The Sentient Prenate: What Every Parent Should Know

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Full Text: Headnote ABSTRACT: In the 1980's parents were first introduced in large numbers to the sensitive, perceptive, conscious, and perhaps even cognitive prenate. This paper summarizes the major evidence, including recent research findings, demonstrating that prenates are 1) sensitive and aware, 2) learn and dream, and 3) are social and communicative. Well-designed research programs in prenatal enrichment confirm the intelligence and receptivity of these babies. A closing section describes the special resources now available to parents to enhance prenatal bonding and communication. It was not until the decade of the 1980's that parents in large numbers were first introduced to the idea that their babies, while still developing in the womb, could be sensitive, perceptive, conscious, perhaps even cognitive beings. Leading the way was Thomas Verny's The secret Life of the Unborn Child (1981) presenting a fundamentally new portrait of the baby in the womb - a baby active, curious, and emotional. These facts had profound implications for the healthy development of persons and the early commencement of parental responsibility. Enjoying multiple editions and translations, The secret spread to many countries in Europe, Asia, and South America. Additional revelations about the mind of the baby came by way of Babies Remember Birth (Chamberlain, 1988), which presented the baby as a fully sentient, gifted communicator, keenly alert, and capable of surprising feats of learning and memory. Both books, although breaking with traditional ideas, represented a scientific approach to the study of prenatal and perinatal life and asserted the legitimacy of the full range of empirical data: anecdotal, clinical, and experimental. Verny's book led to the formation of what is now the Association for Pre- and Perinatal Psychology and Health and to a series of biennial International Congresses which helped to establish pre- and perinatal psychology as a new field of study. During the same decade, representing more intuitive and spiritual sources of knowledge, the work of educator Omraam Mikhael Aivanhov was inspiring the formation of national associations for prenatal education, the first one in France, established by Andre Bertin, followed by similar national associations in Greece, Belgium, Portugal, Italy, Norway, and Russia. Aivanhov"s vision of the importance of parents and their critical influence - for better or for worse - during the prenatal period was contained in the book Education Begins Before Birth (English translation 1982). In lectures going back to 1938, Aivanhov had emphasized the potency of a mother's thoughts, habits, and emotions to effect qualitative changes in the unborn child which would have life-long consequences. These revolutionary ideas, not uncommon outside of Western culture (especially widespread in ancient China and experiencing a revival there today), are in harmony with contemporary insights about the practicality of preventive over reconstructive measures and the fundamental importance of paternal and maternal nurturance to the creation of a truly healthy individual and a truly safe society. In his "Plan for the Future of Mankind" Aivanhov wrote, prophetically: "Instead of leaving the State to spend billions on hospitals, prisons, law courts and reform schools, I advise it to concentrate all its attention on its pregnant mothers. The cost would be far less and the results infinitely superior" (Aivanhov, 1982, p. 38). These groundbreaking scientific, intuitive, and educational efforts of the 1980's to awaken parents to the prime importance of life before birth are fully supported by a constantly increasing volume of research findings (Laughlin, 1989). Animal studies reveal both the advantage of prenatal enrichment and the disastrous effects of stress during pregnancy (Diamond, 1989; Insel, Kinsky, Mann &Bridges, 1990; Schneider &Coe, 1993) while human studies constantly remind us that the prenate is busily interacting with and being affected by the fetal environment (Ward, 1991; Nijhuis, 1992; Roe &Drivas, 1993; Thoman, 1993). Especially impressive are the growing list of studies that demonstrate prenatal learning and memory for stories, music, voices, specific words

and sentences, and particular languages (Thoman &Ingersoll, 1993; Busnel, Granier-Deferre &Lecanuet, 1992; Hepper, 1991). As we acknowledge these important findings and speed their journey across the world, I hope that we will soon break free from the 19th century view of babies which prevails in psychology and medicine at the end of the 20th Century (Chamberlain, 1992b). The 19th century view - still the majority view - holds that a fetus is not yet equipped with working senses, cannot genuinely feel or care about what happens, and has a brain too poor to learn, remember, or make sense of any experiences. If these things were true, we need not concern ourselves about life before birth: in the first nine months motherhood would be only a biological exercise and fatherhood wouldn't begin until later. Technically, this paradigm is obsolete, thoroughly discredited by a quarter century of scientific research, yet in the real world of hospitals, obstetricians, and parents, old ideas still continue to hurt most of the ninety (90) million babies born world-wide every year. As long as parents and professionals continue to believe that babies are deaf, dumb, blind and mindless, babies will continue to be mistreated and the world will be robbed of the priceless opportunities afforded by each conception, each pregnancy, and each birth. We must be thankful for the swelling tide of research over the last two decades gradually (and tentatively) revealing the truth about babies, their innate capabilities, their humanity, and their intelligence before birth (Tronick &Adamson, 1980; Klaus &Klaus, 1985; Chamberlain, 1992a; Hepper, 1992a). Drawing from this new cornucopia of knowledge about babies, we have much to share with couples who want to be parents. In this paper I summarize the major findings under four headings. 1. BABIES ARE SENSITIVE, AWARE First, we must warn parents that babies are sensitive and aware; they have definite preferences which they show by their spontaneous actions; when they are hurt, they feel pain; when they are threatened, they react in self-defense. As we have known for some time now, tactile sensitivity begins as early as the 7th week of gestation when babies first react to the stroke of a hair on the cheek (Humphrey, 1978). Skin sensitivity expands steadily to include most parts of the body by 17 weeks and all parts by 32 weeks. Probably the first emotional reactions are seen in squinting and scowling around 12 weeks and in a sneering look of dissatisfaction at 14 weeks. By 14 weeks, the tasting mechanisms are in place and sucking and swallowing can be seen via ultrasound (Mistretta &Bradley, 1975; Cowart, 1981). The fetus controls the frequency of swallowing amniotic fluid and will speed up or slow down swallowing in reaction to sweet or bitter tastes (DeSnoo, 1937; Tatzer et al., 1985). By latest calculations, faculties of listening begin with the skin, which is a multisensory receptor organ integrating input from mechanoreceptors, thermo receptors, and pain receptors (nocireceptors). This early form of hearing is linked with the vestibular system which is sensitive to gravity and space, and with the cochlear system as it forms (Tomatis, 1991; Blum et al., 1993). The fetal listening system which connects parents and babies begins to function by 16 weeks gestational age (Shahidullah &Hepper, 1992), even before the ear is completed. The vestibular system must be well advanced by 10 weeks in order to support the vigorous program of exercise which can first be seen at this time via ultrasound (Tajani &Ianniruberto, 1990). All parts of the fetal body are seen in smooth and spontaneous motion: rolling, turning the head on the neck, waving arms, kicking legs, flexing back, neck, and feet, etc. This constant movement, interrupted by brief rest periods, is a vehicle for self-expression until birth (Van Dongen &Goudie, 1980; Roberts et al., 1980). At 15 weeks you can observe nearly all the movements of the full-term fetus. Long before mothers can actually sense any of these movements (1622 weeks), their alert babies are reaching and grasping the umbilical cord with their fingers, finding their feet and toes and sucking on them, stretching, scratching, yawning, and rubbing their hands and their feet (Piontelli, 1987). By 26 weeks the baby can do an elegant longitudinal spinal roll (Liley, 1972). Are these acrobatic moves fun? Vision also develops before birth. Although the eyelids remain fused from week 10-26, the fetus is aware of light and will react to lights flashed on the mother's abdomen (Peleg &Goldman, 1980). At birth, vision is well-advanced and adequate for intimate distances, though it is not yet perfect by adult standards (Salapatek &Cohen, 1987). At birth, another sense is added, a fully developed sense of smell. Newborns use their sense of smell immediately to distinguish their own mother from other mothers by breast odors, underarm odors, and by her perfumes (MacFarlane, 1975; Schleidt &Gensel, 1990; Porter, 1991).

Babies feel pain, although ancient and scientific prejudices have kept us from recognizing this. Thorough investigation confirms that some of the anatomical pathways and mechanisms for pain perception are present in the fetus by the 7th week, as previously noted (Humphrey, 1978; Anand &Hickey, 1987). A neurochemical component of pain, substance P, is found in the brain and spinal column as early as 12 weeks. Audible crying, the outward expression of pain, has been recorded by 21 weeks in cases of therapeutic abortion. In the medical literature one can also find over 140 cases of vagitus uterinus (literally, "squalling in the womb") associated mainly with obstetrical manipulations before birth (Freed, 1927; Ryder, 1943; Thiery et al., 1973). The fact that 20% of these squalling fetuses died testifies to the depth of pain and danger these babies were trying to express. Alertness to danger and maneuvers of self-defense are illustrated by fetuses' reactions to amniocentesis, usually done between 9 and 16 weeks g.a. Reactions include increase in heart rate, loss of beatto-beat variations in heart beat four minutes after puncture for two minutes, remaining motionless for two minutes, breathing significantly slower for two days, and failure to normalize their breathing rate for four days. (Ron &Polishuk, 1976; Manning, Platt &Lemay, 1977; Hill, Platt &Manning, 1979; Neldam &Pedersen, 1980). While being viewed via ultrasound, a 24 week fetus who was accidently hit by a needle, twisted his body away, located the needle with its arm, and repeatedly struck the needle barrel (Birnholz, Stephens &Faria, 1978)! Similarly, in the midst of fetal surgery, an obstetrician reported that when he had a blood vessel all lined up and was ready to strike, a hand came out of nowhere and knocked the needle away (Baker, 1978). Ironically, increasing pain for babies at birth is a legacy of modern hospital birth (Chamberlain, 1989). Obstetricians have made pain routine through invasive scalp monitoring, frigid temperatures, needle injections, heel lancing, bright lights, suspending babies by the heels, rough skin cleaning, stringent eye medications, and the discomfort of various clinical ratings (for example, provoking a cry in order to get a full Apgar score), tests, and measurements. Nowhere is pain more routine or severe than in neonatal intensive care units, where the weakest and sickest babies are treated. Here, pain is a way of life (Gottfried &Gaiter; Owen &Todt; Garland, 1978). Perhaps the greatest routine violence to premature babies has been surgery without anesthesia. Even the most common serious surgery, patent ductus arteriosus, has usually been done without pain killers (Harrison, 1987; Butler, 1989; Anand &Aynsley-Green, 1985). A smaller tragedy, but with a longer history, is the practice of penile circumcision, an archaic ritual popularized in modern times by obstetricians - with painful consequences (Romberg, 1985; Porter, Miller &Marshall, 1986; O'Mara, 1993). Nowhere in the world have more babies suffered from this traumatic operation than in the United States. I repeat, we must convince mothers and fathers and doctors that all babies are sensitive and aware, can experience pain, and do care about what happens to them. 2. BABIES LEARN AND DREAM Secondly, we must alert parents to the unexpected cognitive talents of all babies whether they are in the womb or are born before term. These babies demonstrate keen perception, learning, memory, and an active dream life. Since 1980, I have been assembling and publishing evidence to convince a doubtful world that newborns are indeed cognitive beings (Chamberlain, 1980, 1986, 1987). The same case can now be made for the fetus and the premature baby (Chamberlain, 1992a, 1993; Sallenbach, 1993). Our understanding of cognition is evolving. Elizabeth Spelke and colleagues (1992) have demonstrated that cognition develops from its own foundation, not from a foundation of sensory and motor experience, perception, and action, the view taught by noted Swiss psychologist Jean Piaget. They are now seeing cognitive capacities as a basic part of the human endowment. Another important discovery is that the special senses are not separate from each other, but after integrated: what is learned via one sense, e.g. vision, can be applied through another, like touch. This intermodal "fluency" is really cognitive fluency (Rose, 1990; Meltzoff, 1990). After charting the many research findings about fetal behavior, anthropologist Charles Laughlin (1989) concluded that "there exists no stage of development, prenatal or perinatal in which the cognized environment of the child is in chaos" (italics in the original). Perhaps the first experiment to reveal fetal learning was done in Europe by the noted researcher Albrecht Peiper (1925). In a study of fetal hearing, Peiper observed a natural habituation of response with repetition of the stimulus, an automobile horn. Since then,

demonstrations of prenatal habituation learning and classical conditioning have been experimentally achieved in Europe, America, Japan and Australia (Sontag &Newbery, 1940; Ando &Hittori, 1970; Feijoo, 1981; Leader et al., 1982; Kuhlman et al., 1988; Madison et al., 1986; Kisilevsky &Muir, 1991). These findings of fetal learning buttress the more abundant research on (full-term) newborn learning (Lipsitt, 1969; Carpenter, 1974; Crowell et al., 1976; Blass, Ganchrow &Steiner, 1984; Slater, Morrison &Rose, 1984; Moon &Fifer, 1990; Slater et al., 1991). The learning capability of a desperately ill premature baby was demonstrated when auditory conditioning was used to rescue him from constant misery: he had learned from experience that people caused him pain. As a result, he was withdrawn, cried at every human contact, and even went into bradycardia when held. To reverse this conditioning, the staff used a short burst of white noise prior to any painful procedure, but used no sound in relation to pleasant contacts. Within two weeks, this premie learned the difference and was able to relax and enjoy human touch for the first time (Sexon et al., 1986). Psychologist Peter Hepper has found fetal habituation learning so reliable that he can use a pure tone auditory signal to discover the severity of chromosomal and genetic abnormalities (Hepper, 1992b). Babies begin language lessons in the womb. Henry Truby (1975) discovered that a voice spectrograph taken of a baby's first cry at 28 weeks already corresponds to the intonations, rhythms, and other speech characteristics of the mother and could be matched with her spectrograph - proof of both hearing and learning. An old theory held that you couldn't begin to think until after you had a language: now it seems more logical to assume that thinking is necessary to learn language in the first place (Hunt &Agnoli, 1991). Babies learn songs and television theme music after repeated exposure in utero (Panneton, 1985; Hepper, 1988). They recognize stories which have been read to them in the womb. They will suck at whatever speed is necessary to hear these stories rather than others by the same author (DeCasper &Spence, 1982). (Note that learning requires memory and that evidence for learning is also evidence for memory.) What babies learn can be positive or negative. Clinical work often reveals negative memories (Laibow, 1988). Some cases illustrate both positive and negative learnings (Harrison, 1990). For example, during pregnancy, Edward's mother listened every evening to the news on television: the baby was also listening. Born prematurely at 29 weeks, he was separated from his parents - and from news broadcasts - for three months. When he finally returned home, however, he became transfixed at the sound of the evening news on television. Ever since, his mother reports, Edward has watched the news every night, enjoys videotapes of news, and takes pleasure in memorizing and reciting news. His love affair with news language began sometime before 29 weeks. On the negative side, Edward was repeatedly injured in the hospital intensive care nursery. He received major surgery without anesthesia and was left with severe long-lasting phobic reactions to doctors and hospitals to prove it. Also, in the course of daily treatment, removal of the adhesive tape used to attach various monitor pads sometimes pulled off patches of his skin. Fifteen years later, he was still frightened by the sound and sight of adhesive tape and bandages. Can there be any doubt where and when he learned these fears? Finally, we must appreciate the cognitive significance of dreaming - a major activity of premature babies. Sonographic studies show that the Rapid Eye Movements (REMs) which signal dreaming begin at 23 weeks (Birnholz, 1981). In fact, it is not until about 36 weeks of gestation (three months later) that the other major phase of sleep known as "deep sleep" (Non-REM) is detected. Using electroencephalographic (EEG) measures, researchers discovered nearly thirty years ago that premature babies spend more time dreaming than anyone else does (Roffwarg, Muzio &Dement, 1966). At 30 weeks gestation, nearly 100% of sleep time is spent in REM; from 33-35 weeks the percentage has fallen to 67%; by 40 weeks it is closer to 50%. This trend continues gradually through the life span until in old age, only about 14% of sleep time is occupied by dreaming. Dreaming babies show looks of perplexity, disdain, and fright along with writhing movements of the torso, limbs, and digits, as you might expect in a "bad" dream; observers also see smiles and looks of amusement - some have even reported laughter - suggesting "pleasant" dreams (Emde, McCartney &Harmon, 1971). The smiling seen in dreams is especially important because these are usually the first smiles seen on newborn faces. Because smiles arise in dreams, they are definitely cognitive

smiles, different from the so-called "social smiles" wViirh occur later in response to adult smiles. Because dreaming is creative cognitive activity with its roots at an unconscious level, we must consider that babies are processing their own thoughts, feelings, and life experiences to date, much as the rest of us do in dreams. 3. BABIES ARE SOCIAL AND COMMUNICATIVE Thirdly, we must inform potential parents that babies are socially oriented, actively seek stimulation, and interact with parents using innate faculties for communication. Looking at a host of research findings, European experts have labeled newborns "precocious" communicators possessing "innate" resources for communication (Trevarthen, 1977; Papousek &Papousek, 1992). Colwyn Trevarthen of Edinburgh finds that infant sounds, gestures, waving, and pointing are intentional, even if awkward, and are always social in nature. He discovered that body parts like head, toes, and fingers are aimed at targets of interest. This is already seen in the 8-week-old embryo, suggesting there is something innate about attention itself (Trevarthen, 1974). In the womb environment life is interactive and relationships are everything. Never isolated from each other, fetus and mother eat, sleep, exercise, smoke, take medicine, and have accidents together, resulting in a build-up of intense rapport. For example, if a mother is shot, yet survives unharmed, the fetus may die (Goodlin, 1979 p. 10). If a psychotic husband goes on a rampage, the mother and fetus end in distress (Sontag, 1966). Fetuses inside mothers during an earthquake in Southern Italy showed intense hyperkinesia which lasted from two to eight hours; movements were numerous, disordered, and vigorous (Ianniruberto &Tajani, 1981). In some cases, a pregnant woman's watching something horrifying on television affects the fetus as well as the mother (Correia, 1987; Correia, Leader &Clark, 1992). Fetuses inside mothers waiting for amniocentesis are more active than when mothers are waiting for a routine sonogram (Rossi et al., 1989). Inevitably, babies in utero are drawn into the sexual encounters of their parents. Ultrasound studies indicate that they probably have their own sexual feelings to begin with. Males have erections (while sucking on their thumbs) by at least the 26th week (Hitchcock, Sutphen &Scholly, 1980). Other studies reveal that the fetus reacts to maternal and paternal orgasms with wildly erratic and plunging heart rates: the fetus experiences bradycardia, tachycardia, accelerations and decelerations greater than 30 beats per minute, and, in some cases, loss of beat-to-beat variability (Chayen et al., 1986; Goodlin, Schmidt &Creavy, 1972). Apparently, they cannot avoid being involved! Minutes after birth, full-term newborns can imitate adult expressions and gestures (Meltzoff &Moore, 1977; Meltzoff, 1985; Reissland, 1988). This discovery was doubted for years because such complex cognitive skills were not expected until an infant was at least a year old. Now we have evidence that premature babies of 35 weeks can imitate adult expressions (Field et al., 1983). These babies can discriminate and imitate adult facial expressions of happiness, sadness, and surprise. This remarkable achievement is not easy to explain, considering there has been no exposure and no practice prior to testing. Imitation seems an innate recognition of human feelings. One authority, Tom Bower, speculates that babies recognize these expressions on adult faces because they too have had these expressions on their own faces in the womb - a triumph of intermodal cognition. At the least, imitation must be seen as sensitive, empathie, and social communication. Spontaneous social communication has been observed between twin fetuses at 20 weeks (Piontelli, 1992). Using ultrasound, Alessandra Piontelli of Milan watched by the hour as Luke and Alice met and touched each other gently through the membrane which divided their space in the womb. The boy was very active and vigorous, the girl quite sleepy, but, periodically, he would come to the membrane and gently awaken her: she always responded. They would rub heads, play cheek to cheek, seemed to kiss and hug, stroked each other's faces, and rubbed feet together until they returned to their solitary activities. This behavior was observed again and again over six hourlong observation periods until they were born. Visiting them at home around their first birthday, the doctor found them taking great delight in playing together. Their favorite game was hiding on either side of a curtain, using it like the dividing membrane in the womb. Luke would put his hand through the curtain and Alice would reach out with her head as they began their mutual stroking, accompanied by gurgles and smiles. Such rare glimpses inside the secret womb tell us what we never imagined before: fetuses showing interest, affection, tenderness, responsiveness, and forming an enduring relationship. It

is hard to imagine behavior more truly social than that of the twins, already happening only half-way through gestation! All babies in utero tend to develop close ties with their mothers. One link is by voice, which is present day and night. Mother's higher pitch and close range makes her easier to hear than the more distant, deeper voice of father, although both are of interest. A Canadian father who made a point of approaching the womb and greeting his baby each night after work was suddenly rewarded in the 25th week of gestation: a foot poked up to meet his face (Freeman, 1987). When he called out his greeting on the opposite side, the other foot pushed up. Father and baby played this game every night for the next fifteen weeks until the baby was born. When he tried it again during his wife's second pregnancy, he had the same response. Stories like these strongly contradict the earlier theory that infants in the womb (and even at birth) are self-absorbed, egocentric, unable to recognize and relate to other persons and possess no sense of self. Canadian educator, Mac Freeman, calls the relationship of mother and fetus a "duet" and fetal learning "duocentric" - not egocentric - as previously thought (Freeman, 1987). Babies are, in fact, exquisitely prepared for dialog. Newborns prefer it (and will raise the heart beat) when adults speak directly to them, in contrast with speech directed to others (Cooper &Aslin, 1990). Marie-Claire Busnel has demonstrated with premature babies that the heart rate will shift predictably as mothers shift from talking directly to them, to talking to someone else nearby, and back again (Busnel, 1992). Personal talk literally reaches the heart. Babies notice the difference. The magical synchrony of mother and baby is revealed in many ways. Newborn babies learn to identify their mother's face in minutes (Walton, Bower &Bower, 1992). They learn her touch in the dark, as well as distinctive body odors (Widmer, 1979; Cernoch &Porter, 1985; Porter et al., 1992). Babies listen intently to adults speaking and tend to move their body parts in synchrony with adult speech and movement (Condon &Sander, 1974; Kato et al., 1983; Stern, 1980). In the womb, relationships with mother are synchronous, but when deprived of these by premature birth, babies face a relationship crisis. Under these circumstances, perhaps the best substitute for the womb is to be packed against the mother's breast in what has been called "Kangaroo Care." Snug in mother's bosom, nursing at will, wrapped in reassuring, familiar sounds, even the most endangered premature babies can often survive (Ray &Martinez, 1984; Luddington-Hoe &Golant, 1993; Whitelaw, 1990). For babies caught without mothers in hospital nurseries, professional helpers have turned to infant massage, waterbeds (plain and rocking), taped sounds of parents, and even toy teddy bears that can be set to breathe at an attractive rate (Scafidi, et al., 1990; Korner et al., 1990; Kramer &Pierpont, 1976; Thoman, Ingersoll &Acebo, 1991). Babies do respond to these devices, I think, because they represent a fragment - if only a pitiful fragment - of the synchrony they experienced with their real mothers. It is a setback for a baby to be pulled prematurely from its normal environment and find itself out of synch, out of touch, and out of range of motherly communication. 4. INTELLIGENT BABIES NEED INTELLIGENT PARENTS Babies in the womb meet the challenges of life with a complex array of sensory equipment which brings awareness of both pleasure and pain, with a constantly inquiring mind, with memories of what they have learned - for better or for worse - and with a hunger for social and emotional experiences. The womb is a psychological frontier where primal impressions emerge from intimate encounters, where patterns are formed for the future. Given the sensitivity of the fetus and newborn, what happens to the baby of a mother who is distraught, irresponsible, or hostile? Such questions have been raised since ancient times. Since the 1950's, at least thirty studies have focused on the influence of a mother's emotional and mental life on complications at birth and or abnormalities in the children (Stott, 1957; Montagu, 1962; Ferreira, 1965; Carlson &Labarba, 1979; Connally &Cullen, 1983). From this substantial segment of the literature of pre- and perinatal psychology come many correlations which dramatically underscore the concerns of Mikhael Aivanhov (1982) about the education that is taking place between mothers and babies before birth. In a recent study of over a thousand mothers tested for different degrees of depression during pregnancy, researchers found depressed mothers gave birth to babies who tended to be inconsolable and to cry excessively in correlation with their mother's depression scores (Zuckerman et al., 1990). Similarly, mothers who are very anxious may give birth to babies who are cranky, colicky, cry excessively, and have difficulties feeding (Feldman, 1981). When

researchers studied the medical records of a group of severely disturbed children and adolescents, they found the majority had been born to unmarried mothers who had not planned the pregnancy, to mothers who felt unhappy about being pregnant, to mothers who lived in family discord, to mothers who felt emotionally rejected for being pregnant, and to mothers with more physical health problems (Ward, 1991). Such findings warn us that chronic stress during pregnancy may very well effect the later well-being of the children. To be born unwanted may be a baby's greatest peril. A Canadian psychologist worked with four teenagers, each of whom had a history of annual suicide attempts. He discovered they were unconsciously acting out their mother's attempts to abort them - something they consciously knew nothing about (Feldmar, 1979). The link between abortion attempts and anniversary suicide attempts was established through interviews with the mothers. Their seasonal suicide attempts were really eruptions of their hidden memories. A brilliant longitudinal study carried out over a span of 35 years in Sweden, Finland, and the former Czechoslovakia provides unique information about unwanted babies. All the babies in this study were unwanted at conception, unwanted during gestation, and delivered after applications for abortion had been refused, sometimes twice (David et al., 1988). The children of the Goteburg cohort, followed as they grew up, were found to be at greater risk for adverse psychosocial problems, for psychiatric attention, for delinquency, and for school-related problems than matched counterparts. At age 14, many children in the Prague cohort had opted not to continue to secondary school. Teachers rated them as more hyperactive and less sociable than their peers. They felt more rejected by their mothers than did their matched-pairs. Their relationships with their parents tended to worsen with time. By age 23, these unwanted children showed a greater proneness to social problems, criminal activity, and had three times the number of serious repeated offenses requiring custodial care than did their matched counterparts. When they were questioned about their happiness and life style, they reported far more dissatisfaction, unhappiness, problems, and worries than did the controls. They mentioned poor relationships with their parents and they knew their parents were dissatisfied with them. In addition, they reported repeated disappointments with love relationships and agreed with the statement that "love brings more trouble than pleasure." Unwanted children, themselves breastfed for a significantly shorter time than controls, gave the opinion that a child should be breastfed for no longer than a month. When they married, they reported their marriages as less satisfying, their pregnancies as less often welcome, and they required more time to develop a close relationship with their own babies in the womb than did the controls. We must shrink in horror at this Trail of Sorrows which began in the earliest days following conception. In sum, these miserable children did worse in every way than did their matched peers, born in the same hospitals at the same time to similar parents who instead had welcomed both their pregnancy and their children. POSITIVE PRENATAL ENRICHMENT Parents who conceive by choice, happily embrace pregnancy, and surround their unborn babies with loving attention are part of a tradition that stretches back thousands of years to many different countries and cultures. Posters in villages in modern China remind pregnant women that when an empress was pregnant centuries ago, she would not look at unpleasant things, nor listen to bad music, nor speak abusive words, lest she influence the quality of the royal child within. Today, parents who want to begin nurturing and communicating with their babies in the womb have many helpful materials to guide them. These self-help books and group programs - which have become available only in the last 13 years - mark an exciting new frontier in prenatal psychology. Although the pioneers in this field were often told by experts that they were wasting their time and there was no evidence that prenatal education had any effect, current studies document the benefits. The first program to reach the general public was that of Leni Schwartz in 1980 (2nd. ed. 1991) entitled The World of the Unborn: Nurturing Your Child Before Birth. Beginning with two small groups of couples, a novel 16-week program included the unborn child in emotional preparations for birth. Next came Evelyn Mamie's Love Start: Prebirth Bonding in 1983 (rev. 1988), and, more recently, Nurturing the Unborn Child by Thomas Verny and Pamela Weintraub (1991). None of these creative programs, for use by small groups or individual couples, were organized to measure the effect upon babies or parents. Serious measurement of the outcome of prenatal stimulation on babies and parents began in the

private obstetrical practice of Renee Van de Carr of Hayward, California. The Prenatal Classroom: A Parent's Guide for Teaching Your Baby in the Womb (1992) written with psychologist Marc Leher, presents the program which was perfected with waves of pregnant parents since 1979. Outcome results of this curriculum were published in 1986 comparing 50 full participants, 50 partial participants, and 50 non-participants (Van de Carr &Lehrer, 1986). Significant differences were found in early speech, physical growth, parent-infant bonding, and success in breastfeeding. In 1988, five obstetricians working in the same hospital provided 20 experimental and 20 control subjects for a comparative study (Van de Carr, Van de Carr &Lehrer, 1988). Again, similar trends were confirmed by superior Apgar scores, high maternal ratings of the babies, and births that were "easier than expected." The curriculum of The Prenatal Classroom by Van de Carr and Lehrer (1992) has inspired ambitious programs in Thailand and Venezuela, designed with experimental and control groups and including thorough tests and measurements. The program at the Hua Chiew Hospital in Bangkok, created by obstetrician Chairat Panthuraamphorn, begins at 12 weeks of gestation, seeks to maximize fetal potential, and encourages positive feelings toward the unknown baby. Test results show definite physical, mental, and emotional advantages to those in the stimulated groups (Panthuraamphorn, 1993). These babies showed significantly greater height and head circumference, fine and gross motor performance, and speech and language acquisition. They also smiled and laughed at birth - something rarely seen in the West. In Caracas, Venezuela, prenatal enrichment marked the beginning of the most ambitious program ever attempted: a longitudinal study of 600 families randomized into experimental and control groups (Manrique et al., 1993). Extensive measurements were made at two days, one month, 18 months, and three years of age. Led by psychologist Beatriz Manrique, the program aimed at complete and integrated bio-psycho-social development of children through adequate stimulation, training, and nutrition. Prenatal enrichment was accomplished in a 13-week course of two hours per week, using the guidebook Answer Your Baby which teaches techniques of communication. When measured, the stimulated babies showed consistently superior visual, auditory, language, memory, and motor skills. In addition, their mothers had greater confidence, were more active in labor, had greater success in breastfeeding, and showed more intense bonding and family cohesion. When measured at later ages, the experimental infants continued to outperform the control infants on every test. In Spain and Europe, the program "Firstart" organized by the musical couple Manuel Alonso and Rosa Plaza, features sounds broadcast to the fetus through a miniature tape player-speaker worn in a belt around the mother's waist. The tapes make special use of music, appeal to the fetal senses, and encourage conversation and bonding between parents and baby. A four-year research program to test the effects of this program is in progress at a hospital in Spain. CONCLUSION The period from conception to birth is a critical period for the physical, emotional, and mental development of every baby. It is the period when the intimate relationship between parent and child is given form and quality, with long-lasting consequences. With greater knowledge and respect for the sentience and intelligence of babies in the womb, I believe couples can reach new heights of fulfillment in parenthood. And their well-nurtured babies will be a blessing to the world. References REFERENCES Aivanhov, O. M. (1982). Education begins before birth. (Trans. from French). Los Angeles: Prosveta; Also see: Aivanhov, O. M. (1969). The role of the mother during gestation. Los Angeles: Prosveta. Ando, Y. &Hattori, H. (1970). Effects of intense noise during fetal life upon postnatal adaptability. J. of the Acoustical Society of America, 47, 1128-1130. Anand, K. J. S. &Aynsley-Green, A. (1985). Metabolic and endocrine effects of surgical ligation of patent ductus arteriosus in the preterm neonate: Are there implications for further improvement in postoperative outcome? Modern Problems of Paediatrics, 23, 143-157. Anand, K. J. S. &Hickey, P. R. (1987). Pain and its effects in the human neonate and fetus. New England J. of Medicine, 317, 1321-1329. Baker, R. A. (1978). Technologic intervention in obstetrics. Obstetrics &Gynecology Journal, 51, 2. Birnholz, J., Stephens, J. C. &Faria, M. (1978). Fetal movement patterns: A possible means of defining neurologic development milestones in utero. Amer. J. Roentology, 130, 537-540. Birnholz, J. C. (1981). The development of human fetal eye movement patterns. Science, 213, 679-681. Blass, E. M., Ganchrow, J. R. &Steiner, J. E. (1984). Classical conditioning in newborn humans 2-48 hours

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