

Prenatal Receptivity and Intelligence

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The following is a reprint of an article in the 12th edition (1998, Spring issue, pp. 95—115) of the journal. As the focus of many of the following articles in this issue of JOPPPAH is on the interactions between the prenatate and the gestational parent, and what a prenatate is aware of at what time, this article seemed appropriate to share again.

Abstract: This article sets the beginnings of research in prenatal stimulation in historical context with the larger movement of infant research surrounding it. Of particular interest is the evidence for prenatal intelligence, which is here organized around new definitions provided by Robert Sternberg and Howard Gardner. This evidence provides parents with additional reasons to begin communication with prenates as soon as possible and provides psychologists with additional reasons to formulate a larger paradigm to describe the true nature of prenates.

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About this Paper

This introduction to the experimental studies on prenatal enrichment focuses on underlying questions many readers have about the nature of prenatal sensory awareness, emotion, and intelligence. Although the research papers that follow are themselves persuasive evidence for prenatal learning and memory, David Chamberlain creates here a larger historical and scientific context from which to view these specific discoveries. Drawing

David B. Chamberlain, PhD, was a California psychologist, author, and editor who lectured on birth psychology in 20 countries. In 1974, he began using hypnotherapy to discover and resolve traumas arising in the womb and at birth. In landmark research with mother and child pairs in 1980, he demonstrated that birth memories were reliable memories. David served as President of APPPAH for eight years. His book, *The Mind of Your Newborn Baby* (1986/1998) was translated into 13 languages, while his last book, *Windows to the Womb: Revealing the Whole Baby from Conception to Birth* was published in 2013. Although Dr. Chamberlain died in 2014, his legacy lives on in his writing and in the hearts and minds of all who knew him.

on a full range of empirical data—clinical, experimental, and anecdotal—he helps the reader find answers to the question, “Is there intelligence before birth?”

Some of his analysis of intelligence using modern categories proposed by Robert Sternberg and Howard Gardner, enlarged upon here, appeared in this Journal in volume 6(3), 1992. More evidence and references to both fetal and newborn intelligence are found in Chamberlain, *The Mind of Your Newborn Baby* (1998). Experiments in prenatal enrichment are a unique development beginning in the 1980s with the work of California obstetrician F. René Van de Carr.

Long interested in babies as human beings, Dr. Van de Carr was inspired by a pregnant client who came for examination reporting whenever she patted her swollen belly, her baby consistently moved and kicked in return. When the doctor patted her abdomen, the baby responded to him also. Building on that experience, Van de Carr set to work creating a series of exercises couples could use to communicate with their unborn babies. The child who had answered his pat was to become the first graduate of the “prenatal university” in January, 1980.

The idea of communicating with the unborn took wings, the word flying by radio, television, newspaper articles, and cartoons. Parents began to think and talk about the possibilities of prenatal learning, and child development experts began to scoff. Nevertheless, the team in Hayward, California, consisting of an obstetrician, a developmental psychologist, and a marriage and family counselor, began a series of experiments designed to measure the benefits of prenatal enrichment. This idea also grew wings and was soon influencing the design of experiments in Venezuela, Thailand, and Spain. All of these developments are represented in the 1998 Spring and Summer issue of the *Journal of Prenatal and Perinatal Psychology and Health*.

Preliminary to these practical developments, but little known to the public, scientific interest in babies was gaining momentum in Europe through the extraordinary efforts of Albrecht Peiper, who ultimately produced a large volume, *Cerebral Function in Infancy and Childhood*, containing hundreds of citations to specific research on infant “senses and reason.” About 100 of the works cited were his own, dating back to 1925 when he had probably conducted the first experiment anywhere confirming fetal habituation. All this literature was printed in German and was not available in English until the third edition was published in 1963.

In the United States, the gifted American physician, Lester Sontag, was to play a similar role in creating studies of fetal and infant behavior. In 1928, he became the founding Director of the FeIs Institute for the Study of Human Development at Antioch College, Yellow Springs, Ohio. The purpose of the Institute was to do “long-term, multi-disciplinary studies of human beings from conception to birth through maturity.” The

first of 2,000 studies to come from the Institute during the 41 years Sontag was Director, was his paper with Robert Wallace (1933) on their invention of an apparatus for recording fetal movement.

As pioneers, they were obliged to invent and perfect basic tools for the scientific study of fetal and infant behavior. Their historic report in 1934 described the Fels Fund and the status of their studies of fetal activity. Current science, they noted, had “more or less completely neglected the possible influence of environment during the period of intra-uterine development” (Sontag & Wallace, 1934, p. 1050). They wrote, “We are all familiar with the fact that in cases of prematurity in which birth occurs at a fetal age of about seven months, learning and response to stimuli develop rapidly and are well established long before the infant has reached the age at which it normally would be born.” Sontag himself went on to publish some of the first studies on fetal hearing, the effect of maternal emotions on the fetus, and fetal reactions to cigarette smoking.

American and Russian psychologists developed a strong interest in conditioned learning, leading to decades of experiments to tease out the parameters of classical conditioning, operant conditioning, and habituation. An early example of experiments with fetal learning was the work of Wilbert S. Ray in 1932. In 1938, David Spelt reported success with fetal conditioning. Peter Hepper replicated this early discovery in 1993. By 1964, Yvonne Brackbill had summarized and cross-indexed a bibliography of 1,700 research reports on infant behavior, including many in the area of learning and conditioning.

During the same decade—the 1980s—in which the experiments in prenatal stimulation were beginning, American psychologists Robert Sternberg at Yale and Howard Gardner at Harvard were proposing entirely new concepts of human intelligence. For seventy-five years, the field of intelligence had been dominated by the ideas of Alfred Binet and nearly everyone knew about the “intelligence quotient” (IQ). In this measurement system, a variety of verbal and performance tests were standardized for use with different age groups to arrive finally at a number representing “intelligence.” Such tests, depending heavily on verbal ability, academic knowledge, and cultural awareness were not applicable to estimating the intelligence of babies in the womb. In the popular view, babies had not been to school, could not write or talk, had no language, and, for all these seemingly overwhelming reasons, could not possibly know anything.

More seriously, during the 1980s, neurologists considered prenatals too neurologically ill-equipped to be aware, to be truly expressive, and to be affected by their interactions with the people around them, including their mothers and fathers. At the heart of these misunderstandings was the dogmatic belief that baby brains were so poorly developed that babies could not learn or remember anything, could find no meaning in physical

sensations including painful sensations, and could not have genuine emotions. Truly human experiences would not be possible until many months after birth. Babies in the womb were essentially deaf, dumb, and blind, and experts told newspaper reporters that it was silly for parents to try to talk with babies in the womb. Specialists in human development generally held the view that development proceeded from simple to complex systems, and from single to integrated capacities. Late-developing parts of the nervous system were expected to provide the sophisticated mental equipment needed for a sense of self, for the personal memories that would give meaning to life, and for such human qualities as emotion, will, and interest. Developmental psychologists taught that none of these would be possible until long after birth, perhaps not until the second year of life.

Such views, still dominant in the 1980s, made it easy to ridicule experiments in prenatal bonding, or in any other form of prenatal "education." In spite of this official negativity, breakthroughs in psychotherapeutic work, research on the fetal senses, and experiments on habituation and learning in the womb provided a foundation for full-length books like Verny and Kelly's, *The secret Life of the Unborn Child* (1981) and Chamberlain's *Babies Remember Birth* (1988). Wide-ranging reviews of empirical research relating to prenatal and perinatal life could carry as many as 250 references (e.g., Chamberlain, 1983, 1987). Life in the dark and mysterious womb was giving up its secrets, and these secrets were congruent with the findings from experiments in prenatal education. From the earliest weeks of gestation, a tapestry of intelligence was becoming clear.

Two important forces converged to make it possible to construct a new and larger view of life before birth: new observations of behavior in the womb and new definitions of intelligence. Before, we could only speculate about mental life before birth; now we could look at a wide span of empirical evidence and ask if it met the requirements for intelligence provided by Sternberg (1988) and Gardner (1983). Yet it is significant that neither psychologist has applied his criteria for intelligence to the prenatal era.

Sternberg's Theory of Intelligence

In *The Triarchic Mind*, Robert Sternberg celebrates three distinct, but interrelated aspects of intelligence shown by people in everyday life. An individual may be strong in some aspects of intelligence and weak in others. Intelligences can and should be increased, according to Sternberg, and he has developed programs to do just that (1986). To him, intelligence is mental self-management, capitalizing on strengths, utilizing experiences, and mastering environments. It includes what psychologists

have referred to as self-regulation and learning (e.g., Lipsitt, 1990; Rovee-Collier, 1987). Successful self-management comes down to (1) purposive adaptation to an existing environment, (2) selection of new environments, and (3) shaping existing environments to be more relevant to one's life and abilities. This language is well suited to prenatal psychology which has always recognized the womb as our first environment. In the environment of the womb, hosts of modern studies prove that a fetus is active, responsive, and influential (deMause, 1982; Liley, 1972; Verny & Kelly, 1981).

- 1) An example of the first intelligence, purposive adaptation, would be the ways some prenatates have responded to the entry of a needle into the womb during amniocentesis. Mothers watching the procedure on ultrasound have seen fetuses retreat from the needle; others have seen the fetuses repeatedly strike the barrel of the needle (Birnholtz et al., 1978). After amniocentesis, some investigators have noted the decrease of breathing movements for two days (Hill et al., 1979; Manning et al., 1977), an unusual loss of beat-to-beat variation in the heart rate, and lack of motion after needle withdrawal (Neldam & Pedersen, 1980). These seem like intelligent reactions to sudden, unexpected invasions of the womb.
- 2) If intelligence is manifested by selecting a new environment, we could cite a number of examples of selective, discriminative, and preferential behaviors in the womb environment (Bernard & Sontag, 1947; DeCasper & Sigafos, 1983; deSnoo, 1937; Korner et al., 1990; Liley, 1972; Smyth, 1965; Tatzert et al., 1985). Dreaming may be the ultimate form of environmental selection. Sonographic studies show that REM activity begins at 23 weeks gestational age (g.a.) and becomes more frequent from 24 to 35 weeks (Birnholtz, 1981). EEG studies of babies born prematurely confirm an active dream life. In dreams, prenatates are mentally engaged, perhaps even mentally diverted from routine day-to-day activities.
- 3) An example of Sternberg's third criterion, shaping the existing environment into a new one, is prenatates asserting themselves in protest against loud or violent developments by hyperactive movement and kicking. Mothers watching violent movies ("Raiders of the Lost Ark" and "Platoon"), have told me that their prenatates created such a disturbance for them they had to leave the theater. Presto, the environment is "shaped." These examples suggest how the data familiar to us in prenatal psychology could be marshaled to meet Sternberg's criteria of intelligent self-management.

Howard Gardner's Theory of Multiple Intelligences

In *Frames of Mind* (1983), Gardner asserts (with Sternberg) that intelligence tests favor academic skills and pay little attention to everyday creativity, the ability to assimilate new information, or to a person's potential for growth. Tests are so inadequate, Gardner jibes, that "an individual can lose his entire frontal lobes, in the process becoming a radically different person, unable to display any initiative or to solve new problems—and yet may continue to exhibit an IQ close to genius level" (1983, p. 18).

As a substitute, he proposes seven types of intelligence, each semiautonomous, with its own form of memory and learning, its own brain connections, and its own developmental history. The seven intelligences are 1) linguistic, 2) musical, 3) logical-mathematical, 4) spatial, 5) bodily-kinesthetic, 6) intra-personal, and 7) inter-personal intelligence.

My purpose is to show how prenatal data can be matched with these criteria. I recognize as valid the full range of empirical data including experimental results, clinical findings, and anecdotal reports of personal experience, all of which, I believe, are necessary to develop a complete picture of human life at any age. In my view, anecdotal data, which are generally given the lowest status, are especially precious because they are human experience, pointing the way for fruitful exploration, and warning us of realities 10 or 20 years before any confirmation we can hope to get from formal experiments.

Linguistic Intelligence

Language is of tremendous importance in human societies where so much depends on good communication. We use words to convince others to act, as tools for remembering things, as ways of teaching and learning, and as vehicles for clarifying ideas and meanings. The roots of language are still mysterious and controversial, yet current evidence suggests language learning begins in the womb. Some people still insist we need language before we can be intelligent while overlooking that we cannot begin to learn language without intelligence. Henry Truby (1975), one of the first to analyze infant cries using modern sound technology, discovered that cry patterns of premature infants "reveal at least token, and in some instances, specific correspondence to the intonations, rhythms, and other speech performance features of the mother" (p. 67). Truby found that by about 28 weeks g.a., voice spectrographs of mother and infant could be matched, proving that babies had definitely been learning their mother tongue. They were listening with great specificity, using the hearing equipment they had received as early as 14 to 16 weeks of gestation (Blum, 1991; Shahidulla & Hepper, 1992). This means that in the course of a 40-

week pregnancy, a fetus would have from four to six months of voice lessons. When mothers are mute or the fetus deaf, the absence of these voice lessons shows up in obvious differences in cry sounds at birth.

DeCasper and Spence (1986) are famous for a clever experiment in which mothers read Dr. Seuss' *The Cat in the Hat* (1957/1985) to their prenatates twice a day for six weeks before birth. After birth, when given a chance to suck for different recordings, they preferred to suck at the speed at which their mothers' read to them the familiar *Cat in the Hat*. Other DeCasper experiments also support language processing before birth (DeCasper & Fifer, 1980; DeCasper & Prescott, 1984).

Report from Russell. After seeing me on television in Los Angeles, Russell telephoned me about his language abilities between birth and two years of age. He said he could somehow follow the process adults went through to communicate. He could see the original thought, then the effort to find words and make sentences, and he observed a big difference between the original thoughts and their final expression in language. He found language distracting, a "babble," a lower level of communication, but had no trouble understanding thoughts. "Before I could speak," he said, "I could understand all the communication around me." This rare description of what went on in the mind of one infant is consistent with the theory that all communication has both a physical component and a mind-to-mind (telepathic) component. If infants are indeed telepathic (as other evidence suggests), they would understand their mothers and fathers before they had vocabulary or grammar (see Cheek, 1992).

Report from Chad. I received a telephone call from Chad while on a radio talk show in Dallas. "When my wife was six months pregnant," he said, "I read *The Hobbit* [1966/1994] to her. It took a few months. When the baby was four, he begged me to read that story. When I did, he said 'Daddy, I've heard this story before.'

"No you haven't." his father said, "I've never read this to you."

As he read on, the boy kept saying he had heard it before. Finally, his wife remembered: "Yes you did [read it]. You read it day after day when I was pregnant!"

Report from a Mother. During Edward's gestation his mother and father watched the news on television every night. He was born prematurely at 29 weeks and remained in the NICU for three months (with no TV news). On the first evening when he was finally home from the hospital Edward became transfixed at the sound of the theme music for the news: he remained transfixed throughout the broadcast. Ever since, he has watched the news every night, and even enjoys videotapes of news broadcasts which, he quickly memorizes and recites verbatim. Edward is now 15 and "severely intellectually disabled," but he has never lost his love of news since falling in love with it some time before 29 weeks gestational age.

Musical Intelligence

Gardner marvels at the musical intelligence of two- and three-year-old children who can play classical pieces they have learned, or who can compose their own tunes (1983). Even an autistic child, he found, with all their restrictions in the cognitive and affective spheres, could sing back any piece they heard. Musical intelligence is a way of thinking with sound. It is a language in its own right and a universal language shared by people across the world.

Is there musical intelligence before birth? It turns out that babies in the womb are listening to music closely and are learning from what they hear. Chapman (1975) played “Brahms’s Lullaby” to premature babies in a hospital nursery, finding they gained weight faster and were able to leave the hospital a week sooner than babies who did not hear the music. At about the same time, Michelle Clements (1977) was playing classical selections to pregnant mothers in a hospital in London. She reported the fetus quieting down to Vivaldi and Mozart, but kicking and moving violently to Beethoven, Brahms, and rock music—a sure sign of intelligence.

“Mary Had a Little Lamb” was the song sung each day near the end of pregnancy by mothers in a study by Panneton (1985). After birth, the babies preferred this song to an unfamiliar melody, while control group infants showed no preference. In Belfast, seven pregnant women who regularly tuned into the soap opera “Neighbors” were compared to a similar group of pregnant mothers who had not (Hepper, 1988). After birth, when the babies were exposed to the theme music, babies who had been hearing the music stopped crying or went into a quiet alert state while most of those in the control group paid no attention to the music.

A Personal Report. A woman in Wisconsin called me on a talk show to say she had been adopted a few days after birth and had no further contact with her birth mother. In the third grade, when she was given an opportunity to play a musical instrument, she said she picked the saxophone although she knew nothing whatever about it. She just felt strongly that this was the instrument she should play. Much later, she discovered that her birth mother had played the saxophone during her pregnancy before she was given up for adoption.

Child Report. Jamie, at six months of age, reproduced whale sounds which he had heard on an audio tape his parents played before he was born. He had not heard it since he was a prenat.

Logical-Mathematical Intelligence

Logical-mathematical reasoning—surely the least likely of all the intelligences to find in the unborn—involves building and testing of hypotheses, and, on the mathematical side, becoming comfortable in a world of objects. Logic is used to classify, categorize, distinguish things, and learn. Thinking is definitely required and adults tend to believe they are the only ones who can do this.

In the matter of object relations, many have followed the lead of Sigmund Freud (1926) that there is no mental life, no ego, and no sense of objects at birth. Piaget (1936/1952) estimated that object relations commence around 18 months; Jerome Kagan (1972) reduced this time to 9 months. However, Elizabeth Spelke (1985) proposes that “humans begin life with a conception of material objects” (p. 89). This does not seem surprising when you consider that the fetus is sucking fingers and toes by 9 weeks *g.a.*, and plays almost constantly with the umbilical cord.

As far as logical thought is concerned, Inhelder and Piaget (1958) estimated that logic and reversibility are not generally attained until mid-adolescence. In dramatic contrast, psychologist Tom Bower makes a strong case for logic in the first weeks after birth (1989). Bower introduces proof that the newborn responds to the formal abstract properties of stimulation, independent of any specific sense using “higher-order variables” (Gibson, 1950). Infants, he claims, are logical and hypothesis-testing creatures: they are built to detect conjunctions between events and fit them into a predictive framework. He refers to a human baby as “the most powerful learning system in creation” (Bower, 1989, p. 151). Obviously, learning requires thinking.

From over 20 years of work in hypnosis with adults having memories of birth and life in the womb, I have been impressed by the fact that all memories—without exception—contain thought as well as sensations, emotions, and actions. Birth memories, which I found reliable by comparing the memories of mother and child pairs in hypnosis (Chamberlain 1988, 1998a), contain unexpected social criticism, insight, understanding, and even wisdom. They demonstrate the same clear awareness of violence, danger, and breach of trust that any of us adults might show in similar circumstances. From hundreds of cases, I have been forced to conclude that thinking is a basic and innate human activity which should not be confused with formal language or chronological age. I find that babies are equipped to think and are constantly doing so to cope with their experiences, although they are not yet ready to speak. But they can do that later in life when they have the vocabulary to tell us what they were thinking and feeling earlier. Even three-year-olds sometimes have explicit and accurate birth recall. The very nature of much therapeutic work is to recover and resolve debilitating ideas which were formed during

prenatal and perinatal life. That such ideas were formed so early is evidence of logical intelligence.

Although acknowledging newborn logic is a giant step forward for academic psychology, it is only a tiny step for those engaged in consciousness research (e.g., Grof, 1975; Ring, 1980; Stevenson, 1987). Hypnotherapy, rebirthing, yoga, meditation, psychedelics, near-death experience, and other forms of altered state experience open doors, revealing thinking and memory at all ages. When it comes to human consciousness, we are not well described as embryo, fetus, prenat, or neonate: we are all perceptive beings.

Two Clinical Reports. My client Anne, in hypnosis, recalled being in the womb and overhearing a conversation between her mother and her sisters. When mother announced that a child would be coming, her sisters said they were against it, and didn't want one. They were openly hostile. In her thirties, Anne reported that she had always felt alienated from her sisters and had lived her life in a state of siege, as if she needed to protect herself at all times. After recovering this womb memory of threats from her sisters, she no longer felt "at war" with them or with the world.

Another client, Ina, also in hypnosis, recalled a problem at her conception—something that should be impossible. Ina said her parents were drunk at her conception and that her father had forced her mother to have sex. Therefore, Ina didn't feel it was appropriate to enter at that time. Instead, she spent a waiting period in a blissful realm which she described as safe and beautiful. After the session, she said that remembering this was "the greatest religious experience" in her life. Without a physical brain, she seemed perfectly capable of understanding what was going on.

From the vast data gathered in the rebirthing community, Rhonda Levand (1991) gives hundreds of case examples of adult sexual and relationship problems going back to patterns established in childhood, at birth, and before birth. Cases reveal a perfectly logical connection between current problems and relationship patterns, apparently learned as far back as conception. Typical examples include conception by drunken parents, conception through error, conception for reasons such as marital or religious duty. Using her method, Levand uncovers the false reasoning buried in these memories and works them through. The ability to learn from the environment at such early stages seems to be an asset of consciousness. This revolutionary idea is only slowly gaining acceptance in psychology, but it is one that I favor because it is broad enough to comprehend all the data now available from workers like Stevenson (1975), Moody (1976), and my own experience with clients (Chamberlain, 1990).

Helen Wambach (1979) was noted for her carefully structured group work to stimulate memories surrounding conception, choice of parents, purpose in life, womb events, and birth—a kind of "Gallup Poll" of

hypnotized subjects (p. 23). The responses of 750 subjects suggest that cognition is a permanent feature of consciousness. Similarly, John Richard's method using "The Whole Self" to gain impressions from preconception to birth also reveals that, at some level, human beings are always learning, always conscious (Turner, 1988).

Personal Report. While she was in hypnosis and recalling life inside her mother, I asked my research subject, Linda, if her mother talked to her in the womb. Her perceptive answer is not unusual in my experience. She said, "It seems like sometimes she feels like it, but she doesn't. I can tell she wants to. Sometimes she talks to herself, but she is really talking to me. She feels silly talking to me, so she is talking to herself, but she is really talking to me."

Spatial Intelligence

Spatial intelligence enables us to orient to various locales and to find our way around by a kind of mapping and recognition of objects and scenes. Using this intelligence, we conjure up mental images, using them in arts and crafts, photography, inventions, and other imaginative processes. Although this intelligence often utilizes vision, it can also be achieved by blind people, an important fact because it parallels a prenaté's experience in the womb.

Do prenates have spatial intelligence? The womb is definitely a space to be mastered. Objects there include hands, fingers, feet, toes, mouth, and cord. Are they like toys to practice with? Action and interaction is the order of the day. After 9 weeks g.a., there is a typical pattern of alternating activity and rest. Then active, sporadic kicks against the uterine wall may be strong enough to displace the whole fetus from its resting place before it moves back into its original position (Van Dongen & Goudie, 1980). In this way, the fetus gets acquainted with the territory. By the third trimester, the fetus rarely goes 10 minutes without some gross motor activity (Roberts, et al., 1980).

Mary Straub (1971) cannot help speculating about the constant interaction between hand and cord, and hand and mouth. Is the prenaté creating an altered state by squeezing the cord, or is it just exercising its spatial intelligence? Mental images must be the stuff of dreams. As noted before, dreaming is detected in utero around 23 weeks, and EEG studies reveal that dream activity in sleep is maximum around 30 weeks and tapers gradually downward through the entire life span (RoSwarg et al., 1966). This mental imaging practice in sleep would seem to have priority in development because REM sleep develops 10 weeks earlier than deep, quiet sleep (Birnholz, 1981).

Child Report. Marnon, at almost three years of age, had a burst of spontaneous memory for events at birth and before birth (Laibow, 1986). Among other things, he told his parents that he used to dream in the womb.

Child Report. Peyton, at around three years of age, looked at a photo of her pregnant mother, and spoke about a “snake” in the womb (Chamberlain, 1998a, p. 99). She explained it was trying to eat her, but reassured her mother it wasn’t a poisonous snake. The “snake” is a naive, but credible, description of the umbilical cord. Less credible was her report that there was a “doggie” in there too. She said she remembered the dog barking and waved her arms to show how they played together. The improbable dog was a puppy which joined the family during that pregnancy, and who spent a lot of time on mother’s stomach. Apparently, Peyton’s spatial awareness incorporated the area immediately around the womb as well as within it.

Bodily-Kinesthetic Intelligence

Bodily intelligence is the ability to use one’s body in highly differentiated and skillful ways for expressive and/or goal-directed purposes. This involves control of body motions and learning to handle objects skillfully. Such masterful use of the body is seen in dancers, swimmers, athletes, and actors. Part of what is required is a well-honed sense of timing. Gardner reminds us that human movement is incredibly complex, calling for the smooth coordination of a dizzying variety of neural and muscular components in a highly integrated fashion (1983). Our kinesthetic sense monitors muscles, joints, and tendons: agonist and antagonist muscles must work in synchrony. At the same time, the vestibular system (which begins forming at 7.5 weeks and is being myelinated at 16 weeks) helps us balance. And preceding all this movement, there must be elements of choice, intention, or purpose. Obviously, this bodily-kinesthetic intelligence is blended with spatial intelligence, the use we make of the space around us.

Sonograms alert us that between 10 and 12 weeks g.a. there is a burst of activity involving all parts of the body: rolling from side to side, extending and flexing back and neck, turning of the head on the neck, waving arms and kicking legs, flexing of feet, and after 12 weeks, jaws moving up and down, contacting hands and face, and breaking that contact (Van Dongen & Goudie, 1980). Such exercises may continue as long as seven minutes. During these activities, the fetus moves from its usual position, but it will always return to rest in the lowest part of the sac. This vigorous movement program will continue throughout the pregnancy as long as there is enough space. Neurologists call these movements “endogenous” and “spontaneous,” meaning that they originate from within and reflect initiative on the part of the fetus (deVries et al.,

1985; Prechtl, 1985). Is this a body-building program? William Liley points out that in the absence of this muscular activity, the bones and joints fail to develop properly (1972, p. 101). Is it free play? Fetuses certainly spend a lot of time practicing moves which will be needed later. Maybe it is fun? Exercises which prepare for later manual skills and manipulations include not only somersaults and rolls but, as mentioned before, the act of reaching and grasping for the cord, and finding and sucking on fingers and toes, seen at 9 weeks.

Although mothers are not usually aware of fetal movement (“quickenings”) before 16 to 22 weeks, there is a great deal of movement going on in early pregnancy when there is lots of room. The pre-nate changes ends in the uterus by propelling with legs and feet. Changing sides requires what Liley calls “an elegant longitudinal spiral roll” (1972, p. 100). At the midpoint of the turn, there is a 180-degree twist of the spine. To begin the move, the head is extended and rotated; next the shoulders rotate, and, finally, the lumbar spine and legs rotate, making use of the long spinal reflexes. Liley proved that this fancy roll happens at least as early as 26 weeks, although textbooks used to say it was not possible until 14-20 weeks after birth. The buoyant environment of the womb makes this easy, of course, but we must not lose sight of the fact that the fetus is already equipped to perform and is in fact performing these graceful acrobatic moves over and over again in the womb.

The Personal Intelligences

Intra-Personal Intelligence

According to Gardner (1983), there are two “personal” intelligences. Intra-personal intelligence represents the capacity to access one’s own feeling life, to experience and express a range of emotions, to discriminate among them, for example pain and pleasure, and to respond appropriately by becoming more involved or less involved (withdrawing). What feelings come first and how early do we have them? Charles Darwin (1872) studied carefully the development of facial expression in his own children and decided that emotions were innate in both animals and people. Scowls, cries, and grins seem to be cross-cultural. Stanley Greenspan (1985), writing about “first” feelings, proposes six emotional milestones, starting with ages “zero to three.” There is no provision for feelings before birth. However, thumb-sucking is a fetal pastime dating from about nine weeks g.a. It is probably a pleasant pastime. Feelings may also be assumed from sonograms showing thumb-sucking in conjunction with penile erections as early as 16 weeks g.a. Ultrasound observations of near-term babies reveal that erections occur at a frequent rate: typically once or twice per hour with a duration of 5-15 minutes (Shirozu, et al., 1995). These erections

were much more likely in the REM state of sleep. Researchers have also measured increased fetal activity and wildly fluctuating heartbeats at the point of parental orgasms in the third trimester (Chayen et al., 1986).

The smiles seen on the faces of premature babies while they are dreaming surely reflect pleasant feelings, just as unpleasant contortions and squirming in dreams must reflect unpleasant feelings (Roffwarg et al., 1966). These expressions represent a range of feelings. We can assume that if preemies are dreaming outside the womb, babies their age are dreaming inside the womb. Further, if they are dreaming at all, they are probably engaged in intrapsychic, intrapersonal cognitive activity, perhaps even processing their own experiences to date.

Emotions of fear, anger, and hurt are surely manifested in the earliest audible cries. First productions of sound from the fetal larynx have been traced by ultrasound to 18 weeks g.a. (Ramon y Cajal, 1996). Numerous reports of audible crying of the fetus have been placed from 21-24 weeks g.a. It would be perverse for adults to assert that crying prenatates do not feel, do not care, and are crying for nothing. Vagitus uterinus (literally "squalling in the womb") is a rare but well-documented phenomenon supported by over 140 citations in the medical literature going back a hundred years. George Ryder (1943) is one of a dozen authors to summarize these findings. Yet, as late as 1980, some experts on the infant cry wrote, "There appears to be little justification in carrying out any serious discussion about prenatal vocalizations" (Hollien, 1980, p. 25).

However, obstetrics professor Robert Goodlin takes the opposite position. After describing the crying in utero that used to occur after air amniograms (a procedure no longer used), Goodlin writes, "It seems not unreasonable to assume that fetuses are often as uncomfortable [enough to cry] in utero as extra utero, for it is the intrapartum, not the newborn period, which is filled with pain and stress for the infant" (1979, p. 193). He thinks if air were available, we would often hear crying coming from the womb. In modern times, cries from the womb are associated with obstetrical maneuvers like rupture of membranes, catheter insertion, attaching electrodes to the head or bottom, etc., which are upsetting to babies (Thiery et al., 1973). Are these cries not intelligent signals of inner pain, panic, or fear? Squalling, it should be noted, is merely a sound marker for emotion, not the emotion itself.

Emotions can be present without sound, but when the sound does come out it is surely proof of an emotion within. We must awaken to the possibility that prenatates may be feeling many emotions before they are able to emit sounds. Can there be any doubt about the anguish prematurely born babies have suffered during the last century when surgeons operated on them using muscle-paralyzing curare, but no painkillers? Modern blood and hormone studies reveal sure signs of pain and panic in the sudden outpouring of cortisol and beta endorphin at the

time of trauma (Chamberlain, 1998b). Prematurely born babies subjected to a series of heel lances for blood tests quickly learn to withdraw the foot and start fighting when nurses touch the foot. Do we imagine the babies have no intra-personal feelings and cannot distinguish pain and pleasure?

Child Report. A four-year-old child spontaneously remembered his feelings in the womb when his father was beating his mother. The memory surfaced when his mother remarried and was pregnant again. This boy listened to her womb and announced, "The baby is crying."

His mother said, "Babies don't cry in the womb."

The child replied, "I did."

Clinical Data. Elizabeth Noble (1989, 1991) has called attention to the phenomenon of the "vanishing twin," a haunting perception which remains with the surviving fetus when a partner dies before birth. Noble estimates that in about 4% of pregnancies, a co-twin dies at some time during gestation, usually without a trace. Nevertheless, these deeply repressed memories of fear, anger, and grief are emerging in various kinds of therapy today. I have encountered this in my own practice. When such memories do surface, they witness to what the survivor was feeling at the time of loss.

Memories of attempted (but failed) abortions are also coming to the surface in various psychotherapies. The feelings arising from this include fear, distrust, depression, and anxiety (see Ridgeway, 1987, p. 85 for examples in the work of English physician Frank Lake). In a case of mine, I witnessed a long-standing anger and alienation between mother and child stemming from the mother's having gone on a diet in pregnancy and starving her baby.

Inter-Personal Intelligence

Finally, interpersonal intelligence is the ability to notice and distinguish among other individuals, their moods, motives, and intentions. Interpersonal skills are the hallmark of good relationships, including the mother-infant bond which Gardner speculates might be the origin of this intelligence (1983). A sense of self seems essential as a base for the knowledge of others, but, strangely, Gardner, along with other developmental psychologists, thinks the sense of self appears sometime in the second year of life (e.g., Greenspan & Greenspan, 1985; Stern, 1985; White, 1985). From our point of view, womb life is an exercise in relationships. Bonding between infants and parents begins in utero (Marnie, 1989; Verny & Weintraub, 1991). To a pre-nate, the mother's rhythmic breathing, heartbeat, hand clapping, dancing, and singing must be irresistible. The old view that pre-nates and neonates are egocentric should be replaced with the duo-centric view of educator Mac Freeman (1987) who describes the constant interaction of womb life as "duet

learning.” In utero, mutuality is unavoidable: mother and baby eat together, breathe together, sleep together, and perhaps smoke cigarettes, use alcohol, and fall down the stairs together.

The exercise of interpersonal intelligence is inescapable for multiple prenatals sharing the womb. Systematic ultrasound observations of twins places the onset of inter-human contact at 65 postmenstrual days (Arabi et al., 1996). After 20 weeks, twins can be seen having a remarkable social life. Some twins box and kick each other. Others are relating sensitively: kissing, rubbing cheeks together, and playing (Piontelli, 1992).

Prenates seem keenly aware when their parents are having sexual intercourse in the third trimester (Chayen et al., 1986; Goodlin et al., 1972). Obstetricians and their wives who monitored themselves and their prenatals to study this phenomenon discovered that orgasm caused “excessive uterine activity in most cases, with frequent bradycardia, tachycardia, accelerations and decelerations greater than 30 b.p.m.” In four instances, loss of beat-to-beat heart rate variability occurred precisely at the time of male or female orgasms. Interpersonal relations indeed.

Similarly potent effects of mother-fetus interrelations were seen in ultrasound studies of 28 panic-stricken mothers at the time of an earthquake in Italy (Ianniruberto & Tajani, 1981). All the fetuses showed intense hyperkinesia which lasted from 2 to 8 hours; movements of the prenatals were “numerous, disordered, and vigorous.” Another study shows that a prenatal feels the difference between waiting for a routine ultrasound and waiting for amniocentesis (Rossi et al., 1989). Amniocentesis raises anxiety in mothers and stimulates greater fetal activity.

Occasionally, relationships have a fatal outcome. Goodlin (1979) reports several cases in which pregnant women were shot or were extremely frightened but were physically unhurt. However, the fetuses died, perhaps overcome by emotion. But relationships need not be fatal to be harmful. Much recent research reveals that prenatals tend to learn depressed behavior from depressed mothers (see review by Field, 1995).

Research on the complex mutual interaction of mother and fetus has been a busy area of prenatal psychology since Lester Sontag and colleagues began their work at the FeIs Institute in the 1930s (Sontag & Wallace, 1934; Sontag, 1941, 1965). In those days, it was news that a fetus would respond with a change in vital signs to sound outside the womb, or to a mother’s fear or fatigue. Later research would show correlations between maternal distress and developmental problems and illness (Connolly & Cullen, 1983; Stott, 1973), or birth complications and infant mental illness (Batchelor et al., 1991; Feldman, 1981; Reading, 1983; Zitrin et al., 1964). Exemplary surveys on this relationship were published by Anthony Ferreira (1960, 1965, 1969) and Ashley Montagu (1962). I think we can interpret many of these correlations as evidence of negative learning by means of interpersonal intelligence. Precocious interpersonal

intelligence is evident in premature and newborn babies imitating various facial and manual gestures and expressions of happiness, sadness, and surprise (Field et al., 1983; Meltzoff & Moore, 1977; Meltzoff, 1985).

Clinical case. James Herzog (1983) presents the case of Marta, born at 32 weeks g.a. immediately following her parents' sexual intercourse. Marta had her first psychiatric consultation at just two weeks of age. She went on to develop a "pain complex" in which she constantly sought pain in order to feel alive. It would be hard to explain how this pathology was acquired had there been no sensitivity to interpersonal relations.

Parent Report. Mac Freeman (1987) writes about the approach of an expectant father, Ray, who was eager to establish a line of communication with his unborn child. Each night he would bend over close to the womb and say, "Hoo, hoo!" In the 25th week of gestation, he felt a bulge coming up into his cheek from the baby's foot. Repeating his greeting on the opposite side, a foot came up there as well. Relationship established, father and child played this game of "tag" successfully every night for 15 weeks before birth. (And Ray had the same results with the next pregnancy.) We are indebted to parents like Ray for anecdotal evidence of this kind. It is priceless in warning us of the ability of prenatates to socialize, communicate, learn, and play—a manifestation of interpersonal intelligence long before birth.

Implications and Conclusions

We have surely come a long way from thinking of the fetus as a "witless tadpole," as the eminent French educator Jean Jacques Rousseau once put it over 230 years ago. Today, we strive to find the true dimensions of that intelligence. While neither Robert Sternberg nor Howard Gardner hint that prenatates can be intelligent, I think the evidence cited here indicates that prenatates demonstrate all the behaviors which are set forth as criteria for intelligence. The urgency of accepting this, in my opinion, is that until we accept the intelligence of the unborn, we ourselves will not show much intelligence in the way we relate to them. We are not fully awake to the reality that the baby in the womb is entirely connected to the mother's life and experiences and perceives the world through her.

Prenatal intelligence is a direct and inescapable issue for all parents. From the earliest awareness of conception, the quality of the parents' intention and love will be revealed to the baby. Babies experience the difference between unconscious, unintentional "parenting" and conscious conception which carries deep desire, welcome, and love. The difference is reflected in infant mortality statistics, as unwanted babies have more than twice the risk of death in the first 28 days of life (Bustan & Coker, 1994). Parents today have the freedom to communicate directly and indirectly, minimally or greatly with babies in utero. A new option is following an organized program of activities designed to stimulate all the

senses and to exercise the many dimensions of intelligence which are latent in the child. The programs are an invitation to parents to express fully their feelings and intentions. Programs of stimulation and prenatal bonding provide an opportunity for the baby to feel addressed, wanted, trusted, and appreciated as an intelligent, responsive being. With or without programs, parents are powerful in their ability to love and interact creatively with their babies in the womb. This message is especially important for parents who are in poverty, because they do not have to buy something to stimulate their babies. There is always the opportunity to sing, talk, and play with the soul in the womb. And every time babies feel loved and wanted, they are in joy and develop harmoniously. The attention of the mother will always bring them joy.

Exploring the territory of life before birth calls for setting aside historic and personal prejudices and opening the heart to great delights and great responsibilities. Arriving at the truth about prenatals may require going beyond “expert” opinions and following one’s own intuition. Providing a safe womb in which to grow a well-built brain and body is a central challenge. “Labor” actually begins before conception, not at birth. Prenatal psychology is assisting in the construction of a larger paradigm about the nature of prenatals and neonates, one that moves away from talk of “reflexes” to talk of sentience; from “brain” talk to talk of mind; from “conditioned learning” to talk of logic, thinking, and telepathy. In probing the mysteries of intelligence before birth, parents and professionals alike are working at the interface of flesh and spirit. All our efforts should presume the sentient and spiritual nature of babies; we should scrupulously avoid trauma, and always nourish baby persons as true humans.

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