

Is There Intelligence Before Birth?

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Full Text: Headnote ABSTRACT: The concept of intelligence embodied in I.Q. tests seventy five years ago is now being radically redefined in psychology. New approaches formulated by Robert Sternberg (1988) and Howard Gardner (1983) are many-dimensional, behavioral, and closely related to everyday living. In this presentation experimental, clinical, and anecdotal evidence about life before birth is marshalled to meet the proposed criteria of intelligence. Six specific implications and conclusions are drawn. The author believes that the field of prenatal psychology is assisting in the creation of a new paradigm about unborn babies.

INTRODUCTION During the 20th century psychologists have been wrestling with the concept of intelligence and how to measure it (Spearman, 1904; Thurston, 1938; Guilford & Hoepfner, 1971; Sternberg, 1979). It was seventy-five years ago that the famous Binet intelligence test was first published in Paris, yielding its famous "IQ" rating. This was a milestone in psychology which has affected most of us in one way or another. Over the years, the weaknesses of these paper-and-pencil tests have become more obvious. They have been criticized as academic, narrow, culturally biased, and unfair to minorities (Block & Dworkin, 1976). One problem was that the tests defined intelligence; that is, intelligence was what the tests said it was, yet the tests did not sample the full range of important abilities. The subtle message which spread through our culture was that a test would tell you whether you were intelligent or not. This certainly put newborn babies at a disadvantage. How could a baby pass one of these tests and be declared intelligent? How could we even think that a baby could have intelligence when it hadn't been to school yet, couldn't write, and didn't know anything? Most people concluded that babies were not intelligent. Some, in fact, would still argue that babies, like Winnie the Pooh, have such "little brain" that we should not expect them to be intelligent. The very real intelligence of newborns is something I have been writing about in a dozen published papers and the book *Babies Remember Birth* (Ballantine Books, 1990) containing abundant evidence of unexpected perception, knowledge and even wisdom at birth. I continue to fervently wish that the whole world (and especially parents) would wake up to this impressive intelligence. However, my focus in this paper is on the intelligence of the unborn. If newborns have a credibility problem, think how much worse it is for the unborn. The odds are stacked against them. Consider the fact that as you push back in gestational age you have less and less brain until finally you have none at all. How credible, then, is any prenatal intelligence? That is the question I address here, prompted by two recent proposals which specify intelligence as never before; one is by Robert Sternberg of Yale University who expounds on *The Triarchic Mind* (1988) and the other by Howard Gardner of Boston University and Harvard University (1983) who elaborates a theory of "multiple intelligences." Space limitations do not allow me to treat Sternberg's theory in detail but I want to introduce the key ideas and give at least one example of how the fetus might qualify under this theory. Please understand that neither theorist makes any comment about intelligence before birth.

STERNBERG'S THEORY OF INTELLIGENCE: THE TRIARCHIC MIND Robert Sternberg (1988) celebrates three distinct but interrelated aspects of intelligence shown by people leading their everyday lives. An individual may be strong in some aspects of intelligence and weak in others. He believes that intelligence can and should be increased and has developed a program to do that (Sternberg, 1986). To him, intelligence is mental self-management; this involves capitalizing on strengths, utilizing experience, and mastering the environment. It includes what psychologists have referred to as self-regulation and learning (Rovee-Collier, 1987; Lipsitt, 1990). Successful selfmanagement comes down to (1) purposive adaptation to an existing environment, (2) selection of new environments, and (3) the shaping of existing environments into new ones relevant to one's life and

abilities. This language is well suited to prenatal psychology which from its earliest days has referred to the womb as our first environment. In this environment—a host of modern studies prove—the fetus is active, responsive, and influential (Liley, 1972; Verny & Kelly, 1981; Demause, 1982, Chp 7). 1. An example of the first intelligence, purposive adaptation, would be in how prenatals respond to entry of a needle during amniocentesis. Mothers, watching the procedure on ultrasound, have seen the fetus retreat; others have reported the fetus repeatedly striking the needle barrel (Birnholtz, Stephens, & Faria, 1978). Investigators note decreased breathing movements for two days (Manning, Piatt, & LeMay, 1977), loss of beat-to-beat variation in heart rate, and remaining motionless right after needle withdrawal (Neldam & Pedersen, 1980). Are these not intelligent reactions to sudden invasion of the womb? 2. If intelligence is manifested by selecting a new environment we could cite a host of selective, discriminative, and preferential behaviors in the womb (Ray, 1932; deSnoo, 1937; Bernard & Sontag, 1947; Smyth, 1965; Liley, 1972; DeCasper & Sigafos, 1983; Tatzler et al. 1985; Korner et al. 1990). Perhaps the ultimate in environmental selection is dreaming. Sonographic studies show that REM activity begins at 23 wks g.a. and becomes more frequent from 24 to 35 weeks (Birnholtz, 1981). EEG studies of premies confirm an active dream life. In dreams prenatals are mentally engaged, perhaps mentally diverted from regular routines in their day-to-day environment. 3. An example of Sternberg's third criterion, shaping the existing environment into a new one, would be how prenatals assert themselves and engage in protest by means of hyperactive movement and kicking. Parents watching violent movies (Raiders of the Lost Ark, and Platoon) have told me that their prenatals created such a disturbance for them they had to leave the theater. Presto, the environment is "shaped." These few examples suggest how the data familiar to us in prenatal psychology could be marshalled to meet Sternberg's criteria of intelligent self-management.

HOWARD GARDNER'S THEORY OF "MULTIPLE INTELLIGENCES" In his book *Frames of Mind* (1983) Gardner agrees 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 I.Q. close to genius level" (1983, p. 18)! As an alternative, he proposes seven types of intelligence, each semi-autonomous, 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, and the "personal intelligences" 6) intra-personal, and 7) inter-personal. It is not my purpose here to argue with these categories; I merely accept them and suggest prenatal data which might fulfill the stated criteria. The data I cite will include experimental findings, clinical reports, and personal stories, all of which, I believe, are necessary to develop a complete picture of life before birth. 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 a tool to remember things with, as a means for teaching and learning, and a vehicle for clarifying ideas and meanings. The roots of language are mysterious and still controversial, yet evidence now suggests that language learning begins in the womb. Some people persist in thinking that we need language before we can be intelligent; they seem to forget that you have to be intelligent to learn language. What about language before birth? Henry Truby (1975), one of the first to analyze infant cries with modern sound technology, discovered that cry patterns of premature infants "reveal at least token, and in some instances, specific correspondence to the intonations and rhythms and other speech performance features of the mother" (p. 67). By about 28 wks g.a., Truby found that voice spectrographs of mother and infant could be matched. Babies were indeed learning their "mother tongue." They were listening with great specificity, using the hearing abilities which they have as early as 14 to 16 weeks (Blum, 1991) or as late as 24 weeks g.a. (Birnholtz & Benacerraf, 1983). This means that in the course of a 40-week pregnancy a fetus will 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 & Spence (1982) are famous for a clever experiment in which mothers read "The Cat in the Hat"

to their prenatals 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 which gave them the familiar "Cat in the Hat." Other experiments suggest language processing before birth (DeCasper & Fifer, 1980; DeCasper & Prescott, 1984). Report from Russell. After seeing me on television in Los Angeles, Russell K. telephoned me about his language abilities between birth and two years of age. At that time 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. He observed the big difference between the original thoughts and their final expression in language. Language was distracting, a "babble," a lower level of communication, but he 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 as good at the latter as we are they could get the idea without having the vocabulary. 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* 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 didn't" his father said, "I never read this to you." As he read on, the boy kept saying he had heard it before. "No, I didn't read it. . ." Finally his wife remembered: "Yes you did, you read it day after day when I was pregnant." Report from mother. During Edward's gestation his mother and father watched the news on television every night. He was born at 29 wks and remained in the NICU for 3 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 fifteen and "severely retarded" but he has never lost his love affair with news language-something that had already happened by 29 weeks g.a. 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. Even an autistic child, he found, with all his restrictions in the cognitive and affective spheres, could sing back any piece he heard. Musical intelligence is a way of thinking with sound. It is a language in its own right. It is 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 closely to music and learning from what they hear. Chapman (1975), a doctoral student at New York University, played "Brahm's Lullabye" to pretermatures in a nursery and found that they gained weight faster and were able to leave the hospital a week sooner than babies who didn't 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 and kicking and moving violently to Beethoven, Brahms, and rock-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) in North Carolina. 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 this music. 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 felt strongly that this was the instrument she should play. Later on she discovered that her birth mother had played the saxophone during her pregnancy-before she was given up for adoption. Child report. Jamie Emerson, six months of age, reproduced whale sounds which he had heard on an audiotape his parents played before he was born. Logical-Mathematical Intelligence Logical or mathematical reasoning-surely the least likely of all the

intelligences for the unborn-involves building and testing 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 required. Adults tend to think 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 (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 wks g.a., and plays constantly with the umbilical cord. As far as logical thought is concerned, Inhelder & Piaget (1958) estimated that this might not be attained until mid-adolescence. In contrast, psychologist Tom Bower makes a strong case for logic in the first weeks after birth (Bower, 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, hypothesis-testing, built to detect conjunctions between events and fit them into a predictive framework. He calls a human baby "the most powerful learning system in creation" (Bower, 1989, p. 151). Obviously this requires thinking. Brent Logan (1987) has invented a curriculum of sonic impulses which are designed to be played to the fetus beginning in the sixth month of pregnancy. The sounds are broadcast in a progressive array of repeating patterns that might appeal to mathematical intelligence. He hopes to prove that these repetitions, elaborated logically, will stimulate brain growth and cognitive potential without overstimulating the fetus and having unwanted side effect. Acknowledging newborn logic is a giant step forward for academic psychology but only a tiny step for those engaged in consciousness research (Grof, 1975, 1988; Ring, 1980; Stevenson, 1977, 1987). Hypnotherapy, rebirthing, yoga, meditation, psychedelics, near-death experience and other forms of trance experience open up a world of thinking and memory apparently open to all, regardless of age. In consciousness, we are not well described as embryo, fetus, premie, or neonate; we are persons. Clinical report. My client Anne, in hypnosis, recalled being in the womb overhearing a conversation between her mother and her sisters. When mother announced that a new child would be coming, her sisters said they were against it, didn't want one. They were openly hostile. In her thirties Anne reported that she had always felt alienated from her sisters and lived in a constant state of siege, as if she needed to protect herself at all times. After recovering this womb memory, she no longer felt "at war" with her sisters or the world. Another client, Ida, also in hypnosis, recalled a problem at her conception-something that should be impossible. Ida said her parents were drunk at her conception and her mother had been forced to have sex by her father. Therefore she didn't feel it was appropriate to enter at that time. Instead, she waited in a blissful realm, safe and beautiful. Afterward she said that remembering this was "the greatest religious experience" in her life. Without a brain at the time, she seemed perfectly capable of understanding what was going on. Clinical data 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 mistake, while drunk, conceived when unwanted, wanted for the wrong reasons, or when sex was a "duty" of the mother. Levand uncovers the false reasoning buried in these memories and offers methods designed to correct them. 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 myself favor, because it is the only view of memory and learning broad enough to comprehend all the data now available (Stevenson, 1975; Moody, 1976; 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 and Troye Turner's group method using "The Whole Self to gain impressions from

preconception to birth also reveal 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 find our way around by a kind of mapping and recognition of objects and scenes. Using this intelligence we conjure up mental images and use them in arts and crafts, photography, inventions and other imaginative processes. Although this intelligence often utilizes vision, it can be achieved by the blind also, an important fact because this is the situation for the unborn. Do prenatals 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 pattern of alternating rest and activity. When active, sporadic kicks against the uterine wall may be strong enough to displace the whole fetus from its resting place before it subsides slowly 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 ten minutes without some gross activity (Roberts, Griffen, Mooney, Cooper, & Campbell, 1980). We cannot help speculating about the constant interaction between hand and cord and hand and mouth (Straub, 1971). Is it an exercise in spatial intelligence? Mental images must be the stuff of dreams. As noted before, dreaming is detected in utero around 23 weeks. EEG studies with premies reveals that dream activity is maximum around 30 weeks and tapers gradually downward through the whole life span (Roffwarg, Muzio, & Dement, 1966). Practice in imagery would seem to have priority in development because REM sleep develops at least ten weeks before deep, quiet sleep (Birnholtz, 1981). Child report Marnon, at almost three years of age, had 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 Elizabeth Floyd, around three, looking at a photo of her pregnant mother, spoke of a "snake" in the womb (Chamberlain, 1988, p. 99). She explained it was trying to eat her but reassured her mother it wasn't a poisonous snake. This is a naive but credible description of the umbilical cord. Less credible was her report that there was a "doggie" in there too. 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 spent a lot of time on mother's stomach. Peyton's spatial awareness incorporated the area immediately around as well as within the womb. 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. 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 wks and is being myelinated at 16 wks) helps us balance. And preceding all this movement must be some elements of choice, intention, or purpose. Obviously, this body intelligence is often blended with spatial intelligence, the use of the space around us. Sonograms alert us to the fact 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, extension and flexion of back and neck, turning of the head on the neck, waving arms and kicking legs, flexing of the feet, and after 12 weeks, jaws move up and down and there is lots of hand-face contact (Van Dongen & Goudie, 1980). Such exercises may continue as long as seven minutes. During this activity the fetus moves from its usual position but will always return to rest in the lowest part of the sac. This vigorous movement program will continue without much change throughout the entire pregnancy. Neurologists call these movements "endogenous" and "spontaneous," meaning that they originate

from within and represent initiative on the part of the fetus (deVries, Visser, &Prechtl, 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-for-all play? Fetuses certainly spend a lot of time practicing moves which will be needed later. Maybe it's 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 ("quickening") before 16 to 22 weeks, there is a great deal of movement going on in early pregnancy when there is more room. The fetus changes ends in the uterus by propelling with legs and feet. Changing sides employs what Liley calls "an elegant longitudinal spiral roll" (Liley, 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 There are two "personal" intelligences: intra-personal, and interpersonal. 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, e.g., pain and pleasure, and to respond appropriately by becoming more involved or withdraw. 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 and could be seen in both animals and people. Scowls and grins also seem to be cross-cultural. Stanley Greenspan (Greenspan &Greenspan, 1985) writing about "first" feelings proposes six emotional milestones, beginning with age zero to three; there is no mention of feelings before birth. Feelings may be assumed from sonograms which show erections in male prenatals by at least 26 weeks (Hitchcock, Sutphen, Scholly, 1980). The fact that they were sucking their thumbs at the same time is a further suggestion of pleasure. (What females are doing and feeling at this time is not so obvious.) The smiles seen on the faces of premature babies while dreaming surely reflect pleasant, rather than unpleasant feelings (Roffwarg, Muzio, &Dement, 1966). Likewise, the variety of disturbed looks on their faces in different dreams should indicate unpleasant, rather than pleasant feelings. This means we are looking here at a range of emotions. I'm assuming, of course, that if premies are dreaming outside the womb, babies the same gestational age are dreaming inside the womb. I call your attention to the fact that if they are dreaming at all they are engaged in intrapsychic, intrapersonal cognitive activity, perhaps even processing their own experiences to date. Emotions of fear, anger, and hurt are probably manifest in the earliest fetal cries, documented back to at least 21 weeks g.a. (Humphrey, 1978). It would be unfair to assume that these crying prenatals don't care, don't feel, and have nothing to cry about. Squalling in the womb (vagitus uterinus) is a rare phenomenon supported by over 140 citations in the medical literature going back a hundred years (Ryder, 1943). Yet, some experts on the infant cry say "there appears to be little justification in carrying out any serious discussion about prenatal vocalizations" (Hollien, 1980, p. 25). Obstetrics professor Robert Goodlin takes the opposite position. After describing the crying in utero which occurred after air amniograms, Goodlin writes, "It therefore 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 with air available we would hear crying often. 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 the baby (Blair, 1965; Russell, 1957; Thiery et al., 1973). Are these cries not intelligent signals? The importance of squalling in the womb is easily overlooked. Note that emotions exist before they are expressed. The cry sound, for example, is not the emotion itself but what calls attention to the emotion. (Do you always make a sound when you have an

emotion?) Because on occasion, we can actually hear the sound of crying in the womb, we must awaken to the possibility that prenatals may be feeling many emotions, only a small portion of which we can ever expect to hear. The anguish that premies have suffered at the hands of surgeons using muscle paralyzing curare but no painkillers is an example of silent, inexpressible emotion-inexpressible because they are paralyzed and cannot cry or protest (Harrison, 1986; Lawson, 1986; Chamberlain, 1991). Can you imagine the emotion generated by this treatment? One such child endured a shunt operation for microcephaly as a premature infant. As a result of multiple punctures and procedures he became phobic of doctors and hospitals. In addition, because he lost large patches of skin from his chest and abdomen when adhesive pads and tapes were removed this child learned to startle and be distressed at the sound of tape being torn. Is this not intelligent? Surely this premie had access to inner feelings and tried to withdraw. 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," an occasion when the surviving fetus may well experience grief, anger, and despair. She estimates that in about 4% of pregnancies, a co-twin dies at some time during gestation, sometimes early enough to leave no obvious trace. Nevertheless, these deeply repressed memories of loss are emerging in various kinds of therapy. I have encountered this several times in my own practice. When such memories do surface, they witness to what the cotwin was feeling at the time of loss. Memories of attempted abortions are also coming to the surface in various therapies. The feelings include anger, hate, fear, distrust, depression, and anxiety (see Ridgeway, 1987, p. 85 about this in the work of Frank Lake). I have known similar strong feelings to erupt in prenatals whose mothers went on diets and left them starving inside. Personal Intelligence: Interpersonal 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 thinks may be the origin of this intelligence. Although interpersonal skill and knowledge is of tremendous importance in all societies, it has been ignored or minimized in the field of cognition. The sense of self forms a base for the knowledge of others. Gardner, with other developmental psychologists, thinks that the sense of self appears sometime in the second year of life (White, 1985; Greenspan & Greenspan 1985; Stern, 1985). Womb life is an exercise in relationships. Bonding between infants and parents begins here (Church, 1988; Marnie, 1989; Verny & Weintraub, 1991). To a prenatal the mother's rhythmic breathing, heartbeat, handclapping, dancing and singing must be irresistible. The old view that prenatals and neonates are egocentric should probably be supplanted by a duo-centric view. Educator Mac Freeman (1987) refers to the constant interaction of womb life as "duet learning." In utero, mutuality is unavoidable where mother and baby eat together, breathe together, sleep together, and perhaps smoke cigarettes and fall down the stairs together. An illustration of this intimate relationship is what happens to prenatals when their parents have sexual intercourse in the third trimester (Chayen, Tejani, Verma, & Gordon, 1986; Goodlin, Schmidt, & Creevy, 1972). Couples who monitored themselves and their prenatals during this process discovered that orgasm caused "excessive" uterine activity in most cases, with frequent bradycardia, tachycardia, accelerations and decelerations greater than 30 bpm. In four instances loss of beat-to-beat heart rate variability followed male orgasms! Interpersonal relations indeed! Similarly potent effects of mother-fetus interrelations can be 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." Merely waiting for routine ultrasound does not seem to disturb mothers and babies but awaiting amniocentesis raises anxiety in mothers and stimulates greater fetal activity (Rossi, Avveduti, Rizzo, & Lorusso, 1989). Occasionally, relationships have a fatal outcome. Goodlin (1979) reports several cases in which pregnant women were shot or were extremely frightened but physically unhurt and the damage nil; however, the fetuses died, perhaps overcome by emotion.

The interpersonal impact of mutual experiences need not be dramatic to be harmful. Recent research with over 1,000 mothers and infants at term showed that mothers who had been depressed during pregnancy were more likely to have newborns who cried excessively and were inconsolable (Zuckerman, Bauchner, Parker, & Cabral, 1990). Research on the complex influences between mother and fetus has been a busy area of prenatal psychology since Lester Sontag and colleagues began their work at the Fels Institute in Ohio in the 1930's (Sontag & Wallace, 1934; Sontag, 1941; Sontag, 1965). In those days it was news that a fetus would respond to sound outside the womb, to a mother's fear or fatigue with a change in vital signs. Later research would find correlations between maternal distress, developmental problems and illness (Stott, 1973; Connolly & Cullen, 1983), birth complications and infant mental illness (Zitrin, Ferber, & Cohen, 1964; Feldman, 1981; Reading, 1983; Batchelor, Dean, Gray, & Wenck, 1991). Exemplary surveys in this field were published by Anthony Ferreira (1960, 1965, 1969), Ashley Montagu (1962), and Roger Stevenson (1977). I think we can interpret many of these correlations as evidence of learning in an interpersonal context by means of interpersonal intelligence. Interpersonal precocity is evident in both newborns and premies in the ability to imitate various facial and manual gestures and expressions of happiness, sadness, and surprise (Meltzoff & Moore, 1977; Field et al. 1983; and Meltzoff, 1985). Clinical data. James Herzog (1983) presents the case of Marta, born at 32 weeks g.a. immediately following sexual intercourse of her parents. 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 experimental 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. Repeating his greeting on the opposite side, another bulge came up to meet him. Relationship established, father and child played this game of "tag" successfully every night for fifteen weeks before birth. He had the same results with the next pregnancy. We are indebted to parents like Ray for evidence of this kind; it is priceless. It warns us of the ability of prenatals to socialize, communicate, learn, and play—a manifestation of interpersonal intelligence—long before birth.

IMPLICATIONS AND CONCLUSIONS

1. We have come a long way from thinking that "the fetus is a witless tadpole," as Rousseau once put it. I think the famous French educator would happily change his mind if he knew what we know today, but, after all, that was 230 years ago. We are still a long way from acknowledging the intelligence of the unborn.
2. While neither Sternberg nor Gardner hint that prenatals can be intelligent, I think the evidence cited here indicates that they demonstrate all the behaviors which are set forth as criteria. The urgency of accepting this, in my opinion, is that until we accept the great intelligence of the unborn, we ourselves will not show great intelligence in the way we relate to them.
3. In exploring the territory of life before birth we must be prepared to set aside both historic and personal prejudices and open our minds and hearts to great surprises. Arriving at the truth about prenatals often calls for rising above scientific dogma and "expert" opinion, being true to our own observations, and showing respect for the full range of evidence—experimental, clinical, and anecdotal—available to us today.
4. In modern times, environment has taken on new meaning and critical importance. The womb, our first environment, is not necessarily a safe place. To provide a favorable environment for the encouragement of intelligent, healthy, creative human beings parents must show extraordinary vigilance and dedication. Their labor begins before conception; prenatal bonding is a reality, for better or for worse. I'm not sure they know these things.
5. A baby of any age is more than "physical" stuff, more than "brain" stuff. From clinical and experimental work and from personal stories we have learned that intelligence, wisdom, and selfhood go beyond the physical "substrates" that we used to think created them. They manifest without regard to age. This jarring discovery may signal the end of an era of scientific materialism which delayed discovery of human consciousness.
6. Because of all this, I believe that prenatal psychology is assisting in the creation of a new paradigm about babies, moving 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. Unavoidably, we are working at the interface of flesh and spirit. Fellow enthusiasts in pre- and perinatal psychology, search diligently for intelligence. Expect intelligence. Celebrate intelligence wherever you find it—the intelligence that is in us and in our babies; the intelligence that we are.

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