetchian, & Hatthakit, 2008). These findings demonstrate the potential for yoga to favorably impact physical health and birth outcomes.

Pregnancy is an opportune time for suggesting health promotion activities, especially among low-income women who are at highest risk for untoward pregnancy outcomes. Since nurses caring for pregnant women seek to empower them in their care through education and advocacy, and since yoga is a potential benefit to pregnant

women, this study examined changes over time in optimism, power, and well-being during the second and third trimesters in women who practiced yoga.

1.17. AUDITORY TRAINING

The fetal auditory environment is rich and varied, and provides many opportunities for prenatal perceptual learning. The fetus is exposed to sounds from both inside and outside the mother's body. Internal sounds include her voice, breathing, heartbeat, digestion, body movements and footsteps (Lecanuet, 1996). Of these, the voice is most often audible (Fifer & Moon, 1994).

The internal sounds tend to be louder than the external sounds: Richards et al. (1992) found the mother's voice to be about 8 dB louder to the fetus than the voices of her conversational partners.

The fetus is also exposed to patterns of movement that are coupled to sound patterns, such as when the mother walks.

Both internal and external sounds are muffled (low-pass filtered) as they pass through the mother's body and amniotic fluid. Spectral components in the approximate range 100-1000 Hz are attenuated relatively little and may even be slightly amplified, even if their original is external (Richards et al., 1992). When the fetus is exposed to speech, either internally from the mother or from an external source, muffling makes vowels more salient (audible) than consonants and the fundamental frequency contour more salient than spectral information (timbre, phonemes) (cf. Smith et al., 2003) - consistent with the important role of pitch contour in music perception (Dowling & Fujitani, 1971).

In fact, Pregnancy and Childbirth emphasizes how "prenatal parenting" represents the application of recent scientific discoveries: "Traditionally, a baby's birth has been considered the beginning of her emotional and interactive life. Now

modern science makes it clear that a newborn's mental apparatus is not just suddenly 'switched on' at birth: studies show that he has been practicing inside the womb for quite some time" (Hotchner 1997:41-2).

"In the past, women all over the world have sung lullabies to their babies. These were very important because we know the fetus is having first language lessons in the womb. The inflections of the mother tongue are conveyed not only through speech but most importantly through song. The singing voice has a richer frequency range than speech." "What the baby learns in utero are the intonational pattern of sound and the frequencies of a language in his/her particular culture." "When the mother reads out loud, the sound is received by her baby in part via bone conduction. After the sixth month, the fetus moves in rhythm to the mother's speech and that spectrographs of the first cry of an abortus at 28 weeks could be matched with the mother's. The elements of music, namely tonal pitch, timbre, intensity and rhythm, are also elements used in speaking a language. For this reason, music prepares the ear, body and brain to listen to, integrate and produce language sounds."(Dr. Henry Truby, Emeritus Professor of Pediatrics and Linguistics at the University of Miami).

1.17.1 MUSIC

Music is the highest of all sciences. J.S. Bach

Every prenatal child experiences the sonic environment of his or her mother: outside voices, traffic, television, radio, and CDs. The sounds generated by this outside stimuli pass through the abdominal wall, which lowers the volume by about 35 decibels and muffles the sounds. For the baby, it is much like listening to sounds underwater. Even though the baby is exposed to these sounds, they pass by him as white noise because they are too complex and the baby has no frame of reference for them as sounds.

Music has always had an effect on people of all cultures all over the world. Tribes have always used different forms of natural music instruments to display their sadness or their joy.

Listening to music is a pleasurable experience, and certain types of classical music can have a calming effect on a pregnant mother. Since the prenatal baby can sense a mother's mood, the mother's emotional state can have a corresponding calming affect on the baby.

Each one of us also knows what type of music calms or excites us. When the baby is still in the womb, he / she can hear his / her mother's voice. From the voice box the sounds travel through the spinal column to reach the growing baby. When we were seeing our results in many children used the Tomatis Method.

Practicing prenatal music therapist in the Los Angelis area has been a music educator for the past 30 years. "The Importance of Prenatal Sound and Music", (Giselle E. Whitwell, R.M.T.).

Tradition, based on mere assumptions, is contrasted with modern science, based on studies that reveal truths previously hidden and/or unexamined. These truths include "reason to believe that you can make a connection to your baby before he is born: this 'communication' can have important consequences for the baby's development and personality" (Hotchner 1997:42).

Expectant parents are informed of the impact that their nurturance can have on the nature of the expected child and encouraged to begin connecting and communicating with the "baby." The book advises: "Feel free to talk to your unborn baby, play music for her, read her stories, and massage her" (Hotchner 1997:42).

Such advice to connect and communicate with the "unborn baby" as its parents would seem inconceivable in the Ecuadoran highlands, where women describe "the

contents of the womb as ambiguous and uncertain" (Morgan 1997:323) or in the Papua New Guinea village of Gapun, where the "infants are not referred to as human at all" before they are born and referred to instead as "the belly" (Kulick 1992:98). In fact, it is unlikely that any physician of 18th or 19th century Europe or America would have offered such advice. As Duden notes in her history of the unborn: "Man's creation in utero was not conceived as the subsequent evolution of fetal, that is, pre-human form. And certainly women did not imagine a 'fetus' or 'fetal growth' when their bellies were big and when they believed or perceived themselves as 'being with child'" (Duden 1999:13).It also indicates the ways in which children themselves become precious commodities and prized possessions in which time and effort become invested to increase their value (cf., Zelizer 1985). A feature article in a magazine that ran one of the advertisements explained to readers: "The learning starts with the sounds and sensations a baby experiences before he's even born" (Henry 2001:48).

The "discovery" that verbal stimulation can be beneficial for the fetus is presented as based on science, which serves to reinforce the role that science plays in discovery as well as in dictating what is or is not beneficial. For example, it is science, specifically through the invention of imaging techniques such as the ultrasound, which allows us to see – and therefore know – the fetus. In fact, it is through such technologies that "the fetus" emerges from "the unborn" (Duden 1999, Morgan 1997, Petchesky 1987). A feature article on the influence that parents have on their children's linguistic abilities quotes Roberta Michnik Golinkoff, a professor of education at the University of Delaware: "Over the past three decades, we have learned so much about how babies talk that a completely different picture of them has

emerged. Today's infants don't even seem to resemble the babies Dr. Spock described in the 1950's."

1.17.2. GUIDED IMAGERY RELAXATION

Yoga nidra, also known as Yogis sleep is main powerful way to gain the greatest benefits of relaxation and without it actually losing awareness. It is said that one hour of Yoga nidra is equivalent to over 4 hours of sleep. it works so effectively on the mind that it is often called psychic sleep.

Yoga nidra is particularly effective during pregnancy for physical and mental relaxation as well as for childbirth preparation. More importantly, in the early weeks after birth when sleep is of poor quality or broken often, regular Yoga nidra is a miraculous way of resting to restore the body and mind.

Developing intuitive awareness and providing an opportunity for deep relaxation are of great benefit to the pregnant yoga student. Yoga nidra is about the best practice for pregnancy. If a pregnancy only had time to do one thing per day, recommend yoga nidra over all else. It is important that the pregnancy be able to practise this technique at home. Having tapes or compact discs available of various yoga nidra practices will be greatly appreciated by pregnancy. During the visualization stage of yoga nidra, you can instruct the mother through a body rotation of the infant's body parts. This is enjoyed by pregnancy, and should be done on a recording.

These interventions have been implemented in advance of basic understanding of the immediate maternal and fetal effects that such activities generate. Only one report examines contemporaneous effects of an active relaxation protocol (i.e., guided imagery directed by a therapist) on physiological functioning in pregnant women;

findings include reduced maternal heart rate and cortisol in response to the intervention (Teixeira et al., 2005).

The effects of maternal relaxation during pregnancy into the fetal domain: A number of maternal physiological indicators were included to confirm the efficacy of the experimental relaxation manipulation and provide information regarding source mechanisms. These include heart and respiratory rates, measures commonly used in studies to evaluate systemic relaxation responses. Both are influenced by non-neural and neural processes, as well as parasympathetic and sympathetic control. To better isolate sympathetic effects, electrodermal activity was also measured. Skin conductance reflects changes in conductivity of the skin mediated by eccrine glands which are singly innervated by the sympathetic branch of the nervous system (Venables, 1991).

Activity in the hypothalamic– pituitary–adrenal (HPA) axis was assessed via salivary cortisol. In addition, blood flow in the uterine and umbilical vessels was inferred by measuring resistance in these arteries using Doppler technology. Decreased blood flow to the uterus can generate increased placental resistance to umbilical arterial flow and a stress on fetal cardiac function (Trudinger, 1994).

Ascertainment of fetal responsiveness to maternal relaxation was based on fetal heart rate, motor activity, and their interrelation. These measures of fetal functioning are typically referred to as neurobehaviors, develop in predictable ways over the course of gestation, and are widely regarded as indicators of the developing fetal nervous system (Hepper, 1995; James et al., 1995; Maeda et al., 2006; Nijhuis and ten Hof, 1999; Yoshizato et al., 1994). In particular, fetal heart rate variability is a well-known indicator of fetal well being (Parer, 1999), and the degree of coupling between brief acceleratory changes in fetal heart rate in response to motor activity

provides an indicator of integration between neural circuits (Baser et al., 1992; DiPietro et al., 2006).

Induced maternal relaxation was expected to invoke maternal autonomic responses consistent with sympathetic withdrawal and/or parasympathetic activation, indicated by reduced maternal heart rate, slowed respiration, decreased skin conductance, and increased respiratory sinus arrhythmia, as well as transient HPA suppression ascertained through cortisol output, and decreased vascular resistance. Given the lack of available evidence relevant to fetal effects, our hypotheses were based on the converse of observations generated under acute or persistent conditions of maternal stress or arousal. As such, we expected that induced maternal relaxation would generate decreased fetal heart rate, increased fetal heart rate variability and fetal movement–fetal heart rate coupling, and increased fetal motor activity. In addition, we expected that variation in the magnitude of the maternal physiological responses would correspond to the magnitude of the fetal response within maternal–fetal pairs. Women completed the Physiological Tension and Physical Assessment subscales of Relaxation Inventory (Crist, et al., 1989)

1.18. INFANT

Infant-bonding is two-way and reciprocal (Lee, 2006): each party is at some level sensitive to the physical and emotional state of the other. Empirical research is beginning to document the infant's active perception of the mother: compare Stern's (2002) cognitive, psychoanalytic approach with Trevarthen's (1980) concept of intersubjective communication. To successfully monitor the mother's physical and emotional state, the infant must have prior knowledge about the relationship between maternal state and behavior. The fetus has constant access to two reliable sources of information about the physical and emotional state of its mother: behavioural (sound

and movement) and biochemical (blood hormone concentrations). Regarding behavioural information, all patterns of sound and movement that are audible within the body in everyday situations, including vocalization, respiration, circulation, movement, footsteps and digestion, depend on physical and emotional state (Mastropieri and Turkewitz, 2001).

Bonding (secure attachment) between primary caregiver and infant plays an important psychological and physiological role in early development (Schore, 2001). The idea that maternal-infant bonding is an evolutionary adaptation is consistent with high rates of infant mortality among both non-human primate and human hunter-gatherer populations (>50%: Denham, 1974).

Maternal-infant bonding generally increases the chance of infant survival, but not necessarily of surviving infanticide or of preventing abandonment when chances of survival are particularly low (Hausfater, 1984).

Prenatally acquired knowledge about maternal emotional states may promote postnatal bonding and survival by helping the infant to communicate its needs appropriately (cf. Broad et al., 2006) and may in that sense be adaptive. Other factors being equal, the chance that an infant will survive to reproductive age will increase if infant demands on the mother or other carers do not radically exceed their momentary capabilities or resources.

The human fetus has access to three behavioural sources of information about maternal state: sound patterns, linear and rotational acceleration of the fetal body, and relative movement of the fetal limbs. These are perceived by the fetal auditory, vestibular and proprioceptive systems respectively. Regarding biochemical information, the hormones involved in the maternal-fetal interaction arise from three

different sources: the placenta, maternal organs and fetal organs (Power & Schulkin, 2005).

The placenta and fetal membranes produce a large number of steroids that regulate and balance both maternal and fetal physiology. They include progesterone and estrogen, which play a role in maintenance of pregnancy and support of the embryo/fetus (Albrecht et al., 2000); testosterone, which affects fetal development (Matt & MacDonald, 1984); estrogen, related to female secondary sex characteristics (Nelson & Bulun, 2001); corticotropin-releasing hormone, which influences the duration of pregnancy (Hillhouse & Grammatopoulos, 2002); relaxin, which facilitates birth (Klonisch et al., 1999); and placental lactogen (somatomammotropin), which influences nutrient (carbohydrate, lipid) levels in the maternal blood (Walker et al, 1991). In an evolutionary approach, hormonal manipulation of maternal nutrient supply represents an early stage of parent-offspring conflict (Wells, 2003).

Certainly have opinions about the efficacy of fetal stimulation, my goal is not to answer the question "does fetal stimulation really make your child smarter and better adjusted?" but to draw "attention to the fundamental role that knowledges play in rendering aspects of existence thinkable and calculable, and amenable to deliberated and planful initiatives" (Miller & Rose 1992a, 3).

Knowledge and technologies of fetal stimulation construct the fetus in certain ways and in a certain relation to pregnancy, women, families, and broader socio-political relationships, while parts of this knowledge are currently challenged in the broader medical community (Moon and Fifer 2000),

1.19. EARLY EXPERIENCES SHAPE THE BRAIN

Science can inform how we build a strong foundation for a prosperous society. The following set of core developmental concepts emerged from decades of rigorous

research in neuroscience, developmental psychology, and the economics of human capital formation.

In recent years, revolutionary discoveries in neuroscience and developmental psychology have transformed our understanding of infant development. We now know that starting from conception, the infant brain is wired by the environment. Everything that the infant [sic] experiences in his [sic] mother's womb and after birth leaves a permanent imprint on his brain(Verney & Weintraub 2002).

In the endlessly expanding industry of pregnancy advice books, prenatal stimulation is presented as part of a broader programme of nurturing brain development and fetal health more generally. It is contextualized within now-familiar themes of protecting the fetus and its brain from toxins and nutritional deficiencies: don't drink, smoke, or do drugs, take folic acid supplements, and eat your greens. Research, advice and technologies of fetal stimulation represent a shift in the programme: they are not so much about protective measures to ensure a "normal" development of the fetus, rather, they are about enhancing development so that the baby/child is superior to others. Fetal stimulation advocates claim that these children will not only demonstrate improved mental capabilities after birth, but also improved physical coordination, alertness, and attention span; they will be calmer and happier than other babies (Van de Carr & Lehrer 1997, 4).

Different psychologists and psychotherapists in the last decades have been finding cases of adults who spontaneously remember their prenatal lives and births (Chamberlain, 1999e; Cheek, 1986; Janov, 1983).

These memories have been frequently corroborated by hospital records or information provided by the clients' parents. This in itself has challenged the old belief about infantile amnesia and the supposed incapacity of prenates and newborns

to learn and communicate. Later studies have found that toddlers are also capable of remembering specific events of their prenatal lives and births, and that they are able to communicate these explicit memories once they start to talk (Ikegawa, 2002; McCarty, 2004; Piontelli, 2004; Rhodes, 1991).

This study was designed to explore the boundary even further and examine the idea that preverbal children are also capable of having implicit and perhaps even explicit memories of their prenatal lives, something considered impossible in present neurobiology (Siegel, 1999; Siegel & Hartzell, 2003).

1.20. VISUAL RECOGNITION MEMORY

Visual recognition memory is a robust form of memory that is evident from early infancy, shows pronounced developmental change, and is influenced by many of the same factors that affect adult memory; it is surprisingly resistant to decay and interference. Infant visual recognition memory shows (a) modest reliability, (b) good discriminant validity, with performance depressed by numerous peri-natal risk factors, including teratogens and premature birth, (c) good predictive validity, relating to broad cognitive abilities in later childhood, including IQ and language, and (d) significant cross-age continuity, relating to memory in later childhood (through at least 11 years). Infant visual recognition memory is related to, and may be to some extent accounted for by, processing speed, forgetting, and certain aspects of attention (particularly look duration and shift rate). There is growing evidence that infant recognition memory may be an early form of declarative memory that depends on structures in the medial temporal lobe.(Susan A Rose,2003)

Relations between infant visual recognition memory and later cognition have fueled interest in identifying the underlying cognitive components of this important infant ability. The present large-scale study examined three promising factors in this

regard--processing speed, short-term memory capacity, and attention. Two of these factors, attention and processing speed (but, surprisingly, not short-term memory capacity), were related to visual recognition memory: Infants who showed better attention (shorter looks and more shifts) and faster processing had better recognition memory. The contributions of attention and processing speed were independent of one another and were similar at all ages studied--5, 7, and 12 months. Taken together, attention and speed accounted for 6%-9% of the variance in visual recognition memory, leaving a considerable, but not unexpected, portion of the variance unexplained.

1.21. INTERMODAL PERCEPTION

Adults experience the world through the integration of sensory impressions. Infants, to some extent, are capable of coordinating information perceived through different senses. Newborns can detect "arbitrary" auditory-visual relations that are presented during a period of familiarization (a particular shape paired with a particular sound). Most intermodal relations in the world, however, are quite specific rather than arbitrary. An example is speech, which can be simultaneously heard and seen in a talking face. Adults' phoneme perception is strongly influenced by watching faces, the so-called McGurk effect. When adults hear a syllable while looking at a face producing a different syllable, they tend to perceive the sound associated with the lip movements rather than the actual phoneme that they heard. Five-month-old infants are also susceptible to this effect.

1.22. TACTILE PERCEPTION

Tactile perception is the interpretation of information provided by skin sensations. It involves a complex connection from the nerves that supply the skin to the brain, where different areas of the brain correspond to specific sites on the skin.

This information can be critical for spatial awareness, the recognition of threats, and fine motor tasks. Researchers in this field work on experiments to learn more about the brain's role in perception, develop and test hypotheses to explain specific sensory phenomena, and determine what happens when people lose sensation.

The sense of tactile perception starts to develop very early, and matures as infants interact with the world around them. Two areas of the body, the face and hands, are particularly well-supplied with nerves and offer considerable feedback on the surrounding environment to the brain. This is one reason why infants and young children may grab at items of interest to learn more about them. Objects can provide sensations of texture, temperature, and consistency that offer information about what they are and how they work.

Nerves can send a variety of signals about sensation in the environment to help the brain orient the body and interpret its surroundings. Tactile perception can also play a critical role in safety. Specialized nerve endings known as nociceptors are sensitized to pain specifically, and provide warnings about the experience of pain. These signals can fast track to allow the body to move to avoid a threat like a fire or sharp object.

1.23. AUDITORY PERCEPTION

Auditory perception is the ability to perceive and understand sounds, usually with specific organs, such as a human's ears. Sound exists in the form of vibrations that travel through the air or through other substances. Ears detect such vibrations and convert them into nerve impulses, which are then sent to the brain where they can be interpreted. Deafness describes a condition in which individuals have no auditory perception; deaf individuals are not capable of perceiving or interpreting sounds.

Different animals can perceive different sounds; dogs, for example, are capable of perceiving very high-pitched sounds that humans cannot perceive.

There are many factors that affect auditory perception beyond simply hearing sounds. The brain is largely responsible for many processes that can turn a mass of incoming noise into something useful and understandable. Auditory discrimination is the process by which one is able to note the differences between sounds; this is extremely important to language as spoken words are understood based on different sounds. Discrimination between foreground and background is also an important part of auditory discrimination. It is important to be able to focus on important noises and to ignore irrelevant and unimportant noises so that one is not overwhelmed by a vast amount of noise.

1.24. OBJECTIVES OF THE STUDY

1. To find out whether there would be any significant difference in Infant Intermodal Perception, due to Yogic Prenatal Stimulation Practices such as Pranayama practices and Auditory Stimulation Practices.

2. To find out whether there would be any significant difference in Infant Auditory Perception, due to Yogic Prenatal Stimulation Practices such as Pranayama practices and Auditory Stimulation Practices.

3. To find out whether there would be any significant difference in Infant Tactile Perception, due to Yogic Prenatal Stimulation Practices such as Pranayama practices and Auditory Stimulation Practices.

4. To find out whether there would be any significant difference in Infant Visual Recognition memory due to Yogic Prenatal Stimulation Practices such as Pranayama practices and Auditory Stimulation Practices.

1.25. REASONS FOR THE SELECTION OF THE TOPIC

The goal of prenatal stimulation is to increase the number of brain cells the child has at birth. It is estimated that 75 to 90 percent of all brain cells a child forms during these prenatal months do not survive through birth. Prenatal stimulation results in the child being born with strengthened mental architecture, similar to the additional strength created by regularly exercising a muscle.

As progress has been made in understanding the abilities of the Infant, the question of when newborn abilities begin has been raised. It is logically possible, although unlikely, that at the moment of birth the behavioural, sensory, and learning abilities of the newborn are suddenly switched on. More plausible is that these abilities have their origins in the prenatal period, implying a continuity of development across the birth period. The reason for choosing prenatal stimulation in infant as my research topic relates to my passion for working with very young children, as well as my desire to fill in the gap in research about prenatal abilities in infant.

1.26. REASONS FOR THE SELECTION OF VARIABLES

For this reason, the main research question for my study will be: Do Infants (preverbal children) have Cognitive abilities and/or social development of prenatal experiences that they express through their behaviour Infant Visual Recognition memory, Auditory Perception, Tactile Perception and Intermodal Perception.

1.27. STATEMENT OF THE PROBLEM

The purpose of the study was to find out the effect of selected yogic pre and postnatal stimulation practices on perception of speech, sound, behaviour and development among the infants.

1.28. DELIMITATIONS:

The following delimitations were taken into consideration in the interpretation of results:

1. This study was delimited to forty five healthy pregnant women with the gestation period between 32 and 42 weeks in the area of Chidambaram, Cuddalore District, Tamilnadu, India.

2. T The age of the mother were ranged from 20 to 35 years.

3. They were divided in to three equal groups of fifteen women each namely pranayama practices group, auditory stimulation practices group and control group.

4. The pranayama practices group underwent Nadi suddhi pranayama and Naada Anusandhaana pranayama twice a day for seven days a week upto delivery. For auditory simulation practices group, the music and guided imagery relaxation have been used. The music was presented over a 12.5-cm speaker positioned 20 cm above the mother's abdomen as prenatal stimulation for two sessions per day for seven days a week upto their delivery. And Group III acted as control group in which they did not undergo any special training programme rather than their routine work.

5. After delivery, the infants of the selected healthy pregnant women were selected as subjects and they were assigned with the same group as their mother belongs to.

6. The pranayama practices and auditory stimulation practices were selected as independent variables. The following perception of speech, sound, behavior and developmental variables namely Intermodal Perception, Auditory Perception, Visual Recognition memory and Tactile Perception were selected as dependent variables.

7. The selected criterion variables were tested by using habituation–dishabituation paradigm introduced by Fantz.

8. The data were collected on Auditory Perception, Visual Recognition memory and Tactile Perception with the selected infants at the end of

4^{th}, 5^{th} and 6^{th} month. The data on Intermodal Perception of the selected infants was collected at the end of 10^{th}, 11^{th} and 12^{th} month.

9. The data collected from the three groups at the end of 4^{th} month and at the end of 6^{th} month on Auditory Perception, Visual Recognition memory, Tactile Perception and at the end of 10^{th} month and at the end of 12^{th} month on Intermodal Perception.

1.29. LIMITATIONS

1. The ways of treatment/medication, underwent by the pregnancy only were considered as limitation.

2. External factors like diet, habits, life styles, body structure, socioeconomic status, motivation and other environmental conditions were not taken into consideration.

3. The growth and development of the subjects if any, during the experimental period and possible influence on the criterion variables, which could not be controlled, were considered as limitation.

4. Though the subjects were motivated verbally, no attempt was made to differentiate the motivational level during the period of training and testing.

1.30. HYPOTHESES

The following hypotheses were set for the present study:

1 It was hypothesised that the effects of pranayama and auditory training on Infant Visual Recognition memory, Auditory Perception, Tactile Perception and Intermodal Perception will significantly increase when compared with the control group.

2 The auditory training group will be superior to pranayama group on Infant Visual Recognition memory, Auditory Perception, Tactile Perception and Intermodal Perception during the training period.

3 It was hypothesised that the training effects of 4th month test to 5th month test will be superior 5th month test to 6th month test during the testing period on Infant Visual Recognition memory, Auditory Perception and Tactile Perception.

4 It was hypothesised that the training effects of 10th month test to 11th month test will be superior 11th month test to 12th month test during the testing period on intermodal perception.

1.31. SIGNIFICANCE OF THE STUDY

1. To find out the exact prenatal stimulation for cognitive ability by comparing Pranayama practices as well as Auditory Stimulation practices.

2. To explain the Infant Visual Recognition memory, Auditory Perception, Tactile Perception and Intermodal Perception.

3. To create awareness among the pregnancy in the society about the values of the Pranayama practices as well as Auditory Stimulation practices.

4. This study may be helpful to the future research scholars to select new problems related to the topic.

1.32. OPERATIONAL DEFINITIONS OF TERMS

1.32.1. Yoga

Yoga as "Chitta vritti nirodhah"

– Patanjali's Yoga Sutra/I.2

1.32.2. Pranayama

"Tasminsati svasaprasvasayorgativichchhdah pranayamah"

- Patanjali's Yoga Sutra/II.46.

(The asana having been done, pranayama is the cessation of the movement of inhalation and exhalation).

1.32.3. Auditory stimulation

Auditory stimulation that combines music and language is central to the theory behind Suggestopedia, a language teaching method.

- Bulgarian psychologist Georgi Lozanov.

1.32.4. Music

The science and the art of tones, or musical sounds, i. e., sounds of higher or lower pitch, begotten of uniform and synchronous vibrations, as of a string at various degrees of tension; the science of harmonical tones which treats of the principles of harmony, or the properties, dependences, and relations of tones to each other; the art of combining tones in a manner to please the ear.

1.32.5. Guided Imagery

Imagery is "the mental invention or recreation of an experience that in at least some respects resembles the experience of actually perceiving an object or event"

-Finke,

1.32.6. Intermodal Perception

Speaking faces, baking bread, speeding cars—the world provides a richly structured, continuously changing stream of stimulation to all of our senses.

-Bahrick .L.E

1.32.7. Auditory perception

Auditory perception refers to how the brain interprets what we hear. This may include speech sounds as well as environmental sounds.

-Dorothy Kellyz

1.32.8. Visual recognition memory

Visual recognition memory is a robust form of memory that is evident from early infancy.

-Susan A Rose

1.32.9. Tactile Perception

The human finger is exquisitely sensitive in perceiving different materials, but the question remains as to what length scales are capable of being distinguished in active touch. *-Lisa Skedung*

1.32.10. Prenatal

The prenatal period, beginning at conception and ending at birth, is divided into three stages: the conceptual or germinal period, the embryonic period, and the fetal period.

- Moore & Persuad,

1.32.11. Infant

Infant or infants are human children at the youngest stage of life. The word stems from the Latin word meaning "cannot speak".

- Merriam Webster's Online Dictionary.