

# Educating Parents to Educate Their Children

– Invited Paper –

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**Abstract:** This presentation focuses on educating parents and professionals to achieve an effective understanding of pre and post natal environmental enrichment methods and of the principles involved. As to such questions as: Are there any direct measurable fetal effects of prenatal stimulation? Does prenatal stimulation shift the developmental time table, including tooth development, toward earlier onset of capability? Are there other things that can be done during pregnancy to enhance the fetus such as musical stimulation, electronic cardiac rhythm and diet? The answer to all these questions is “yes!”

The author describes how prenatal and postnatal stimulation fits in the big picture of Pre & Perinatal Psychology. He focuses on the problems of Prenatal Stimulation, and also discusses his own and Dr. Kristin Van De Carr’s research and replication of the work of others. He refers to other related research in the field of pre and perinatal psychology. He begins by describing the stimulation techniques that he has been recommending as safe and effective since 1979. Prenatal University has over 3000 graduates.

**Zusammenfassung:** *Anleitung der Eltern zur Kindererziehung.* Diese Arbeit stellt die Ausbildung von Eltern und Professionellen zu einem besseren Verstehen von prä- und perinatalen Fördermaßnahmen und deren Grundlagen in den Vordergrund. Es geht um solche Fragen wie: Gibt es direkt meßbare Auswirkungen pränataler Stimulation auf das ungeborene Kind? Verschiebt pränatale Stimulation den Entwicklungszeitplan, einschließlich der Zahnentwicklung, zu einem früheren Reifezeitpunkt? Gibt es noch andere Verhal-

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tensweisen während der Schwangerschaft zur Förderung des Ungeborenen wie z. B. über akustische Reize, Herztöne und die Ernährung? Die Antwort auf all diese Fragen ist „ja“!

Der Autor beschreibt, wie vor- und nachgeburtliche Stimulationen im Gedankengebäude der prä- und perinatale Psychologie ihren Platz haben. Er geht auf Probleme der pränatalen Stimulation ein, erläutert seine eigenen und Dr. Kristin Van De Carrs Forschungsarbeiten und gibt Antworten auf die Arbeiten anderer. Er nimmt Bezug auf benachbarte Forschungsbereiche zur prä- und perinatalen Psychologie. Hier fängt er mit der Beschreibung von Stimulationsverfahren an, die sich seit dem Jahre 1979 als verlässlich und wirksam erwiesen haben. Seine „Pränatale Hochschule“ haben über 3000 Teilnehmer durchlaufen.

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## Introduction

Early in 1970 during my obstetric practice I had begun to consider how mothers could make better contact with their babies before birth. My interest was prompted by birth experiences which alerted me to different levels of consciousness in babies at birth. At the time, to be sure, as a matter of course, many mothers were receiving large amounts of anesthetics or medications. The relatively few mothers who used little or no anesthetics were therefore of interest to me. When I observed their babies they appeared to be more alert and more “person like”.

In 1979, I was introduced to prenatal stimulation by one of my patients. A mother, about eight months pregnant at the time, came to me for obstetrical care and confided to me, “My husband and I have been doing something during the last month that we really enjoy and we want to tell you about it.

Every day when my husband comes home from work we lie down together and spend a few minutes playing with the baby inside me. Baby’s foot kicks my belly and than I pat right where I feel the kick. It is now getting to the point where my husband is able to see and feel places where baby is kicking. We have a lot of fun playing this game with baby.”

Because these parents seemed so “radiant and excited” about their baby, I wanted to share this with my other patients and immediately wrote my first prenatal stimulation manual with my wife, Kristin. This instruction manual suggested enhancing of the fetal neural system by increasing sensory input. The program consisted of pairing mother or father voice and hand stimuli together; for instance, repeatedly saying “pat, pat, pat, rub, rub, rub” while the hand was respectively patting and rubbing the baby’s back through mother’s abdomen.

Another set of exercises for vestibular (middle ear) stimulation was developed which combined words such as “shake”, “sway”, “drop” with appropriate movement being simultaneously imparted to the fetus. We also outlined words presented in the prenatal period and connected with sensations and objects presented in the postnatal period.

Our prenatal program was designed to: one, enable the mother and father to follow a stylized tactile-vestibular verbal system of exercises in relating to the fetus so that through the habit and pattern the parents will continue to relate to the baby in this way after birth; and two, enable the fetus to be more interactive with the surroundings and therefore enable the fetus to receive added environmental

feedback during pregnancy and early development. As our experience grew, additional forms of prenatal stimulation, audio and video tapes were developed and the Prenatal University was founded.

### **The Big Picture**

In the usual course of events one envisions about eighty-five billion nerve cells each sending out tens of thousands of connector fibers to make up 1,000 trillion contact points between the cells. This is more than is needed. So beginning at the seventh month of pregnancy new neuron growth is stopped and cell death occurs in 50% of neurons before birth. This is why we are so interested in providing enrichment stimuli in the fifth month (20th week) of pregnancy and add complexity and diversity to our stimulation at seven months. 40% of remaining neurons are trimmed away between birth and twenty-one months. This is why we want to continue our very active stimulation efforts till the age of three. It is at age three that the brain's size is 80% its adult weight and is three times what it was at birth. And, myelin (insulating brain fat) reaches adult levels by age two. Positron emission topography brain activity at age three is twice as high as in adults. In practical terms, Dr. Wayne Dennis found that sensorially deprived children in an institution were mentally retarded, but if they were adopted before the age of two they would reach normal intellectual function. After age two they remained retarded. We must keep in mind that brain growth and streamlining doesn't stop at three but goes on actively till age 15 and mental stimulation has positive benefits throughout life. However, I feel that the biggest return per dollar or time invested occurs when the "baby student" receives adequate stimulation training between five months gestation and three years of age.

### **Intrauterine Class Room**

The womb is not a quiet place. There is the steady pounding of mama's heart. There is twice as fast beat of the baby's heart. There is the placental soufflé of blood transfer through the placenta; the mother's bowel sounds; the mother's voice transmitting through the diaphragm; plus outside sounds coming through the abdominal wall. Uterine noise is 95 decibels with the mother's pulse. Attenuation of external sound in 14 decibels at 20 cycles frequency and about 60 decibels attenuation of three thousand cycles. Voice sounds and music inside the uterus are like listening to a stereo with the treble turned all the way down and the base all the way up. The qualities of pitch, dynamics, timing and timber of music or voice are all heard above the basic uterine background noise.

### **Medical Limitations**

We have always urged our pregnant mothers to check with their health care provider before beginning stimulation in pregnancy; such conditions as severe gestation diabetes or placenta previa could be adversely affected by abdominal manipulation.

## General Research

There are three critically important concepts that from the outset have been the foundation of our work. I will come back to these points several times as these are the most important things that you can retain from this paper.

The first is that developmental windows for specific types of cognitive function and ability will open and close at various times in an individual's early life. And, if stimulation is inadequate or reduced during this time than that specific function or ability may be reduced or absent.

The second is that the neural growth responsible for what we call intelligence is greatly dependent on experiential input or stimulation.

The third is that the most propitious time for stimulation intervention is between the fourth month of gestation to three years of age.

Over the last 15 years there has been a dramatic increase of our knowledge in the field of pre and perinatal psychology. The profound effects that prebirth, birth and early life experiences can have on an individual's lifelong behavior have been studied by Fedor-Freybergh, Verny, Chamberlain, Emerson, Janus, Laing, Grof, Kafkalides, the Turners, Lake, Noble and numerous others. These early events shape and form how we will process data the rest of our lives; much as the "read only" memory instructs the processing of data entered into a computer. As an example, Dr. Bertl Jacobson, a physician and mathematician studied over 10,000 births and found that where the mother received morphine in labor, the baby when it grew up, was at over nine times greater risk of becoming a drug user.

Looking at some underlying scientific principles, we teach parents that the human brain develops from genetic potential manifested in the formation of major regions or pathways, but that evidence now shows that experiential input produces neural growth beyond major pathways, and that prenatal stimulation effects other systems as well as neural growth. Edelman suggests that utilized pathways will survive while unutilized neural pathways will tend to atrophy or become non-functional.

These complex neurophysiological processes are now beginning to be understood and we are becoming aware of how external sensory stimulation can influence the anatomy and function of higher level nerve tissues. Examples of these processes are found in the research of Hubel and Weisel who have demonstrated permanent loss of neural capability based on cellular depletion after unilateral visual stimulus deprivation in cats. These changes were produced from the second to the fourth months post partum indicating a developmental window for the optic system in cats. Additional research by Aoki and Siekevitz illustrates a cytochemical reaction for neural facilitation, whereby sensory stimuli produce dephosphorylation of a substance called microtubule associated with protein 2 (map 2). Without external stimulation this protein becomes phosphorylated and prevents formation of neural microtubules and the interaction of micro and neural filaments. Llinas demonstrates the influence of sensory stimulation on electrical pulses needed for the formation of neural networks and early brain development. Glial cells, especially astrocytes, tend to be found in areas of higher neural pathway utilization. These cells especially have been shown to contain neurotransmitter receptors that metabolize gamma amino butyric acid (GABA). Thus it appears that the histochemical and neurophysiological mechanisms involved in brain growth

due to sensory input are becoming increasingly better understood. The anatomy and physiology of higher level neural tissues is responsive to experiential input at specific times during its development: if sufficient appropriate stimulation is not supplied during that time that the developmental window is open than the individual may have permanent reduced capacity in this area. At the same time, brain plasticity in the young is very forgiving and function can be switched from inactive to active areas. For instance in dyslexia, an area normally functioning to integrate visual input with phonemes is not active, and a less efficient area for integrating sound and vision is utilized.

There also may be a developmental window for the ability to know and express affection based on tactile and vestibular stimulation. Research by Prescott suggests that reducing deprivation in tactile and vestibular sensory deprivation by more touching, shaking and holding decreases later child abuse by the individual, and increases ability for sexual fulfillment and mated relationship. The role of vestibular stimuli in the development of the ability to behave affectionately now seems to be dependent upon these stimuli being provided within an hour of birth before the developmental window for affection closes.

Usually, at some point, parents are feeling badly about their own brain development. I explain that even though massive amounts of brain growth stops about age three, synaptic proliferation and plasticity continue in diminishing amounts even into old age and can be stimulated by thought, play and mental exercise. These considerations make up a new field of cognitive neuro science.

### **South American Prenatal Study Changes Society**

Understanding these principles enables us to change the destiny of the individual and eventually the destiny of our society. Well, you may ask, how can a prenatal stimulation program effect a society. An article published by Dr. Beatrice Manrichy of Carracquez, Venezuela shows us how. I first had contact with Dr. Manrichy in the early 1980s. I told her about prenatal stimulation and suggested that it might improve her post birth enrichment program. She put together a government funded research group of over 600 mothers whom she followed for seven years. She demonstrated marked improvement of socio-effective behavior in her experimental group. This group showed an increasingly widening gap in scores on the Weise and Stanford Bennet Intelligence Test as well with emotional intelligence evaluation.

In 1997, a meeting of the American Association for the Advancement of Science presented studies of Dr. Craig Camey at the University of Alabama showing that early post birth stimulation produced up to 30% increase in intelligence scores. Similar results were previously obtained by Dr. Ruth Gross in a multi-center study of 916 stimulated babies showing a 13.7 point increase in group intelligence on the Stanford Bennet.

### **The Prebirth Stimulation Program**

We explain how external sensory input stimulation can control the anatomy and function of the higher level nerve tissues, and stress the “use it or loss it” principle.

Therefore, I want to emphasise again that there are windows of opportunity for neural stimulation that open and close during development. As just mentioned, even a window for the ability to give and receive affection must have adequate tactile and vestibular stimulation before it closes within an hour of birth. We want to enrich all of the fetal/infant interactive environment. The most important and the earliest applied element of that environment is the baby's mother. The frequency, length, speed, manner and complexity of those interactions with the mother can profoundly effect neural growth and capability. Traditionally, first born children tend to perform better as adults than subsequent siblings because quality of that interactive relationship deteriorates as mother becomes more burdened with other children. This explains why babies under three years of age sent to daycare centers show decreased intelligence if the number of babies per care giver is too high. Here, I would like to site an analogy used for parent trainers. The baby's brain is like a computer that grows every time you turn it on. And, the growth is directly related to the number of bytes of information or activity effectively transferred to or from the fetus/infant and the environment.

Our program is a developmental enhancement program. It is for the fetus (or preborn), for the newborn baby and for her or his parents as well. Mothers, fathers and siblings and anybody in the household can participate. Our goal is to promote a beneficial evolution of the maternal bonding process and to provide father with a place of importance and promote his interaction with baby as an individual beginning at the fifth month of pregnancy. In fact, by the time mother is in labor, dad is comfortable about touching and reassuring baby between contractions during labor. There are many ways to do prenatal stimulation with baby.

Our desire in Prenatal Stimulation is to first get the preborn's attention, get them in the habit of being aware of outside stimuli, and provide them with consistent patterns of stimuli. We communicate with baby using verbal language; music, which is a language of mathematical relationships; tactile sign language (touch); and vibratory and kinesthetic language of affection. After birth, a mother uses language when she comforts her baby by gently jiggling it and while patting its back. We can use visual language using external light through the abdominal wall in the last month of pregnancy. We tie these languages together moving from simple to more complex patterns as pregnancy advances. Other means by which we can communicate with the preborn are biophysical language using a small drum placed on the abdomen to reproduce the heartbeat vibration of maternal or fetal heart, or variations of them in the fourth month of pregnancy. Biochemical language is occurring when the mother feels excited and happy that the preborn is responding to her touch and neurotransmitters associated with the pleasure are released into the maternal bloodstream. The message to the baby is, "When I interact with the world I feel pleasure!" Similarly, if mother eats a very sweet or sour substance, the taste is transmitted to baby. We can use extra sensory communication with baby. For instance, thinking thought clusters like:

"I am going to RUB – TOUCH – LOVE YOU!" just before touching the preborn.

**Parent Education**

Although teaching the mechanics of effective prenatal and infant stimulation is important, in a practical sense, it is more complicated than one would expect. There are problems in overcoming prejudices or “common knowledge” about the baby. Such questions as, Does baby hear me talk? Does baby think?, reflect the classic lack of knowledge of fetal capability. Most parents, even some childhood development experts carry with them prejudices about the preborn baby’s or infant’s capability for education. The most critical thing I have found in the re-education of parents is to have them understand where prenatal education (stimulation) fits into and effects the general scheme of human neural development. It is essential that they understand that from the second trimester of pregnancy to the age of three, we are using stimulation education with the intent of producing capability to learn not knowledge. With this approach whether an individual remembers what they learned before the age of three is unimportant and concerns about forced learning and negative effects about “task failure” are minimized.

Here I would like to diverge to tell a story about my seventh child, a boy, who was prenatally and postnatally stimulated. Shortly after he had turned two years old, we were sitting on the floor together and I was holding up his alphabet blocks and having him say the letters. He kept missing the letter “R”. As he became aware of my increasing frustration, he reached up taking the block from my hand and said, “Letters are important daddy, but not that important. Lets do something else now!” This is an example of the student reminding the teacher that the parent/child relationship is what is important.

Since the mother as well as the father are so necessary in providing stimuli, our task is to direct the way they respond to their preborn and to help them form good interactive habits. First, we must facilitate mother and father acceptance of the fetus as a family member before birth. (Note: This is what Peter Fedor-Freybergh has described as the mother/father/baby dialogue.) At the Prenatal University, we maintain that this process has a tremendous potential for reducing complications during pregnancy, and for reducing stresses upon the family system during and after pregnancy. Many parents of prenatally stimulated babies have told us that giving their full attention to the preborn baby during stimulation exercise, even for two minutes or less, taught them an important lesson: i.e. that these sessions prepared them for and helped them feel good about responding to their baby’s needs after the birth. In our educational program mothers are taught during pregnancy to assess the baby’s alertness status and fetal position and learn to become familiar the their preborn’s sleeping and waking cycles. They are asked to be aware of special fetal movements like rolling or arching and this becomes their foundation for utilizing “baby signs” and pantomime for communication before development of infant verbal skills. We encourage working mothers if they feel a substantial kick to respond; to stop what they are doing for a moment and respond with verbal and tactile response and then to return to the work task. If the pregnant mother anticipates a loud noise, like a car door slamming, we foster the habit of warning the preborn with a word such as “loud” or “noise”. This is training the parents to be in the habit of interacting and giving their baby feedback about the environment. We encourage the expectation that their baby will want to respond to them and will be a successful learner.

An elementary school study showed that student performance was a function of teacher's expectations. Anything we can do to increase the effectiveness of the mother/fetus or mother/infant environment, we believe, will increase the baby's intelligence and capability. When we make the baby more real and important, for example, by having mother go for prenatal visits, the research shows that we get improvement in intelligence scores. If mother breast feeds there is score improvement.

### **Is there Lasting Benefit from Prenatal Stimulation?**

Can this kind of suggestive program during pregnancy make any lasting difference in the mother/father/child relationship? A pediatrician working with welfare patients with our prenatal stimulation and non-stimulation groups noted that the stimulation mothers, when compared to the non-stimulation mothers, tended to stand closer to their babies, neither hovering nor standing across the room, but in a touch distance stance near their babies. They are allowing space for their babies to experience the exam but close enough to provide reassurance, making the pediatric exam a safe and in itself an inherently stimulating experience.

In a two year follow up study, mothers from prenatal groups were asked to describe their babies. Mothers involved in prenatal stimulation wrote two and a half ( $2\frac{1}{2}$ ) times more information than mothers in the control group. Please remember that much of our research was done on an economically deprived population. When testing was done by my wife Kristin in 1986 using Broussard's Neonatal Perception Inventory, mothers using fetal stimulation had a significantly more positive perception of their babies. Validity of this test as a predictor has been established for assessing the risk of child abuse and mental illness in children.

### **Summary**

In conclusion, the important points I would like you to remember are: There is a time from the second trimester of pregnancy to three years of age when massive synaptic proliferation is occurring within the human brain. Brain growth can be enhanced by effective fetal/infant environmental interaction. The attitude, responsiveness and stimulating effectiveness of the mother and father can be positively and permanently modified by education during the prenatal period.

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