Coming into the World:
A Dialogue between Medical and Human Sciences

Edited by
Giovanni Battista La Sala, Piergiuseppina Fagandini, Vanna Iori, Fiorella Monti, Isaac Blickstein

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Foreword

In October 1998, I was invited to attend a meeting in Reggio Emilia. As a first-time visitor to this region of Italy, I was initially introduced to the world famous parmigiano, prosciutto di parma, and to the aceto balsamico di Modena. However, these palatal delights were only the seasoning to a conference with a highly intriguing theme: *"Special Children and Parents: From the desired to the real child"*. At this weekend in Reggio Emilia I learnt about the keen interest of the conference president – Dr. La Sala – in a holistic approach towards patients undergoing infertility treatment.

Since that meeting, my ways with Dr. La Sala crossed numerous times, in scientific meetings as well as in research collaborations. In addition, during this period, I became acquainted with La Sala's group and their close teamwork with humanistic disciplines in Reggio and Bologna.

It was thus only natural to learn about the Modena congress – *"Coming into the world: a dialogue between medical and human sciences"* – which is, to the best of my knowledge – the first scientific attempt to encompass the myriad humanistic aspects of the complexities of reproduction. I was honored to accept the invitation extended by the Editors – La Sala, Fagandini, Iori, and Monti – to be responsible for the English version of a book that will be cover the main topics of the Modena congress in September 2006.

The production of this book had several difficulties that had to be resolved. First, it was the duty of the Editors to select the topics for this book from the presentations of the congress – not a simple mission at all given the high quality of the speakers as well as importance of all subjects. I am indebted to the Editors for their outstanding work.

Second, we had to translate multilingual contributions into English. This mission was skillfully done, supervised, and coordinated by Gillian Mansfield (Associate Professor of English Language, University of Parma), and by the Parma team including Niamh Boland, M.A, Michela Canepari, Ph.D, Alex Gillan, B.A., Natasha Huff, B.A. and Joan Rundo. I am deeply thankful for their efforts to make my editorial work much easier. The reader should however note that differences in style were inevitable, owing to differences in citations used by medical as compared to humanistic disciplines.

Third, the Editors are happy to illustrate this book with drawings from Reggio Children (Diana Municipal Preschool of Reggio Emilia) compiled by Annamaria Mucchi. These paintings best illustrate the authentic voice of childhood, in line with the theme of this book.

Finally, special thanks should be given to the Publishing house – Walter de Gruyter GmbH & Co, Berlin, and especially to Dr. Stephanie Dawson – Editor of Medicine & Sciences, for the invaluable help in all production steps.

Isaac Blickstein, MD

1. Preface: The “normal” complexities of coming into the world

Giovanni Battista La Sala; Department of Obstetrics and Gynecology, S. Maria Nuova Hospital, Reggio Emilia, Italy

The sound of the first cry of a newborn is a joyful event, yet full of conscious and unconscious mysteries of the past and the future. It is the symbol of the “normal” and, one might add, “mysterious” complexity of coming into and being in the world.

During life, birth is an intermediate stage of a long journey which “is born” from a desire-project of the parents, it is made materially possible by means of pregnancy and childbirth, and it is given concrete realization in extra-uterine life. Birth is a link between the past and the future, it is an important and complex piece within an even more important and complex totality, such as is human life.

The author of this text is an example of a gynecologist-obstetrician who has been trained and exercises his profession in a contemporary western society. My institutional role is that of supervising as best as I can the biology and anatomy of pregnancy and childbirth. In that respect, society has not only taught me how to do so, it requires me to do so. On the other hand, as far as I know, my institutional role symbolizes the division of medicine, which, as a model exerts its power not only in Italy but in all Western civilization.

During my thirty years of professional career, I gradually became aware of the objective and subjective limitations, at times very frustrating, of my “technical” role in pregnancy and childbirth. Indeed, I began to feel the need to go beyond the institutional “ghetto” in order to seek “help” from other sciences, such as the humanistic ones, in order to perform better my role as a “technician” and to learn more about what occurs before and after pregnancy and childbirth. I attempted to discuss my frustrations and my desire to try and modify the present state of affairs and re-build the existing bridge between medical and human sciences with Pinuccia Fagandini and Fiorella Monti, psychologists, and with Vanna Iori, family pedagogist. I was truly and pleasantly surprised to realize that we share the same wavelength and that we would be able to work together.

This is how the idea of this International Congress in Modena was conceived. This was then followed by the idea of publishing the proceedings of the Congress in Modena not only in Italian but also in English, as if to leave a message in a bottle that makes its way round the world.

The Modena Congress and this publication have been made possible thanks to the work of so many people to whom I give my sincere thanks. Particular thanks go to Serono S.p.A., who following a generous tradition known to obstetricians and gynecologists has provided an important financial contribution for the realization of this Congress and the publication of this volume.

2. Let children speak

Sandra Piccinini; Nursery and Pre-School Institution,
Reggio Emilia, Italy

"What am I doing here? Tell me".

You may wonder why a quotation from Alice in Wonderland should be used at the opening of an International Congress such as this by the President of a Children's Institution.

It is correct to let children speak, as if we were borrowing from learning. In times such as these, children are great help to us in extending our knowledge, in times when – as Loris Malaguzzi claimed – "it is necessary to reunite disciplines, since each on its own is helpless, each one needs to find some sort of trans-cultural solidarity". This interaction between disciplines and between different forms of learning becomes necessary if our thoughts are to be more connected than up to now.

This, I think, is also the aim of this congress: to compare various points of view on *coming into this world*.

The collaboration between the pre-schools of Reggio Emilia (in particular Diana – recognized internationally as a high level pedagogical project that is both qualitative and innovative) and Prof. La Sala did not begin today: "Mamma Onda" was the first of a series of collaborations in which we were able to find a common research approach. Research and exchanging knowledge will be the common denominator of this Congress, which we hope will achieve further competence in the daily work of all of us.

With this, let children speak:

The sea is born from mother wave.
The weather is born from the storm.
The wind is born from the air and takes shape by flapping
Time is born from years.

3. Modern reproductive medicine and the definition of parenthood: Praeter Naturam

Isaac Blickstein, MD; Department of Obstetrics and Gynecology, Kaplan Medical Center, Rehovot, and the Hadassah-Hebrew University School of Medicine, Jerusalem, Israel

Introduction

God blessed them. God said to them, "Be fruitful, multiply, fill the earth, and subdue it …" Genesis 1: 28.

Reproduction is an intrinsic component of life. Without reproduction, life does not seem to be complete and, therefore, reproduction is an existential drive. As the passage from Genesis clearly states, reproduction is also a divine command. From a biological perspective, reproduction is quite simple and entails the mixture of DNA from male and female gametes to form a zygote. This zygote is then protected by a specialized organ of the female to allow differentiation and growth of the embryo-fetus. Finally, the products of conception are expelled in a timely fashion to allow the delivery of an offspring that is capable to survive.

This pattern of reproduction is followed, as a rule, in the entire animal kingdom and reproduction is considered impaired if one of these components is defective. Species-specific differences in this pattern are believed to represent clever ways that nature selected to circumvent specific obstacles to a successful outcome. In the human, the formation of the zygote in the oviduct by the postcoital unification of a single spermatozoon and a single oocyte, is followed by implantation, pregnancy, and birth. However, as far as we know, there are no natural solutions to overcome reproductive obstacles, and hence, the inability to reproduce is essentially unresolved unless some form of man-made intervention is implemented.

The probably oldest intervention in reproduction is cesarean section, aimed to help women who are unable to conclude the reproductive sequence. At the same time, no other advances have been made for centuries to overcome other reproductive obstacles. A distinct change in this construct occurred when effective infertility therapy became available and about three decades ago when the first in vitro fertilization (IVF) baby was born. These novel methods created puzzling deviations in the classical definition of parenthood, and re-shuffled all that we consider as natural reproduction.

This chapter discusses several examples of current reproductive medicine that significantly depart from the natural course. As Aristotle (300 BC) described similar circumstances, the argument will be that such deviations are beyond the nature's common course – praeter naturam.

Fatherhood

Data from more than twenty years suggest that the male factor is at least partly responsible in about 50% of infertile couples (approximately 30% of man only, and in 20% both man and woman are abnormal). The deviation from the natural course of reproduction begins in these cases with artificial insemination, whereby sperm is injected rather then ejaculated into the lower female genital tract and circumvents the natural way of conception. In even a more sophisticated way, sperm is directly injected, in vitro, into the female gamete, in a method called intracytoplasmic sperm injection (ICSI). One step further was the observation that sperm is actually not needed for fertilization. This led to sampling primordial spermatic forms from the testicles or ejaculatory tract (epididimis) by methods like TESA (testicular sperm extraction) or MESA (microsurgical epididymal sperm aspiration) followed by ICSI.

Whatever autologous method is used, it is expected that in a monogamic relationship, the male partner is the father of the child born to a given woman. However, using donor sperm for artificial insemination or for ICSI, the offspring is obviously not a biological product of the couple. Fatherhood should therefore be considered according to other levels of parent-child relationship.

Motherhood

A popular adage implies that one cannot be sure who was his father, but can be certain who his mother is. This somewhat chauvinistic cliché is no longer valid in the era of modern treatment of infertile women. First and foremost was the acceptance that, in practice, women need their uterus but do not need their ovaries in order to conceive. Since the 1990s, pregnancies with donor oocytes have become commonplace in many countries. This finding, namely that fertility is dependent on ovarian-age but not on uterine age, was the basis for pushing maternal age to upper limits which were never encountered before. For example, the BBC announced on January 23, 2005, that a 66-year-old Romanian woman, Adriana Iliescu, become the world's oldest mother. Dr Bogdan Marinescu, who carried out the fertility treatment, justified the procedure by saying she was in an appropriate condition to give birth and needless to say that the mother encountered immense joy when her baby was born, five weeks early, after undergoing nine years of fertility treatment. The case has prompted criticism from health

professionals concerned about the medical risks and the impact on the child, since it is not clear how long the child will enjoy his mother.

Having said this, one should realize that there are pros and cons for pregnancy beyond reproductive age. Oocyte donation to postmenopausal women can be defended by societal practices, gender equality, and reproductive freedom. For societal practice, one may argue that there is no reason to assume that society, at large, will be harmed by allowing older women to conceive and that the parents have no physical and psychological resources for raising children at older age. Moreover, older parents are likely to be economically stable, more responsible, and have a more mature family unit. Regarding gender equality, one may argue that since older men are qualified to have children, denying women from this privilege is prejudicial and discriminative, albeit the offspring is not genetically her own child (as is the case with older fathers). Finally, if our society respects the rights of patients with life-limiting disease to procreate, the life expectancy of older mothers should not be a factor in reproductive choices.

The main argument against oocyte donation to women beyond reproductive age is that they exceeded a "natural" limit of reproductive capability, and compared this situation to oocyte donation to prepubertal girls. Thus the fact that teenager can sometimes be successful mothers is not an argument favoring teenage pregnancies. Conversely, the fact that grandparents can sometimes successfully raise children does not imply that older parents have emotional and physical energy to raise children. Finally, the increased risk of many pregnancy complications at older maternal age, for both mother and child, is also a strong argument against pregnancy beyond reproductive age.

The main ethical issue, raised by the American Society of Reproductive Medicine (http://www.asrm.org/Media/Ethics/postmemo.html), is whether the ultimate bearing and rearing of a child contribute to mutual well being of both parties – the women as well as the children – are served by assisted reproductive technology (ART) using donor oocytes. It could well be that societal and cultural pressures might push women beyond reproductive age to become mothers and it could be that children would eventually resent having mothers as old as grandmothers of their peers, and thus be adversely affected psychologically and socially by having older parents. In any case, postmenopausal pregnancy should always be discussed with both maternal and child interests considered together.

Going back to the cliché cited above, with modern infertility treatment, one may also be unsure whether the pregnant woman is the biological mother of the fetus. Surrogacy means that the surrogate mother, who has no genetic contribution to the offspring, is hired to substitute the biological mother and carry a baby that is given to those who employed her to do that job. It goes without saying that surrogate motherhood, albeit performed worldwide, is still controversial. Those in favor assume that surrogacy is beneficial to all parties involved: the infertile couple will have a biological child and the surrogate mother will receive a fair financial compensation. This view does not consider commercial surroga-

cy (i.e., not performed by a family member, friend, or driven by altruism) as potentially unethical. Those who are against surrogacy maintain that the risks outweigh the potential benefits, and that motherly emotions and antepartum bonding with the fetus that arise during pregnancy do not permit a genuinely informed consent by the surrogate mother to relinquish the baby postpartum.

Surrogacy is not restricted just to the uterus using a biologically distinct embryo produced by ART. One form of surrogacy is, in fact, carrying a 'semi'-autologous embryo, namely one that was conceived using the sperm of the male partner for intrauterine insemination. In such circumstance, the reproductive sequence just circumvents the coital act and the surrogate mother is also the genetic mother. Irrespective of how much the biological relationship between the surrogate mother and the unborn child is altered by the type of surrogacy, no doubt exists that all combinations form, in one way or another, profound medical, ethical, legal, and undoubtedly – also psychological – consequences. Consider, for example, the case of a British woman pregnant with twins that sued a California couple, alleging that couple who hired her surrogacy service backed out of the contract after she refused to perform a two to one reduction of the twins. (CNN, August 14, 2001; http://archives.cnn.com/2001/LAW/08/13/surrogate.dispute/index.html) The surrogate mother wants to carry the twins to term and find adoptive parents for them because she holds that the biological parents – wanting to perform an unselected reduction – are unfit to become parents of these children. In simple terms, a circumstance involving intimacy, love, parenthood, joy, and pleasure became a rent-a-womb situation, whereby the surrogate mother was interested in carrying the pregnancy in exchange for a fee whereas the biological parents were looking to rent space for the pregnancy period. This situation is certainly a challenge to the definition of parenthood.

Parenthood

Infertility and the derived bizarre situations are not restricted to the question of the 'real' mother in surrogacy. Consider the "five-person pregnancy" or "Angela" case which is a curious and controversial example of the consequences of ART, and casts serious doubts on the definition of parenthood. In March 1997, Reuter Information Service reported that a 37-year-old Italian mother of two, identified only as "Angela," had been implanted with two embryos created from the sperm and eggs of two different couples, after she agreed to act as a surrogate mother simultaneously for two infertile couples. The surrogate mother, a Roman Catholic herself, disagreed with the Church's opposition to both IVF and surrogate motherhood, and considered her altruistic effort to help others as undeserving of condemnation. It was then reported (Lancet, 1997) that Angela gave birth to a healthy boy and girl at 36 weeks' gestation but parenthood (i.e., which baby belongs to which couple) was only established by postpartum DNA

fingerprinting. This is probably the first example of twins who share no parents, share no genetic relationship with the surrogate mother, and share no genetic relationship with each other.

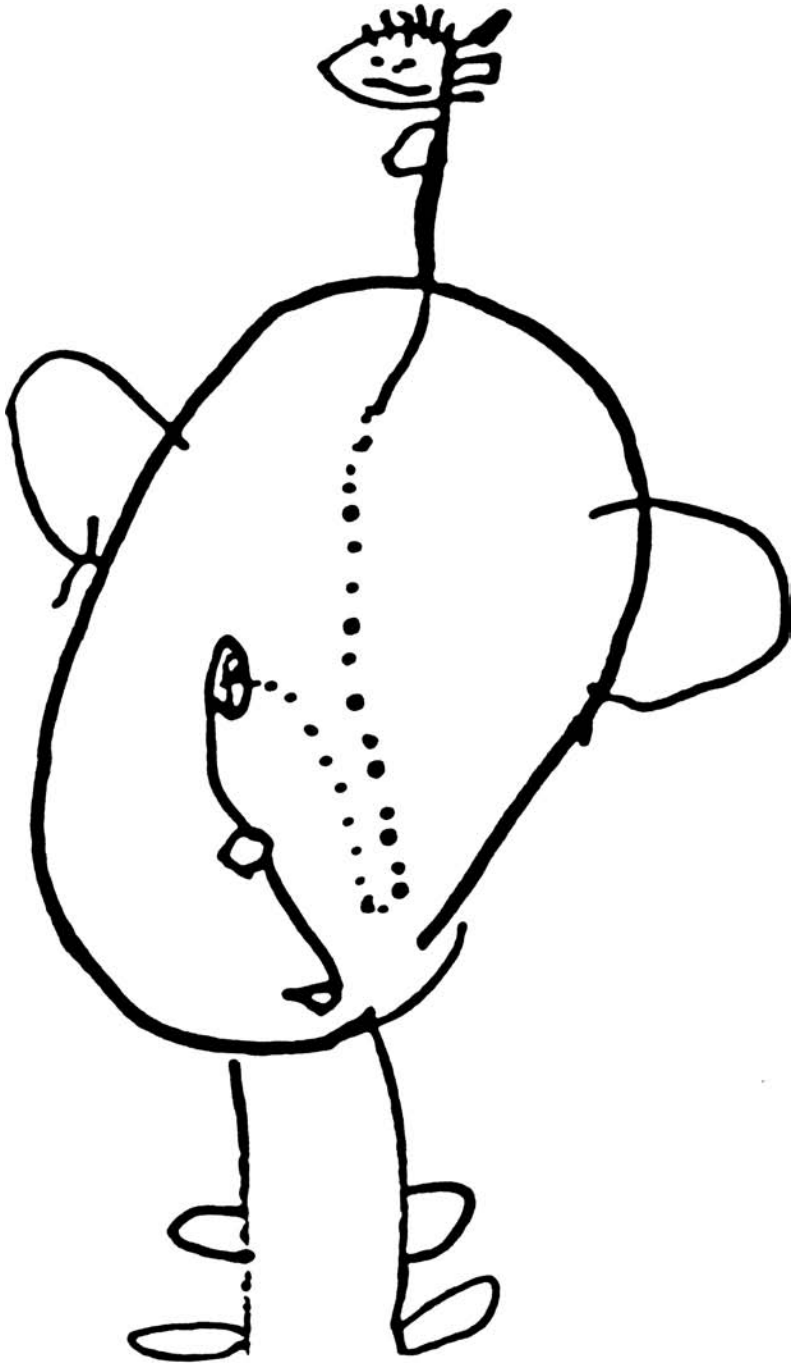
Another example was reported in May 2003 (http://www.smh.com.au) whereby the Supreme Court of New South Wales had to decide if frozen embryos implanted and born after their grandmother's death are entitled to inherit her. The will left her estate, equally divided, to the child or children of her son and daughter and about $1 million was left in trust to grandchildren "who shall survive me and attain the age of 25 years". The Court was asked to determine whether two frozen embryos, and their live siblings, should share in their grandmother's estate. The court concluded that while it was highly unlikely that the grandmother did not wish to benefit grandchildren born after her death, he would take the traditional definition of "survive" – that one had to be alive at the time of the grandmother's death. That excluded all the embryos, including the two children who have since been born.

This example suggests that frozen embryos, sperm, and more recently also frozen oocytes, may eventually lead to birth of a child, sometime long after the death of family member and thus could delay the distribution of the heritage. As the example given above suggests, such strange cases do occur. Whereas in the past, blood or legal marital ties seemed sufficient to document important relationships, currently, the existence of a pre-conception life is fully recognized, at least by legal terms.

Epilogue

This chapter discusses several examples of how ART-related circumstances changed the concept of fatherhood, motherhood, and parenthood. Some of these cases are obviously unique and by all means do not represent the vast majority of ART pregnancies and parentage. Nonetheless, these cases have a message. For example, several chapters in this book suggest that the baby is considered as part of the 'self' of the pregnant woman. How is this related to pregnancies following egg donation? How does the surrogate mother consider that 'self' when the embryo was created from heterologous gametes? How do these factors influence the decision about the mode of delivery? How does the male partner react to the entire pregnancy created by donor sperm and to the 'coming into the world' process, i.e., birth?

These cases, to a certain extent, point to the need for change in the traditional way of thinking and calls for open-mindedness to the unnatural way and new definition of parenthood: Praeter Naturam.



(Luca, 4 yrs. 3 mos.)
A baby grows in the mother's tummy because the mother eats and the baby eats the crumbs.

4. Self and dyadic expansion of consciousness, meaning-making, open systems, and the experience of pleasure

Ed Tronick; Departments of Pediatrics and Psychology, Harvard Medical School Cambridge, Massachusetts, USA; School of Psychology, Fielding Graduate University, Santa Barbara, California, USA

There is a connection between experience, including the experience of pleasure, creativity and development, which has to do with individuals making new meanings as well as their experience when making them. This perspective is based on the first principles of dynamic systems governing the operation of open biological systems, of which we, humans, are but one example (Tronick, 2005). These first principles assert that as an open complex system individuals seek energy in the service of maximizing their organizational complexity, including its coherence, integration and flexibility. Bridging between the principles of system theory and experience requires finding concepts that relate the principles governing the operations of *any* kind of biological system to the operation of *humans* as complex open systems. For me, such a concept is provided by Bruner's (1990) beguiling simple assertion that humans are *meaning* makers, a concept easily linked to dynamic systems' principles (Stengers, Prigogine, 1997). Humans, when thought of as meaning-making open systems, utilize energy to create complexly organized, coherent, integrated and flexible states of consciousness. States of consciousness are psychobiological states that contain the private meanings an individual gives to their place in the world. In the language of systems theory, states of consciousness are attractor states.

These states are organized moment-by-moment by the individual and function to organize and anticipate the future based on the immediate present and updated past; that is, to organize the whole individual's movement into the world. An individual's states of consciousness generate intentions and actions. Meanings, the elements assembled into states of consciousness may be in, or more likely out of awareness. In fact, meaning may only come into awareness when it is violated. Few of us walk around with an awareness of our belief in the existence of things until we confront a magician who makes things disappear. Indeed, though typically out of awareness, a state of consciousness has always an impelling certitude that the world ***is*** this way. An 8 month-old in one moment is absolutely certain that a hidden object is gone and in the next moment when the

object is brought into view the infant is absolutely certain that it exists. The two certitudes do not fit together but they are impelling in each moment.

States of consciousness are generated by self- and social- meaning-making processes of an embodied mind as individuals engage their own private meanings and the world of things and people. One of the most robust ways of expanding the complexity of an individual's state of consciousness is to create what I call a dyadic state of consciousness. Like Vygotsky's zone of proximal development, these states are a joint creation of two embodied minds bringing together elements from each of their own states into a shared dyadic state. As participants in this dyadic state, individuals appropriate new elements into their own state of consciousness and, as a consequence, the complexity of each individual's state of consciousness grows. Paradoxically, though systems principles suggest that the organism strives to maximize the coherence of their sense of the world, and even though these states have an impelling certitude, the states produced are always unpredictable and messy, and may be contradictory and incoherent.

The messiness is inherent to the process of meaning-making because of the large number of different kinds of meaning that must be integrated, limitations in the capacity of meaning-making systems, and the different kinds of a large number of meaning-making processes including affective, cognitive, memorial, linguistic, and bodily processes and psychodynamic meaning-making processes such as a dynamic unconscious, projective identification and transference. Nonetheless, the messiness of meanings is the stuff from which new meanings are created. Were states of consciousness are fixed, nothing new could be created and complexity could not be increased. An implication is that humans are more attracted to making meaning with others, as contrasted to objects, because messiness is always greater for the meanings made with people than with things or events in the world. Dyadic states of consciousness are joint creations and as such bring together the messy, unpredictable and inchoate features of each individual's state of consciousness. By contrast, most events in the inanimate world are predictable and simple by comparison, such that while new meanings may be created, the process is one of diminishing returns. Thus making meaning with others presents a greater possibility of the emergence of new meanings.

Returning to the principles of open systems, systems that successfully gain energy and become more complex and integrated. By contrast, when sufficient energy is not obtained, systems lose complexity and coherence, dissipate and move toward chaos and death. Thus organisms, human or otherwise as open biologic systems, are always engaged in a struggle against chaos.

But the term energy is too generic for humans. All systems struggle to gain particular forms of energy that they can utilize to increase their complexity; that is, not any form of energy for any given species will do. The food prey eat to provide energy for growth is not in an appropriate form for predators, though once it is formed in the body of the prey it can now be utilized by predators for

growth. Humans, too, are always engaged in this struggle against chaos, and the struggle is for energy in many forms but its most critical form is in the form of meaning.

When meaning is made – humans grow, and when it is not made – humans dissipate, even if other energetic needs are fulfilled. This assertion is exactly the opposite of reductionism often seen in the neurosciences and psychology. Following Freeman (2000) it as an assertion of downward causality with the highest level of the hierarchical system (e.g., states of consciousness) affecting processes lower down in the system (e.g., metabolism).

The effects of a failure to make meaning on the utilization of other forms of energy is seen in the chronic "deprivation" of infants in orphanages described by Spitz (Spitz, Cobliner, 1965). These infants were in an extremely pathological state in which there was a reduction of their attempts to act on and make sense of the world. Such a failure is to fail to fulfill the basic system principle. The resemblance of these deprived infants to the infant monkeys raised by surrogates has often been noted. It is easy to think how compromising the food intake would lead to "malnourished" behavior, body, and brain. But in many cases we know that the nutrition and other 'necessities' were adequate. The general consensus is that the absent "necessity" was social stimulation. But stimulation is a too dispassionate and too general a term.

For me, these children were deprived of meaning-making, that is, they were unable to form dyadic states of consciousness with others. The Spitzian infants were open human systems that, deprived of meaning-making, could neither increase the complexity of their states of consciousness nor could they even maintain their complexity. They were failed open systems. When these "Spitzian systems" are viewed as the little experiencing humans they in fact were, we can see that they had lost their capacity to engage with others or even the world of things to make meaning. Their self-organizing and dyadic capacities were so stunted and compromised that they could not make coherent sense of their place in the world. Perhaps more accurately, and even more insidiously, their impelling certitude was that they had no place in the world.

To further explore meaning-making I have created an experiment to disrupt meaning-making in infants, children and adults: the Face-to-Face Still-face Paradigm. The Still-face creates a situation in which there is a failure to create a dyadic state of consciousness which leads to dissipation of the complexity of the individual's state of consciousness. (Adamson, Frick, 2000; Tronick et al., 1978). With young infants we ask the mother to 'freeze' while *en face* with her infant – to hold a Still-face and refrain from talking or gesturing. The (in)-action of the Still-faced mother precludes the formation of a dyadic state of consciousness because there is no exchange of meaningful affect and action with the infant, no creation of meaning. The infants are forced to make meaning with their own self-organizing abilities, and though they can do it for a while, their self-organizing abilities are limited and quickly fail. Initially in response to the Still-face, infants act to re-instate their

exchange of meaning by smiling at and gesturing to their mothers. But with the mother's continued lack of response the infants disengage, look away, become sad and engage in self-organized regulatory behaviors such as thumb sucking to maintain their coherence and complexity, to avoid the dissipation of their already achieved complexity level of their state of consciousness.

Figure 1 shows an infant during the Still-face who literally loses postural control, turns away, has a sad facial expression, and is self-comforting with his hands in his mouth. Indeed, what we are seeing is a failed attempt to make meaning and a collapse of a whole set of systems including motor and attention systems and the deployment of self-regulatory maintenance systems. Though we cannot truly know the age-possible impelling certitude of the infant's state of consciousness in the face of the still-faced mother, it must be something like, "[this is] threatening," or perhaps "I no longer exist." As the Still-face continues, the infant's state of consciousness is likely to change to something like, "I must try to hold myself together." If one doubts these or similar interpretations, simply consider that the infant could apprehend the Still-face mother in other ways

Figure 1. An infant losing postural control and turning to self-comforting behaviors in response to the mother being still-faced.

– as boring, playful, or novel – all of which would result in different forms of organized infant behaviors, behaviors which are *not* seen during the Still-face. Thus for the infant in the still-face there is meaning and certitude made *by* and expressed *in* his or her posture, actions and affects but the meaning is one that precludes gaining complexity.

More recent work on the Still-face with young children and adults makes it even clearer how the Still-face is a failure to co-create meanings and form dyadic states of consciousness. In my laboratory we have developed a procedure for using the Still-face with children 18 to 54 months of age (Weinberg et al., 2002; Tronick 2005). In the first episode of this procedure the child and the adult are seated on the floor and play with toys. This episode is followed by a Still-face episode in which the mother 'freezes" and does not respond to the infant. In the third episode the mother resumes her normal play. The findings are as striking as our original Still-face findings with infants. Young children respond to the maternal Still-face with heightened negative affect and expressions of confusion and demands for change. Toddlers ask, "Why don't you talk to me?" or command, "Talk to me!", while simultaneously soliciting the mother's interactive behavior (e.g., pointing at her eyes, tapping or almost hitting the mother, making repeated louder and louder demands). In the end they may distance themselves from her and even appear to be in an internally focused engagement with their own internal thoughts about what to make of what is going on.

Importantly and in keeping with their greater meaning-making capacities compared to infants, toddlers attribute states of mind to the mother (e.g., "Are you sleeping? Wake up!" or "Don't be afraid of the [toy] alligator!"). There is meaning in their words, in their affect and actions that reflects their capacities for pretend play, cognition, language, mentalization (Fonagy, Target, 1998), and complex affects, capacities not available to infants. Their impelling certitude is one of fearfulness and confusion at the break in connection. But the need for making sense of the world is so great that when play is resumed, some of the toddlers ask questions that attempt to make coherent sense of what happened with the mother (e.g., "Why didn't you talk to me?") even though it brings back the painfulness of the experience.

In further extension of the Still-face to adults, one of my research assistants, Lisa Bohne (unpublished) interviewed college students after they participated in an experimental role-play of an adult version of the Still-face. In this procedure, one student role-played an unresponsive mother and the other simulated being "in the mind of an infant." The "infant-persons" reported feeling anxious and vulnerable, angry, frustrated, sad, afraid, confused, even "panicky." The Still-faced, "mother-person" reported feeling guilty, distressed, anxious, depressed, shamed, vulnerable, and confused. One reported, "It felt terrible to be so closed off from the infant. It made me feel depressed and I'm sure the "infant" did too after our interaction." Preventing an exchange meaning and the formation of a dyadic state of consciousness disorganized each adult's own state of conscious-

ness and generated a fearful, confused and less coherent sense of the world. Importantly, these adults did not try to step away from their negative experience, but in more sophisticated ways than the toddlers, continued to try to make coherent sense of what they had experienced after the procedure was terminated. They talked with each other about their experience and some of them actually apologized for what they had done.

The still-face experiments serve as a contrast to what happens during normal social engagement when making meaning is successful. The contrast is needed because meaning-making is like the fish not noticing the water because meaning-making like the water is an ongoing and continuous process of the self- or co-creation of new meaning. Self-organized meaning-making can be observed in the smile of the infant when she grabs hold of an object that had been out of reach or the exuberance of the newly walking toddler as he moves upright into the world, or the announcement by the 5 year-old that "I did it" when they put the last puzzle piece in place. There are also the "I did its" that continue throughout life when finally the sense of something is made of what up to that moment had been insensible. The *co*-creation of meaning is seen in the mutual smiling and cooing of mother and infant in face-to-face interactions. Their exchange is an example of a dyadic state of consciousness in which there is a mutual creation of new meanings of what they can do together. So too is the pretend play of the toddler with another person and the all night conversations of adolescents. Social referencing (i.e., looking at other's reactions to an event to understand one's own reaction) by infants, children and adults is a way to gain meaning that leads to a new impelling certitude about an event's meaning (Campos, Lucariello, 2000).

By co-creating a dyadic state of consciousness, individuals experience a growth in the coherence and complexity of their state of consciousness. As should be clear from the work on the Still-face and on normal interactions, meaning does not only exist in words and narrative. Meanings are age-possible, an idea that harks back to Bruner's idea that children of any age could learn anything in their own way. The concept of "age-possible" states of consciousness is needed to take into account the developmentally possible sense of their place in the world that individuals are capable of making, given their meaning-making processes. Young infants' states of consciousness are moment-by-moment assemblages of affect and actions. The meaning is in what their body and brain do. It is *of* and *in* the moment, though the moment soon integrates personal experience and lengthens with development.

The toddler and young child have qualitatively different states of consciousness from those of the infant. Their meaning-making tools include language and symbols, and complex body skills (e.g., fine finger movements to running) and body micro-practices (e.g., false coyness). In pretend play toddlers assemble fantasy, reality, and their age-possible memories into new states of consciousness. They hardly are only in the moment, but their meanings are disjunctive

assemblages of illogical narratives. That is, their states of consciousness of toddlers have an "*and ___, and ____, and ___,…"* form of organization of apprehension that places no demand for the possible or the logical. Think only of a toddler's impelling certitude when he loudly demands to have the identical berries that fell from a branch back on the tree exactly the way they were and his utter distress when he says a different branch is bad and he does not want it… ever! (A. Bergman, personal communication). Children's states of consciousness have concrete meanings and here and now language. Adolescents have impossibly abstract states of consciousness with annoying impelling certitude.

There is little need to further elaborate the idea that states of consciousness are age-possible and qualitatively different for older children, adolescents and adults. Nonetheless it is worth noting, because developmental and neuroscientists tend not to attend to it, that at some point in development, states of consciousness assemble meanings from psychodynamic processes including a psycho-dynamic unconscious and transference. These dynamic processes are not equivalent to the passionless non-conscious or implicit processes invoked by developmental psychologists, cognitive neuroscientists or even some psychoanalytic writers. I believe that unconscious dynamic processes are inherent to the states of consciousness of children and adults. While I would not, Kleinians would assert they are present in infants. Dynamic unconscious processes make one person's knowing what is in another person's state of consciousness cryptic and as problematic as knowing the state of consciousness of the infant, even though children and adults use language. Thus, only explicitly knowing the other's sense of the world is not sufficient for truly knowing another person's state of consciousness. It is barely the tip of the iceberg of their sense of their place in the world. Further, the concept of age-possible makes explicit that the dyadic states of consciousness made between an infant and adult versus a child and adult are qualitatively different. Thus states of consciousness are not of one kind but are dynamically changing with development.

What, then, is the link between the open systems theory, meaning-making and experience, in particular the experience of pleasure? After all, other species make meaning in the world and are also governed by first principles of systems theory. But what do humans exclusively do, or at least do more of compared to other species that makes pleasure a consequence of their meaning-making as open systems. Humans, like other biologic systems, strive to utilize energy to expand the complexity of their states of consciousness. However, I believe that humans always implicitly and sometimes explicitly have an *experience* of the extent to which their meaning-making fulfills systems principles. Thus, when humans are seen as *experiencing* meaning-making systems, the systems phenomenon of the dissipation or of the increase of complexity of their systems have powerful *experiential* consequences.

Dissipation, the losing of complexity, occurs in all open systems. In humans dissipation occurs when there is a failure to make meaning. There is a loss of

complexity of the individual's state of consciousness and the loss has experiential consequences. When it occurs, the individual experiences shrinkage, anxiety, a loss of self and a fear of annihilation. One's self in the world begins to come apart. Spitz's infants were chronically deprived of the possibility of making meaning and every level of their system literally failed to grow and expand, and their experience was one of apathy, fearfulness and sadness. This experiential state further amplified their failure to make meaning. Infants, children, and adults, when confronted with a non-meaning-making partner in the Still-face, initially experience disappointment and confusion but eventually experience anger, sadness and withdrawal. They also feel helpless and panicky in the face of the threat they experience to their on-going self-organization. I think it is noteworthy that in the adult Still-face study these experiential effects occurred in *role playing* adults who knew that the situation was set-up and unreal. Nonetheless, the effects were powerful because the experiment taps into a basic primordial experience of failing to make a connection and experiencing a dissipation of self-organization. In these situations pleasure is not possible.

The increase of the complexity of a system also occurs in systems and in humans it too has experiential consequences. When new meanings are self-created or co-created, the individual experiences an expansion of her own state of consciousness, a feeling of being bigger and a connectedness to the action, idea or person on which or with whom the new meaning was made. In contrast to a blockage of meaning-making, individuals – infants, children, adults – when creating new meanings, grow in every possible way and experience joy, interest, curiosity, and exuberance. Ultimately I believe there is a primordial embodied experience of fulfilling a basic life governing principle: the success of making sense of one's place in the world and becoming more complexly organized. Often this feeling of wholeness, completeness, safety and exuberance is out of awareness. Occasionally it is in awareness, and when it is, it is special indeed. But whether in or out of awareness, it is the experience of pleasure, a deep abiding pleasure.

Humans as meaning makers have no option but to strive to increase the complexity of our states of consciousness. Were we to stop we would perish, dissipate and experience the terror of annihilation. Successfully striving to create new meanings increases our complexity and brings pleasure. However, it is not as simple as either strive or fail, because striving to create something new requires taking apart some of the old. But when taking apart the old organization to create something new, complexity is actually reduced and the reduction is experienced as anxiety, and the anxiety is further increased because there is no guarantee of success of the creative effort. An apparent way to prevent the anxiety is to remain fixed and not change, but of course such fixedness precludes the pleasure of expanding and the fulfillment of systems principles. Thus the dilemma of striving to be a system that grows in complexity and simultaneously risks dissolution is to experience pleasure tinged with terror or to not strive to

grow and never experience pleasure. Healthy humans choose pleasure and terror. For example, in Carol Gilligan's recounting of the myth of Psyche and Cupid, Psyche has all the pleasure one could imagine, yet chooses to look at Cupid because she *must* strive for the deep pleasure of expanding her knowing of him and her relation to him, even at the risk of dissolution of the complexity she has already achieved. It is something she must do to be human, and she is, indeed, human. Her greatest pleasure comes when the old dissolves and she expands her state of consciousness. Thus the myth captures the momentous and the everyday nature of meaning-making, the experience of pleasure and, yes, even systems principles: to create the new is to risk the old for the possibility of a greater pleasure, but to not create the new is surely to perish.

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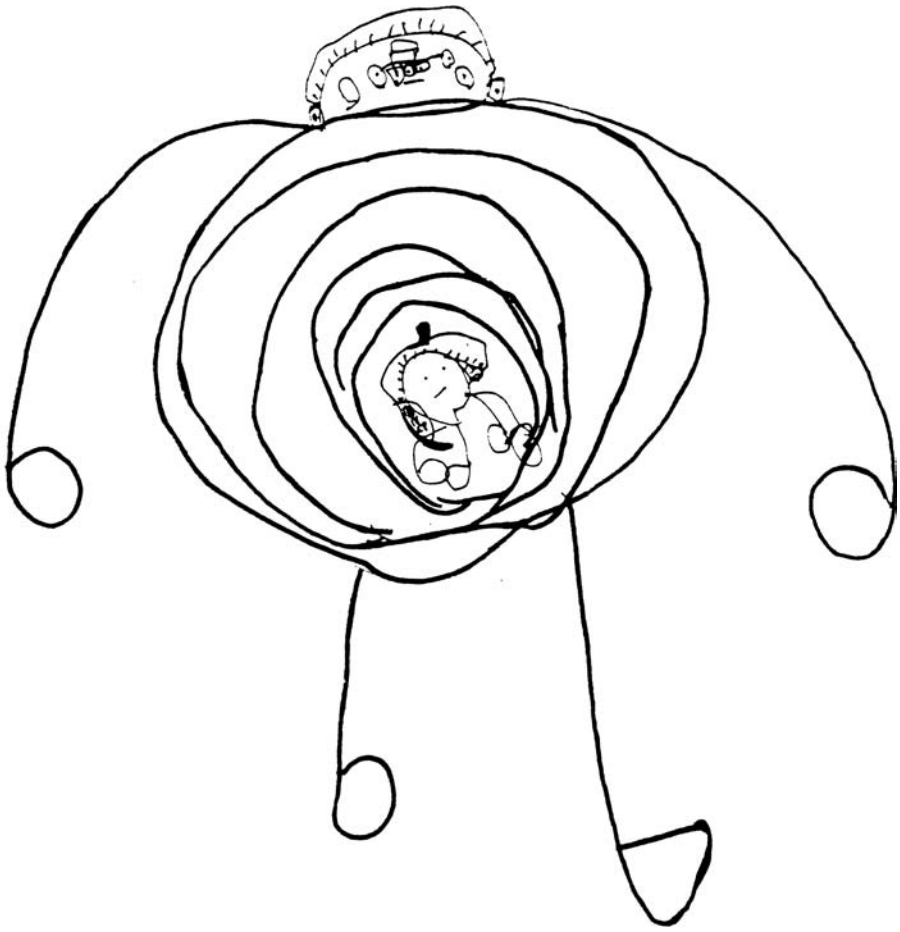

(Maddalena, 3 yrs. 8 mos.)
I was all wet, I was in water inside a balloon… I didn't ask them if I had a bathing suit on.