

Bonding Goes Back to the Dawn of Cosmos

ARTICLE

DOI: 10.24946/IJPLS/28.12.22

AUTHOR: Olga Gouni¹

*I think I am me. But I am not.
I am a galaxy. In fact, I am a thousand galaxies!*

Marcus Chown, *What a Wonderful World*

ABSTRACT

Bonding is more than a lifelong process. It is a process that begins long before conception. In a broader context, this process begins with the dawn of the cosmos itself.

Bonding is the linking process that bridges the prenatal and postnatal stages and prepares the child to connect securely and meaningfully with the world and life on earth.

This article highlights aspects of bonding in the pre-conception and conception periods, as well as in pregnancy and birth, so that connections can be made to pre-, gestational, then peri-, and postnatal growth. A list of bonding support issues accompanies the consideration of parent and child development within the psychocultural, spatial, and temporal environments so that taking responsibility for personal health and growth at different stages becomes possible.

In summary, bonding is about strengthening the life-enhancing polarity over the life-diminishing polarity.

Keywords: bonding, preconception, conception, maternal environment, prenatal, postnatal

1. INTRODUCTION

There are more influences on us than there are stars in the universe. What we think of as our core identities have been shaped by millions and millions of complex interactions between us and those around us, not only in the near environment of space, but also in the distant environment of both space and time.

Billions of years ago, human beings appeared on Earth, a small planet in our solar system, part of the Milky Way Galaxy, which is just one of the many galaxies in this universe, which in turn is one of the many universes, as scientists today speak about a multi-universe. About three billion years ago, life in the single-cell stage paved the way for life in the multicellular stage, which led from fungi to

¹ Affiliation: Prenatal Sciences Research Institute SOPHIA, GREECE, Orcid: 0000-0002-2437-9997, email: info@cosmoanelixis.gr

plants, to animals, and finally to humans. Simplicity preceded complexity (Turner, Turner & Gouni 2018), allowing richer and richer forms of expression.

To our human understanding, the secret formula behind increasing complexities is cooperation, first between, then among, those who showed symbiotic qualities that allowed single identities to emerge, finding themselves crossing a critical threshold to get together and create a huge variety of expressed intelligent life forms that finally led to the emergence of human life. Certainly, even before prokaryotes, there would be some form of intelligence at work, creating the background that would enable the emergence of the next stage, and the next, and the next. An intermittent chain of events developed at critical thresholds, securing new circumstances that enabled the whole process. It is like an endless line of ants all around the periphery of our planet at its largest measurements, working with patience to overcome whatever obstacle, displaying both intelligence and humility to establish the vast cosmic theater, carrying and assembling the building blocks of life, allowing even more complex intelligent performances to be displayed.

Each one of us carries this cosmic information within us. Our preconception phase is the background environment that hosts symbiotic qualities from the present moment to the past: from the present parental environment to the transgenerational ancestral one, all the way back to the single cellular experience and further back to the dynamics of life present in the cosmic soup impregnated with all that followed. The quality of information that extends from that far beyond, as it interacts with the trillions of trillions of others met in the time-space-direction process, act as the attractor of the specific human consciousness to be conceived. Thus, the **first bonding that takes place between the meant-to-be-conceived, and maternal environment extends over billions of years, all the way back from preconception time to the zero moment of cosmic creation.** This vastness will provide the informational network and the qualities of symbiotic foundations (Bloomsbury 2012) between the one to be conceived and the maternal environment. Here, it is necessary to remember that symbiosis is for the mutual benefit (Martin & Schwab 2012) of those involved, although not necessarily of the same polarity but motivationally similar. Both parts work together to achieve their goal of maintaining existential identity. They do so through change, which will help the given system advance.

2. CONCEPTS REVEALED

Concepts are not only mental representations but also complete psychological entities. The mysteries of the letters that dance in chorus to the music of vowels and consonants hold their secrets. Those who can see through their eyes, both physical and mental, can get the meaning. Concepts are story carriers, narrating the human experience of the cosmos from time immemorial. They are history books and human culture encyclopedias. When decoded, they can become the building blocks of our minds, the blueprints of the architectural design of our lives and our relationships.

2.1 Bond(ing)

Merriam-Webster's Online Dictionary defines bonding as "the formation of a **close relationship** (as between mother and child or between a person and an animal), especially through **frequent or constant association.**" *Macmillan Dictionary* further adds to the definition of bonding as "the development of a special close relationship between people." The Oxford dictionary adds an explanation as to what it is that leads to this close relationship. It speaks about feelings of **friendship** or **attraction, shared ideas or interests, and shared experiences.** However, the concept of "bonding" is not restricted to psychology. We meet the concept in other fields such as chemistry, economics, sociology, biology, and physics. The study of such fields will provide a more comprehensive understanding of the bonding in a relationship.

In chemistry, we speak about this *strong force of attraction holding atoms together in a molecule or crystal, resulting from the sharing or transfer of electrons*. Sometimes, this chemical bond comes naturally because of natural laws that are applied without intervention. Other times heat, pressure, or another adhesive substance may be used as an *outer force, leading to the same outcome*.

I dare to think of the parent-child relationship and apply this information to the parental bond. No matter whether it is a natural or assisted conception, the parent and the child are attracted to each other or joined together, and their bonding force may be the common ground of shared ideas, interests, or experiences that are shared or transferred.

Moving a little further, we also find in the above dictionaries that in building, they use the bricks in an overlapping pattern to ensure the strength of the resulting structure, and that is a bond. Let's keep the element of security. In both chemistry and building, **what bonds together is strong**.

In law, a "bond" is a deed by which a person is committed to making payment to another. When do we make a payment to someone else? It seems that we pay for what has value. Bringing this to the parental relationship, it seems that the parent (mother or father) and the child, by making a bond, are all committed to making payment to each other for what seems to be of value. Perhaps this legal aspect of the concept relates to the South African meaning of "bond" as a mortgage, the meaning of "bond" as a certificate issued by a government or public company promising to repay borrowed money at a fixed rate of interest at a specific time, or an insurance policy to protect against losses resulting from circumstances. More questions to reflect on: *who is in the role of offering first, and who repays when. What is the value both parties see in making such an agreement? What are the risks, and how do we minimize the risks resulting from the circumstances?*

Finally, we also find another most interesting meaning of the concept of "bond": It means the ropes, chains, or other restraints used to restrict a person's movements, as well as the act of restricting another, keeping this other in captivity, "bondage," or being unable to move. **Too strong a bond that removes freedom**. Is it possible that *your attachment to security needs is robbing you of your freedom to be and act as you please?*

2.2. Maternal Environment

The theme of our paper is extensive. However, we will restrict this work to "the bonding between the maternal environment and the pre-nate."

When we speak about '*maternal environment*' we use it as formulated in Bronfenbrenner's bio-ecological theory (Bronfenbrenner & Ceci 1994; Bronfenbrenner 1995; Bronfenbrenner & Evans 2000). Thus, when we say '*maternal*' we do not refer to the biological mother only. We refer to the extended familial, social, cultural, and other systems – parts and wholes at the same time, too – as well as the chronosystem based on his theory of Process-Person-Context-Time (PPCT). This means that each of us in Europe or Asia interacts with and influences a child conceived, gestated, born, and raised in Alaska. Each of us affects the relationships formed on a micro-, meso-, macro-, or chrono-system level. Each of us is a part of a larger whole or holon. As part, we have our integrity and identity. The whole, or holon, has its integrity and identity, and at the same time, it is part of a larger system. Finally, every part, holon, and system is part of the cosmos. That includes the baby, too, who is a part-whole in this world. And of course, that hypothetical Alaska child influences us as this child interacts with us as well.

Looking at its main attributes in the concept of bonding, we find affection, association, attachment, and relationship but also mutuality, compatibility, interdependence, and co-evolution. It can healthily manifest these attributes or move in the opposite direction and manifest the opposite conditions, those of aversion, isolation, parasitism, competition, powerlessness, and stagnation.

Bonding always exists between the newcomer and the environment; it is not a matter of just being strong or weak but whether it is inspirational and life-enhancing, or life-diminishing.

3. Bonding Starts Preconception

Bonding (Else-Quest, Shibley-Hyde & Clark 2003; Barker, Daniels, O’Neal & van Sell 2017) starts preconception. What is the conceptual framework of the specific environment? What is its value system? What is the perception of oneself, of others, of the world, and of life? What are the survival strategies of the system; What are the visions, expectations, and adopted behaviors of each of us in the system? We think of all positive, negative, or neutral elements or information existing, as Arthur Koestler (1967) described it, in each holon, as Ken Wilber (2000) and other scientists, like J.T. Velikovsky (2014), from various fields, further developed it, calling it SOHO (Self-Organizing Holarchic Open) systems, memes, fractals, or otherwise, and as it has been integrated into prenatal psychology by Frederick Michael Farrar and other prenatal psychology pioneers. This way, we will have a good understanding of how the preconception stage can lay the groundwork for qualities manifested in the baby conceived.

3.1. How Can We Inspire the Life-Enhancing Polarity Versus the Life-Diminishing One?

Affection, as a feeling of liking and caring for a mother or parent but also for the world, is one of the most significant characteristics in the process of healthy bonding. As it starts preconception, the question asked is what are qualities attracting kindness and caring for the other? Perhaps Plato could answer, saying that the “Good, the True, and the Beautiful” are. Social scientists may have their observations on peace, social justice, and equality; biologists may speak about neurotransmitters at play, and lay people would just say, ‘love!’ Despite differences, affection is the force that brings people together—a unifying force, not conflict energy, the kind of which we observe when opposing forces are at play to secure survival. Certainly, our understanding of the study of holons (and the world consists of myriads of holons as it, the world, is also part of an even bigger holon) makes it obvious that every holon has this dual tendency to preserve and assert its individuality as a quasi-autonomous whole and to function as an integrated part of an existing or evolving larger whole. Peace, security, and nurturing lie in the common ground where both needs are met, and individuality, autonomy, and integration, as in co-existence and co-evolution, are honored. It is part of our human responsibility to work in ways that respect self-autonomy and integration. These are qualities that serve the growth needs of all involved. And this is a lifelong process and a decision to be made by all players on the universal theatrical stage.

Perhaps, the estimated 48.5 million couples worldwide who are unable to become pregnant after five years, according to research data (Mascarenhas, Flaxman, Boerma, Vanderpoel & Stevens 2012), could also be understood in the context of how attractive or not our living experience is for newcomers. It might explain why despite hygiene improvement and medical as well as technological advances, infertility statistics remained the same over the last twenty years. Perhaps the question to be asked is, “Why newcomers do not wish to come?” or, “why do already living humans not invite any?”

How would it be if each one of us could see the living miracle unfolding in front of our eyes, giving rise to a variety of life forms? What if we could embrace all life forms with respect, appreciation, and recognition of the million years of a continuous process of the unseen energies to manifest? The same on the micro level: recognizing and appreciating the ancestral line that leads to us, treating ourselves and transgenerational information with respect, learning from the choices made, the successes and the failures, far from condemning ourselves as not enough, or not appropriate, or even life-threatening, but cultivating a background of trust.

4. PRENATAL BONDING

4.1. Bonding at Conception

The origin of the term "association" is medieval Latin, coming from the mid-16th century. It means to "unite" or "ally" for a common purpose with something or somebody else, making a mental connection. The question asked here is, "What is the mental connection between the newly conceived and the maternal environment?" And what is the *common* purpose served?

At conception, there is a first affirmative relationship. It takes the form of a connection, established between the newly conceived and the world. The newly-conceived has taken the first step toward manifesting in the world and becoming part of it via the specific maternal environment. *Merriam-Webster* enriches our understanding of the relationship by adding the element of *kinship* and the element of *existing affairs or dealings between the two parties*. My clinical experience has shown that **there is always a good reason why each baby is conceived in a specific family, as familial or parental information holds the key to the next stage of the specific baby's life process**. What lays the groundwork for life-enhancing bonding is:

1. the element of compatibility (kinship), as well as
2. the recognition of mutual benefits for co-evolution (through resolving common issues or dealings) of the entire system and the individual systems, respectively.

We could say that **each conception represents the healing dynamics of the whole system**.

4.2. Bonding during Pregnancy and Gestation

Unfortunately, unhealed traumas (Turner & Turner 1992; 1993) and/or shocks (Raffai 1997; 1998a; 1998b; Turner 1988), which still exist in the individual or familial and social systems, detract from the possibility of relationships that could evolve at all. Pain and fear steal affection. They add to aversion because they trigger the fear of losing individuality, autonomy, and personal thriving if integrated into the new relationship. As a result, there is a separation tendency with conflicts that can result in high levels of aggression and violence. A climax seems to appear when, in the maternal environment, some weeks after conception, pregnancy is discovered. When she learns the news of her pregnancy, she may experience anguish over losses, a sense of powerlessness and terror, or feelings of inadequacy and insecurity. Sometimes, this can lead to abortion thoughts or failed abortion attempts. John Sonne (2002), Athanassios Kafkalides (1995), and many other pioneers have described the tragedy of abortion survivors.

The inner maternal environment recognizes conception dynamics, that is, the meaning involved as well as the higher purpose served. It makes use of nine months of pregnancy to prepare the pregnant woman for life's experiences. Reality shows the way to what can lead to life-enhancing bonding (Verny & Weintraub 2000; Verny 1981) during pregnancy and beyond (Janus 1997). Among the ways to support that kind of bonding are in a list form:

- **Welcome the baby to the world.** Welcoming a baby is very different from wanting a baby or expecting a baby. The primordial Health Advancement program "**WELCOME**" (Gouni 2009) focuses on the pre-nate although it works with the whole maternal environment, and it aims to empower the pre-nate so that (s)he can create a healthy bond with the world. There is a small number of Health Advancement programs that work in this direction.

- **Recognize the individual identity** of the baby. One of the indicators of high-quality prenatal bonding is when the maternal environment refers to the baby using an appropriate name showing respect and honor, reflecting positive qualities already discovered in the silence of maternal traits so that the baby can manifest and express them.

- **Respect the gender of the baby during pregnancy.** Sex preference, which is usually an unhealed issue, can entrap a lot of sadness, anger, and frustration; it can lead to hiding strategies or adopting the behaviors of the preferred sex; it can also lead to dissociation and distancing from one's true self.

- **Communicate the virtues of other family members, the intellect manifested in the social or national group, and those of humanity.** Stories of people and the ways they added value to our quality of life and civilization are a great help. Visits to temples of wisdom, past and present, like museums, galleries, concert halls, theaters, etc., but also places or sites and buildings that represent such a spirit, are part of the process.

- **Communicate (Chamberlain 1994; 1998) the understanding of how scientific work can help remove prejudice and fear of natural phenomena and cultivate healthy curiosity,** which drives exploration, discovery, advancement, invention, and pioneer thinking.

- **Frequent, almost daily, exposure to fine arts** (Gouni 2017; Dutton 2003) in whatever form is available in the mother's surroundings can nourish the unborn's emotional body.

- **Provide space for silence** so that the voice of the baby can be heard.

- **Prioritize** again and reschedule routine options and activities.

- **Include your baby** in everyday experiences, always paying attention to his or her presence and providing answers to whatever is part of this world of ours.

- **Recognize that a baby is not a powerless entity but an intelligent one,** able to interact with the environment and make decisions to solve specific problems or provide new answers to old problems.

- **Respect the baby's autonomy and individuality** without burdening the baby with personal expectations and preferences.

- **Maintain calmness; cultivate trust** that everything will be okay at the end of the day.

- **Nourish the baby** not only physically by providing nutrients for bodily development but also nourish the soul with joy and acts of kindness, the mind with a constant quest for truth and justice, and the spirit with personal cultivation and the practice of ideals and virtues. **Exposure to philosophy, art, and science,** as well as frequent encounters with **nature** and other gentle people or like-minded groups, can do miracles for the baby.

Such dynamics will allow the maternal environment to thrive. Aristotle, in *Politics*, so wisely says: "Parents have the opportunity to grow just because they are parents." The maternal environment allows you to see the world through new eyes. Pregnancy is a process of mutual growth and maturity. Unfortunately (Gouni 2008; Gouni, Sekulic, & Topalidou 2016), we often fail to see that. We are conditioned, and we see the maternal environment as only a giver and not a receiver. When listing the blessings of pregnancy, we see that the list consists of concepts like attention, support, and care. Sometimes, people put themselves in the position of the prenaté—a position they have never had in their own postnatal life. This can deprive the baby of energy without even realizing it. Life-enhancing prenatal bonding will lead to perinatal bonding, directing the birth experience toward healthy relationships for both parents and baby.

5. PERINATAL BONDING

Labor is not a solely maternal process. The baby gives birth to himself or herself as well. In our clinical experience, we have heard of many stories of babies resisting birth. Most of these babies are afraid of the unknown. In fact, we would be more accurate if we spoke about the fear of the "known". The information that comes from the maternal environment in the wider meaning is perceived as threatening; full of conflict, cruelty, mistrust, or death. Having already lost trust in their power, having already dissociated and lost connection of themselves, they resist the natural forces that push them

toward birth, creating challenges for their health, suffocating problems, exhaustion, and the like. As they fight what they wrongly perceive as lethal (labor), they create a threat to themselves. If they are successful in resisting birth, they will die for sure. They may cause, at least, some kind of "death" to the maternal organism due to interdependence. To make matters worse, their resistance might lead to medical interventions. These may be perceived as violent and disrespectful. This, in turn, will give rise to a whole range of inimical or defense-oriented behaviors directed at anything mirroring such interventions later on in life (Emerson 1997). The paradox is that what supports life is considered to be death. Life-saving intentions are interpreted as aggression. Maternal environments will not manage to inspire life-enhancing bonding. This may lead to challenging labor experiences and disrupted relationships that ask for more energy to be invested just to balance and move away from self-destruction or life-destruction. In adult life, depression seems highly possible. The unhealed birth traumas are behind the conflicts and wars that are staged to relieve the tension they cause (Lloyd deMause, 2002).

Michel Odent (2014) has lately spoken about the importance of the first hour after birth (Klaus & Kennell 1982) for the establishment of a healthy relationship between child and mother. This first look will enable them to recognize and receive love and to act on love. Wilhelm Reich extensively spoke about "eye armor," what it is caused by, and its impact on experiencing a quality of life. Looking someone in the eyes is like connecting with their soul, their deepest depths, and their core. Pain, guilt, shame, or hatred may avert us from connecting at that deep level, and this can lead to later non-authentic relationships.

Sometimes, it is the maternal environment in the form of health professionals present at childbirth that creates such distance. There are health protocols that do not allow or do not facilitate parental perinatal bonding, fathers are not welcome (Jomeen 2017), the mother is anesthetized or facing challenges; there is noise, stress, etc. in the environment. In such cases, the newborn (Klaus & Klaus 2000) comes to terms with the most unwelcome beginning, which is full of stress, sensory disrespect, cold, isolation, neglect, or pain. A welcoming world, on the other hand, can provide healing after the stress of birthing oneself. It can strengthen trust, and empower safe attachment (Sullivan, Perry, Sloan, Kleinhaus, & Burtchen 2011), as first described by John Bowlby (Bowlby, 1969/1982; Bretherton, 1992). Touch is very important for perinatal bonding. The way the new-born baby will be touched is an introduction to what the world feels like. With high statistics in caesarean births (Odent 2004), the first touch today is not of the best quality, especially when it is an emergency caesarean.

Researchers have extensively spoken about the importance of tender skin-to-skin contact, gentle caressing, kissing, or touching of the mother's hands or arms. This contact can establish a safe connection with reality. It is the beginning of a healthy body connection for all intimate and personal relationships. The first contact with the maternal microbiome has also occurred.

But certainly, touching is not something that we do with our hands. We touch the world with our voice, with the melody or noise we make, with our eyes, and with our actions of compassion and kindness. We radiate thoughts with which we touch the world and create realities and deeds.

Also, part of the bonding process is immediate and prolonged breastfeeding. Breastfeeding is a very intimate and private act based on closeness and connection. The quality of breastfeeding (Zetterstrom 1999; Cernadas, Noceda, Barrera, Martinez & Garda 2003), goes beyond what we usually read in the reports. It is not just an act of feeding to satisfy bodily hunger and thirst. It is not what triggers hormone release. It is not what supports the immune system. It is all of them, of course. But

beyond all that, it is an opportunity to enhance bonds between mother and infant by promoting the development of maternal behavior and adding value to the dyad, which can inspire the belief that the world can be a nourishing place to be.

6. POSTNATAL BONDING

Bonding does not end at birth, and attachment does not end in childhood. Bonding is a lifelong process. Once it is established as a life-enhancing relationship, it continues as such. It provides the basis for a creative life that leads to growth and healthy living. In the few months (Lafuente et al., 1997) and the many years and decades (WHO, 1986) that follow birth, the same factors that have been presented above are at play. The scenarios may differ to match new needs and new circumstances, but the core themes remain the same.

The following are opportunities for mutual progress and co-evolution: Response to the child's needs.

- Learning and developing ways of interacting with the child at different ages.
- Taking responsibility for our personal health and growth.
- Building ties with the neighborhood, the place of birth, the native country, and the human community.
- Facilitating that process for the child.
- Connecting and doing things together.
- Having fun together, but also sharing significant information and inspiring ethos.
- Participating in activities that promote peace and civilization.

Life-enhancing bonding is what provides the human beings with information that will keep them free from mental pathologies like schizophrenia, mania, or depression (Ohoka et al. 2014; Meltzer-Brody 2011), maybe even post-partum depression (Taylor, Atkins, Kumar, Adams, & Glover 2005), or from physical pathologies.

To support life-enhancing bonding and contribute positive environmental cues in the world, we must open our defenses and support the healing of our deep prenatal and perinatal traumas and shocks. That's where prenatal psychology can help.

7. EPILOGUE

As more and more of us make steps to heal ourselves, that healing energy impregnates the environment in which it appears, touching whoever is in the environment. Personal healing becomes universal. Primal Health Advancement Programs, educational modules, conscious parenting, and therapeutic work can do miracles. As we develop, mature and evolve, we can change the way we receive our children. Baby steps at the beginning can make for giant strides at the end. Just as a musician can develop his theme and lead it to a triumphant crescendo, we can all transform the way we give birth to our children. We can learn to approach the pregnant couple with no discrimination of any kind. We can look at them with our soul's eyes. We can join forces so that we can be present and hold hands with them as they heal their own pre-, peri-, and postnatal traumas; we can open up their consciousness and hearts to welcome, recognize, appreciate, and honor the invaluable gift of new life as encountered in the unborn child.

REFERENCES

- Barker J, Daniels A, O'Neal K, van Sell SL (2017). Maternal-Newborn Bonding Concept Analysis. *Intl J Nurs Clin Pract* 4:29.
- Bloomsbury Guide to Human Thought* (1993). London: Bloomsbury Publ. corp.credoreference.com, retrieved September 17, 2012.
- Bowlby J (1969/1982). *Attachment and Loss. Vol. 1*. New York: Basic Books.
- Bretherton I (1992). The Origins of Attachment Theory: John Bowlby and Mary Ainsworth. *Developm Psychol* 28:759-775.
- Bronfenbrenner U (1995). *Developmental ecology through space and time: a future perspective*. In: Moen P, Elder GH, Luescher K (eds.). *Examining Lives in Context: Perspectives on the Ecology of Human Development*. Washington DC: American Psychological Association, pp. 619-647.
- Bronfenbrenner U, Ceci SJ (1994). Nature-nurture reconceptualized in developmental perspective: A bio-ecological model. *Psychol Rev* 101(4):568-586.
- Bronfenbrenner U, Evans GW (2000). Developmental science in the 21st century: emerging questions, theoretical models, research designs and empirical findings. *Soc Dev* 9(1):115-125.
- Cernadas JM, Noceda G, Barrera L, Martinez AM, Garda A (2003). Maternal and perinatal factors influencing the duration of exclusive breastfeeding during the first 6 months of life. *J Hum Lact* 19:136-144.
- Chamberlain D (1994). The sentient pre-nate: what every parent should know. *Pre- and Perinatal J* 9(1):9-31.
- Chamberlain D (1998). Prenatal receptivity and intelligence. *J Prenatal Perinatal Psychol Health* 12(3-4):95-117.
- Chown M (2013). *What a Wonderful World*. London: Faber & Faber.
- Dutton D (2003). *Aesthetics and Evolutionary Psychology*. In: Levinson J (ed.). *The Oxford Handbook for Aesthetics*. New York: Oxford University Press, pp. 693-705.
- deMause Lloyd, (2002). *The Emotional Life of Nations*, Other Press LLC, ISBN 978-1892746986.
- Else-Quest N, Shibley-Hyde J, Clark R (2003). Breastfeeding, bonding, and the mother-infant relationship. *Merrill-Palmer Quarterly* 49:495-517.
- Emerson W (1997). *Birth Trauma: The Psychological Effects of Obstetrical Interventions. Petaluma CA: Emerson Training Seminars*.
- Gouni O (2008). Prenatal Cont(r)acts for a Lifetime. *Congress presentation, ANEP Congress, Parma, Italy*.
- Gouni O (2009). *Welcome! Athens: Eleftho*.
- Gouni O., (2009), *Welcome, Athens, The Hellenic Union of Prenatal & Perinatal Psychology & Medicine*, ISBN: 9789609823326
- Gouni O (2017). Art-feeding the (un)born child. *Intl J Prenatal Life Sci* 1(1):1-33.
- Gouni O, Sekulic S, Topalidou A (2016). The contribution of prenatal psychology to our understanding about prenatal dynamics and fetal behavior. *Psychol Res* 6(12):693-711.
- Janus L (1997). *Echoes from the Womb: The Enduring Effects of Prenatal Experience*. New York: Jason Aronson Publ.
- Jomeen J (2017). Fathers in the birth room: choice or coercion? Help or hindrance? *J Reproductive Infant Psychol* 35(4):321-323.
- Kafkalides A (1995). *The Knowledge of the Womb. Autopsychognosia with Psychedelic Drugs*. Trans. Sandra Morris. Corfu: Triklino House.
- Klaus MH, Kennell JH (1982). *Parent-Infant Bonding*. 2nd ed. St. Louis MO: Mosby.
- Klaus MH, Klaus P (2000). *Your Amazing Newborn*. Boston: Hachette/DaCapo.
- Koestler A (1967). *The Ghost in the Machine*. London/New York: Hutchinson-Macmillan.
- Lafuente MJ, Grifol R, Segarra J, Soriano J, Gorba MA, Montesinos A (1997). Effects of the Firststart method of prenatal stimulation on psychomotor development: the first six months. *Pre- and Perinatal Psychol J* 11(3):151-162.

- Martin BD, Schwab E (2012). Symbiosis: 'Living together' in Chaos. *Stud Hist Biol* 4(4):7-25.
- Mascarenhas MN, Flaxman SR, Boerma T, Vanderpoel S, Stevens GA (2012). National, regional, and global trends in infertility prevalence since 1990: a systematic analysis of 277 health surveys. *PLoS Med* 9(12):e1001356.
- Meltzer-Brody S (2011). New insights into perinatal depression: pathogenesis and treatment during pregnancy and postpartum. *Dialogues in Clinical Neuroscience* 13(1):89-100.
- Odent M (2004). *The Caesarean*. London: Free Association Publ.
- Odent M (2014). *The Scientification of Love*. London: Free Association Publ.
- Ohoka H, Koide T, Goto S, Murase S, Kanai A et al. (2014). Effects of maternal depressive symptomatology during pregnancy and the postpartum period on infant-mother attachment. *Psychiat Clin Neurosci* 68:631-639.
- Raffai J (1997). Mother-Child Bonding Analysis in the prenatal realm. *Intl J Pre- and Perinatal Psychol Medicine* 9(4):457-466.



ASPECTS OF BEING BORN CESAREAN

By Olga Gouni, info@cosmoanelixis.gr

Here's what you seem to think:
That I just lie here, like a hunk of ham
(and just as dumb)
Floating in my mama's fluid
... But essentially disconnected from her
And all that goes on in her life
And in your world out there...
Michael Trout
(BABY VERSES)

I would like to begin this paper by making it clear that every child comes to this world in the best possible way and that the conception, pregnancy and birth experience he has prepares him to adapt to the environment that this child is going to live. If the environment he is going to grow and live is that of respect and trust, then his conception, prenatal and Perinatal experience will reflect these elements. We will see more and more of these in the near future, as the world is destined to move to a more balanced position. When, he is going to grow and live in a competitive, fast moving, material-based value, intervention and disrespectful family or general environment, then these qualities will reflect in his early experiences.

The way a child is born is the end act of the pregnancy and conception experience. Most of the times we blame the medical system for the double, sometimes three times as high, rate of cesarean (in Greece almost one in two mothers give birth cesarean). However, the medical staff, though there are unfortunate cases, is not to blame. When the pregnant couple goes through lots of stress during pregnancy –stress for which most of the times the obstetrician/midwife is unaware of- can do very little if anything to support a natural vaginal birth. Regaining our power from systems and maternity hospital protocols is a huge step towards healing our babies. And ourselves. Asking ourselves what was it in my life that led to this can take us to very interesting answers.

I have also experienced the aggression and guilt and pain and anger and all such ill-feelings from the part of the parents who have given c-section birth to their child and get trapped in that without being able to move on to the next stage of learning from the experience and evolve and at the same time support their whole environment (child included) to the next evolutionary stage and healing what can be healed every time. A lot of wasted energy... to be discovered soon, as no matter how much we may resist, symptoms remain and dysfunctions surface sometimes decades after birth. So mummies and daddies, relax and allow life to guide you wisely.



In this paper, we will focus on the symptoms that a baby can present as part of his c-section birth experience so that we can recognize them and then we will see some ways we can support them as they move to a homeostasis.

SOME OF THE TRAUMATIZATION FACTORS IN C-SECTION

According to William Emmerson, pioneer in the field of supporting children with a birth trauma, the following eight factors can be traumatizing in cesarean births. Unplanned C-sections can be even more traumatized than planned ones, as the baby also experiences the shock because of the emergency that calls for a c-section.

1. Obstetrical interventions as result of birth complications that make a c-section necessary.
2. Cephalo-pelvic proportion: when the baby's head doesn't fit the mother's pelvis and the baby gets stuck with subsequent feeling of being helpless or maybe hopeless. (This may later show up again as claustrophobia).
3. Interruption. The process is interrupted to be followed by another act.
4. Boundary Intrusion: The mother is cut open and the baby is reached over. This process, in the name of saving the child –which is true at times of emergency- involves violation, intrusion and a psychological shock.
5. Section dislodging. The baby is dislodged from the pelvis. This action causes a lot of confusion. Furthermore, the baby feels annihilated from the mechanical forces being applied.
6. Section lifting: The baby is lifted out of the uterus in a rather abrupt way and this is associated with difficulties in transitions.
7. Separation and Abandonment: The baby is taken away from the mother/parents and this may be associated with separation/abandonment patterns in later life.
8. Parental Stress: The birth does not go as planned. In most cases, parents feel frustrated and due to the symbiosis between mother and baby, this parental stress/frustration etc increases the traumatising of the baby.

THE SYMPTOMS

We could distinguish the symptoms in two big categories: a. Somatic symptoms and b. psychological symptoms.

A. THE SOMATIC SYMPTOMS

1. There is an increase in the level of stress hormones in the body of the newborn which can be measured through the usual medical tests.
2. There is physiological reactivity. The baby –especially when the birth process started as a natural vaginal birth but then due to emergency it had to change into c-section- presents changes in physiological readings such as respiration patterns or cardiac rhythm, every time there is a simulation of the passage in the birth canal. An example of this re-experience is when we dress the child and a tight garment goes down the head applying pressure to the head and upper torso of the baby
3. C-section babies cry more often and for longer periods of time, most of the times parents feel incapable to find out the reasons for this crying.
4. C-section babies are more delicate when squeezed or held presenting contact difficulties.



5. C-section babies when they breastfeed may present stress as they may experience as if they are drawing.
6. C-section babies show regressive patterns.

How can we help

1. It is important to observe so that we can detect pain-sensitive areas in the body. When we have the complete “body chart” we use birth simulation techniques and desensitization practices to release the pain on a cellular level.
2. We re-activate the extremities of the body –legs and hands.
3. Do a lot of work with the reflexes
4. Use empathy and understanding
5. Work with parents so that they get free of their pain, frustration and stress.

B. THE PSYCHOLOGICAL SYMPTOMS

1. Grounding difficulties

The C-section born person seems not to be 100% grounded in our world, has feelings of not belonging to our world or not being part of this world and most of the times he looks back, to the past, and sees the old in the new missing the opportunity to take the wisdom from the past experience and bring the WISDOM of the past to the present.

How can we help?

Grounding exercises like getting in contact with your body parts (physical education teachers can contribute a lot here) or grounding activities/hobbies like gardening, cooking etc Involvement in courses, projects, activities, conversations etc which bring a person in contact with the beauties and blessings of the physical world and at the same time enable the person to recognize the spiritual aspects in the material reality he experiences and enable him to see the continuum in it. Parents can see and get all opportunities to connect their child with the Earth energy and respect the earth gifts – which means that parents cleanse their own perceptions about our earthly experience, life and the world,

2. Difficult to relax

As a result of the interruption of the natural cycle where life force and eternal force (zoe and vios) meet, the c-section person

- a. finds it difficult to relax naturally and let go
- b. Is usually stressed and tired/exhausted
- c. In his effort to relax, he is involved in activities that culminate in a peak experience eg work too much or too hard or do a lot of sports to get the sense of getting rid of the excess energy or get drugs, or resort to alcohol to relax in a non natural way.

How can we help?

1. Breathing Exercises

We could see the breathing process in the C-section experience. Exactly as in the breathing process, 1. we inhale and 2. The charging process comes to a peak, 3 we exhale to the end and 4. Relax so that a new cycle begins, Breathing exercises, with emphasis on the exhalation phase can help people born cesarean to re-establish the breaking of the above-mentioned cycle which took place at the third stage.

2. Relaxation Techniques



There are many relaxation/reflection exercises –depending on the age, cultural background etc- which can help C-section people learn how to relax naturally, without exhausting themselves in their careers, gyms or without becoming drug addicts or alcoholics.

3. A change in our value system esp. in industrial or technological cultures where productivity is important and a better balance so that reflection, relaxation, inspiration etc are appreciated together with productivity, organization and the such.

3. Difficulties with the time element

Every birthing process starts at the moment when both involved are ready to do it. With the help of biochemical procedures, the message is exchanged and the birthing takes place as a respectful, deep, internal dialogue between the baby and the mother/environment. In the case of cesarean section, this element is missing. Other factors get in the way and the birthing process starts without the consent of the baby, thus reducing such a significant event to a profitable opportunity, or an event that can be controlled by others. Consequently, the person may feel:

1. I have no rights. I have to behave, function, live my life according to the programs, needs and/or decisions of the others
2. Often, they experience a huge internal stress when they have to meet deadlines
3. They procrastinate and leave everything to the last minute. The internal stress is high.

How can we help?

1. It is important for the whole environment, the C-section born person, the parents, the family... to integrate the deepest aspects of respect, learn how to respond to the primal needs of recognition, appreciation, gratitude, learn how to take full responsibility for the satisfaction of their needs and move away from control mechanisms to cover up their fears or pain. This is long, deep personal work that can continue in education at school and in lifelong education.

2. Time management techniques

As C-section people show this difficulty with time element, it is important to acquaint them with the time dimension (as in human experience), and learn how to cope with it so that their plans, visions, tasks etc can get form in life.

4. Anaesthesia

In cesarean, mother gets anaesthesia, either full or epidural. The quantity of the drug is calculated taken into account the mother. The anaesthesia gets to the system of the baby too and it causes a numbness to the baby, esp. the baby loses the function of his extremities and as a result he loses means to co-operate with the mother at this specific moment, so that he can co-create. The psychological effects of this are:

1. The person loses faith/trust in himself: I can't support myself
2. I can't fulfill my own personal goals.
3. at moments when I need to have all my best aspects of me alert and at a peak performance, I numb and stay helpless. Eg. I have to give important exams and there I am feeling that I have forgotten everything. Or when involved in a sexual intercourse and just before the peak of the orgasm, I fail.



4. the person fails to experience the union in the mystery of the divine

5. Perinatal Bonding

Because of the full anesthesia given to mum, or when the c-section took place because of an emergency and mum has to be looked after as there is a danger for her, the newborn misses the opportunity to bond perinatally during the first 45 minutes after birth. Consequently, this loss of opportunity affects the way the baby will bond with others in life, he will find it difficult to experience mutuality and/or the fact that he can love and be loved in a deep level.

How can we help?

1. Heal the loss through bereavement techniques.
2. Support people as they learn how to open up and bond.
3. Empathy courses are very helpful.
4. Group work so that through art, projects in whatever field people can learn how to co-create with inspiration.

5. Fear

Especially, in the cases of emergency cesareans, but in planned cesareans too, there is a lot of fear involved. A fear that gets trapped in the system.

How can we help?

1. Connect these people with their power through empowerment courses/techniques, teachings about what creative power is and how we can use it to support our existence in a gentle way.
2. Through physical techniques, open up the cell and release the fear entrapped on a cellular level.
3. Teachings that help these people integrate gentleness, peace and high frequency ideas, ideals so that they can move away from fear and violence on all levels.

6. The intervention

In C-sections, besides the already mentioned experiences of violence and disrespect, there is also the outside intervention that either allows the salvation of the life of a baby blocked and at risk, or dislodges a baby not still ready. Depending on the circumstances, the baby may harbor either relief for the outside support or harbor anger for the outside intervention. What we can later see are:

1. The C-section born person does not easily bring his tasks to a successful end without outside help or the expectation for outside help.
2. Often, he expects someone to SAVE him finish with domestic tasks, studies, relationships, etc even the sentence he starts when speaking.
3. Manipulates the environment with whatever mechanisms he can think of, playing it dumb and I can't do it among them too, so that he can secure that he gets the support he needs or thinks he needs.
4. He recreates emergency situations in his everyday life, such that ask for an outside intervention to heal.
5. The paradox is that although they get the outside help in cases of danger, they may harbor and express anger against the one who saved their life.
6. When close to the completion of a task, he gets numb, feels frustrated, experiences anxiety, fear, frigidity, stress...



7. Hesitates and this behavior of his can be mis-translated as ambivalence or suspicion.
8. When the outside help or the expected help does not come, then the person acts in ways that can bring him in front of unpredictable dangers.
9. The person lives a life in which violence is part of the day. This brings the person experience abuse or sexual abuse later on in his life, making relationships even more difficult.

How can we help?

Many of the techniques and healing suggestions can help in this case too. Furthermore, we suggest that:

1. People work on their prebirth, Perinatal traumas and resolve them. Prebirth psychology does it in a very gentle way. So, patterns of Pain, fear, shame, powerlessness, despair, guilt, perfection, all self-criticisms, ... can be released and reveal the pure core of the person who is always beautiful.
2. Teach people about autonomy and how they can be self sustained. Parents and educators also need to learn how to support their kids through autonomy.
3. Teach people how they can look after themselves, accept and love themselves not the narcissistic/ autistic way but the way that celebrates life.
4. Teach people communication skills.
5. Teach them how to relate.
6. Re-establish healthy contact.
7. Rekindle the flame or passion for life and creation.

Many disciplines can work in harmony and support kids or adults as they move from this position of traumatisation to the position of health. Prebirth psychology, philosophy, education, art are just a few examples.

Depending on the age, we can work with playtherapy, sound therapy, music therapy, art therapy, reflexes, myths and stories, psychotherapeutic techniques, movement and body release practices etc.

The sooner we can detect what the specific pattern is, the better it will be and the sooner the person will be able to express his full potential.

In our seminars to support C-section kids and adults we teach a lot how to support this process in yourself or your child. We'll be glad to accompany you on your way to harmony.

By Olga Gouni

Prenatal psychologist, educator, researcher, author

Contact: info@cosmoanelixis.gr



DOI: 10.24946/IJPLS.20.19.00.00.181108
<https://www.journalprenatalife.com>

Title: Prenatal Human Modification, Designing Babies and the End of Homo Sapiens.

Author: Olga Gouni¹

Affiliation:

**cosmoanelixis, Prenatal & Life Sciences, Athens, Greece
Prenatal Sciences Research Institute, Athens, Greece**

The rapid pace of genetic research guarantees that we will see genetically manufactured babies before the end of the century. Eric G Swedin (Swedin, 2006)

Abstract

Since 1978, the year when Louise Joy Brown, the first human baby conceived by IVF was born, the scientific world has seen a huge explosion in the knowledge gained in the fields of genetics and genetic research and technology, biology, engineering, Artificial Intelligence and the such. Hybrid fields came into appearance and words like biogenetics, human engineering, human enhancement and Reprogenetics (Silver 2000) to mention a few have entered our vocabulary. ART was once a word to describe the talented outcomes of painters and sculptors. Today, it is a common word to refer to Artificial Reproductive Technology. Back in 1932, Aldous Huxley (Huxley, 1932) published well-known dystopian novel “Brave New World” and set the futurist genetically modified citizens, members of an intelligence-based social/political hierarchy into context, anticipating the huge scientific developments in reproductive technology which now are a reality. Pre-implantation Genetic Diagnosis (PGD), Cloning, Germ-line Therapy, Human Enhancement and (True) Designer Babies are here to stay. Parents, today, are seduced into a possibility of selecting the particular genes that will render their children healthy, intelligent and powerful, thus controlling their children identity of being. They turn to cloning and baby design to provide for their sick children. Reprogenetics is being practiced in an effort to control the birth of mentally retarded humans and postnatal interventions are here to allow certain characteristics to be integrated as human enhancements.

Studying the psychological and socio-relational consequences of traumatic preconception, prenatal, birth and early postnatal experience, what we are to see as a result of the new, here to stay scientific, technological and laboratory interventions that

¹ Corresponding author email: info@cosmoanelixis.gr

may turn parenthood into an act of gardening or cultivation with decision-making based on eugenic genetic control is just a small fraction². Is there a line to be drawn? Is this the end of Homo Sapiens? Has already the Posthuman been conceived? Will the intention of health support become the front cover for hidden sociopolitical agendas, leading to the extinction of democracy and the sovereignty of those who have and can?

Keywords: PGD (Preimplantation Genetic Diagnosis), Cloning, Germ-line Therapy, Human Enhancement, Post-humanity, Designer Baby, Genetic Engineering, Genomic Science, Reprogenetics, Prenatal Human Modification, Bioethics.

Introduction

“The price of anything is the amount of life we exchange for it”

Henry David Thoreau

More than 40 years passed since the first human baby was conceived and born through science rather than the loving act of mother and father becoming one. The moment was hailed as a miracle raising hope for infertile couples but also sent shockwaves to various circles, church and medical profession among them raising ethical questions. Since then, science has run kilometres. **Crisp** (Clustered Regularly Interspaced Palindromic Repeats) (Begley, 2018), is the fastest, easiest and cheapest method of manipulating the genes and provides scientists with molecular tools which can precisely target and cut any kind of genetic material. (Baylis, 2019) What once seemed to be Science Fiction is now a reality that enables scientists to manipulate the code of life in any organism on the planet, humans included, thus being able to change the fundamental chemistry of who we are.

Just one year ago, in November 2018, at the National Academy of the Sciences summit, **He Jiankui**, a Chinese biophysicist, announced the successful application of human germline editing that led to the birth of Lulu and Nana, twins (He Jiankui, 2018). He Jiankui used Crisp technology to edit the embryo of the HIV+ father and HIV- mother so that the child can have the sure trait of the ability to resist HIV infections. He Jiankui also finally revealed that his research team had so far injected Crisp systems into 31 more cases developed to the blastocyst stage. The announcement was received with a lot of scepticism (Bulluck, 2019), a lot of voices among which that of the Nobel laureate and summit chair David Baltimore (Saey, 2019) who spoke about the “*non-responsible application of human germline editing*”, the experiment was paused, and investigations started.

From drosophila to Humans?

What we have recently witnessed as a reality in the field of genetics can be traced back to the time when Hermann J Muller, who won the Nobel for medicine in 1946, changed the understanding of the gene and revolutionized the research in the genetics when he demonstrated that radiation from X-rays would change the genetic makeup of fruit flies (*drosophila*) and create mutations passed to the generations that follow. This was the beginning of an era when humans altered the genetics of another creature. His Nobel award came 20 years after Muller’s findings (Muller, 1927, 1928), got published in Science

² The paper will risk posing questions for philosophical and ethical considerations, hoping to sensitize those involved so that human progress and consciousness evolution can continue on health grounds.

back in 1927. His publication attracted a lot of attention at the time and his work connecting radiation and mutation- which actually altered the heredity of flies- became an eye-opener for scientists to explore the vast possibilities of genetics. Of course, Muller was also to speak and publish about the threats radiation posed on people, much sooner than most other scientists did. What Muller introduced as so innovative 100 years ago seems quite simple and commonplace today (Calabrese E. J. ,2018).

However, Muller was not the first one to experiment and research into improving human possibilities.

Nature the Great Scientist V human practices


Throughout history, the interplay between Nature and organism (McMurray, 2016) has introduced changes which enabled organisms better adapt and maintain life on our planet. Such processes took long to appear and passed through manifold changes along the way, dropping and assuming qualities.

Studying the social and anthropological aspects of humanity (Bashford, 2010), we can also see that people tried to get desirable traits by manipulating sexual act. Thus, noble people got married and had children of noble origin, people of specific traits were together with others who also presented specific traits to create offspring with desirable qualities. Positive eugenics has been an ancient practice as ancient as negative eugenics, which included marriage prohibitions, forced isolations etc to avoid passing undesirable traits to the next generation (Hansen et al, 2001).

The term “eugenics”³ from the Greek word ευγενής, ευγένεια, was first coined in 1883 by Sir Francis Galton (Sir Francis Galton, 1883, 1904), a British polymath, child prodigy, half-cousin of Charles Darwin and the one who first introduced other well-known terms, beyond “eugenics” that is “Nature Versus Nurture” and synaesthesia and he was the one who founded psychometrics but also did research on the power of prayer.

The definition of “Eugenics” given in those early times described “the science which deals with all influences that improve the inborn qualities of a race; also, with those that develop them to the utmost advantage”. According to Sir Galton, eugenics “takes cognisance of all influences that tend in however remote a degree to give the more suitable races or strains of blood a better chance of prevailing speedily over the less suitable than they otherwise would have had.”

Still in practice today, in other fields such as agriculture and animal breeding, apart from humans, sterilization , contraception, genetic selection, prenatal testing followed by abortion, prenatal screening and testing for anomalies, chorionic villus sampling, amniocentesis, donor insemination and other suchlike practices are in use to reduce or eliminate undesirable outcomes among the human population. And the memory of Nazi experiments (Kevles, 1999) in their effort to create the Arian Race is still fresh to remind us of the sensitive line not to be crossed.

³ **Eugenics:** Applied science or the biosocial movement which advocates the use of practices aimed at improving the genetic composition of a population. Usually refers to human populations. Definition from: [Unified Medical Language System](#)  (Psychological Index Terms) at the National Library of Medicine

Designer Babies

The term “designer baby” became part of the vocabulary in the mid-to-late 1980s. At that early use of the term there was no reference to the genetics, gene editing, modification, enhancement etc. It reflected a tendency that appeared at the time to describe the expensive and exclusive, as part of the marketing frenzy that asked for designer clothes, kitchens, bed-linen etc and finally designer pets and designer babies, moving from the inanimate sphere to that of living entities and finally human beings.

At the time, a designer baby was the “perfect little creature who was welcomed into the world with matching curtains, cot covers, changing mats and super-sprung buggies” and adorned with upscale designer baby products like “baby splashes, lotions, oils, shampoos, fragrances, lip balms and special soaps”(Baylis, 2019).

From that point on, the term took on a new meaning. Using the same technology already in use for the modification of vegetables or animals -and the advances that will see the light in the future- people will be able to edit or reshuffle genes so that they make sure that the baby will present specific characteristics. According to Oxford English dictionary, a design baby is “*a baby whose genetic makeup has been artificially selected by genetic engineering combined with in vitro fertilization to ensure the presence or absence of particular genes or characteristics.*” (2). A design baby is a GM baby, unique not by chance, the result of the interplay of the environment and the baby, but by design. What is most is that the baby will be in part at least “produced” outside the womb. And since the whole process will be done by a specific company that first receives an order by a “client” for this baby and charges fees for their standard or customised work, the baby will be a “product” available to those who can afford with monumental societal and relational consequences.

Do we become a commodity? Have we thought of the impact this alone could have on the psychospiritual development of all involved? (Agar, 2006)

Cloning

Another biotechnology—cloning—may enable the selection of children’s characteristics. Although some people may view cloning (Plus, 2011, Latham 2005) as a last-ditch response to infertility, others may see it as a way of selecting the characteristics of their child. This choice would be exercised through the choice of the person to be cloned. For example, you might pursue physical attractiveness on your child’s behalf by using a somatic cell from a top model or Hollywood star, or the Nobelist cognitive qualities and/or the Picasso’s artistic skills. The religious opposition is easily understood (Bainbridge, 2003), but beyond that cloning (Mumford, 2013) raises lots of identity issues, challenges efforts to resurrect from the Dead with all its unforeseen consequences, has become part of the culture today with lots of debates on how clones could be used for warfare and lots of films have been produced around the theme. Furthermore, it raises an issue of violation of the rights of the child (the argument, stands true in all cases) who cannot give a consent for any action, no matter what it is, done to him/her even to his/her best. Consent is a crucial topic in bioethics and any person needs to give his/her own consent for any action performed on him/her from before. And in cases of curators or guardians, they need to be wise enough to make decisions for those they look after for the best of their interests. Certainly, the debate about this wisdom is the guiding force behind the decisions that parents make for their offspring is big. In the field of Prenatal Psychology, control issues and power games which disempower the

child born are evident as well as all the consequences well-documented now for those conceived or born to execute specific goals on behalf of others or those born after a parental preference for an enhanced child with all known unpleasant effects on the born child.

At the same time, there is no need for any sperm. Does this mean that we are heading towards a new era of females to be the dominant sex? Besides, there are major concerns about the health of clones. Animal clones suffer from a variety of problems that some scientists connect with incomplete reprogramming of somatic cell DNA or damage inflicted by the process of nuclear transfer. Human clones (Humber, 1998) may also suffer from these problems.⁴

Does your genetic code define your destiny?

And this brings forward another significant issue: Genetic Determinism and the old dilemma Nature or Nurture.⁹ **Genetic determinism** supports the notion that an organism's significant characteristics depends on its genes, with environmental influences playing a **negligible**, or small, role. With the findings from the field of Epigenetics, this view is now widely recognized as false. Organisms emerge from a complex interaction of genes and environment. Roger Federer, one of the greatest tennis players in history is the authentic outcome of such very complex interplay. His clone would be subjected to different environmental influences from the original, meaning that the clone might easily lack any interest in or **aptitude**, or ability, for tennis.

Apart from the physical, Ishiguro Kazuo, Literature Nobelist, (Ishiguro, 2005) in his book "Never Let Me Go" casts light on the destiny of those created to act as organ donors to the ones who paid for them (clones) and provides food for thought around the nature, rights and life of such a dystopian possibility.

William Kent Krueger (Krueger, 2014) in his book "Ordinary Grace", shows the meaning in life as each of the characters in this gripping story has a burden to bear, but many of them rise above their challenges to make the world somehow better through simple acts of courage and kindness.

Getting rid of the disease

Of course, the argument that specific diseases will stop from being handed down from generation to generation is the one which is to be used. And it may be true. Although we must learn from mutated food in the supermarkets and think again. Many genes have more than one effect which means that the effect we intend may be accompanied by others of which we become aware only later. Since epidemiological studies are difficult to happen and spread over generations, it may be too late when we realize the side effects of tampering genes, especially when we edit multiple genes to achieve the specific traits in mind.

The use of preimplantation genetic diagnosis to avoid passing on a disease to a child is already extensively used posing ethical questions (Josefson, 2000), causing psychological issues and relational challenges and certainly adding up abortion rates as it reflects maternal environment preferences or/and rejection, both having been extensively studied within the field of Prenatal Psychology.

⁴ <http://www.aaas.org/spp/sfrl/docs/cloningstatement.shtml>

Saviour siblings

Adam Nash is the world's first known **designer baby**. Using a "pre-implantation process", scientists genetically selected his embryo so that he would have the right cells to save the life of his dying sister who suffered from Fanconi-anaemia, an extremely rare genetic disease that would eventually kill (Verlinsky et al, 2001), (Pennings et al, 2002), (Van de Velde et al, 2004), (Boyle R, Savulescu J., 2001), (Springs, Savulescu, 2002). It would be very interesting to see how these intentions might affect saviour siblings and what happens to their lives later, both within the family and out, in the society. (Devolver. 2005). The editor of the "Bulletin of Medical Ethics", Richard Nicholson stated that "we are not creating the saviour sibling to be a child in the correct sense. We have created it—designed it—to be a source of spare parts for an existing child." "Where do we draw a moral distinction between slavery...and creating what I prefer to call slave siblings". (Nicholson, 2003). Suzi Leather (Leather, 2003) says we might equally call them "spare part sisters" or "bred to order brothers".

And although good intentions as the above-mentioned ones of parents for example wishing the best for their children at least health wise (Madanamoothoo A, 2011), the opposite polarity is also at play. As Robert G. Edwards the scientist who helped in the 1st tube baby said in 2003 "It was a fantastic achievement, but it was about more than infertility. It was also about issues like stem cells and the ethics of human conception. I wanted to find out exactly who was in charge, whether it was God himself or whether it was scientists in the laboratory... It was us!"

Gene Modification technology in the hands of those who are not motivated by the best intentions can put humanity at risk by selecting traits to manifest in babies who can make the best soldiers, Mars explorers, sex mates, brilliant minds etc with unforeseen social consequences.

Transhumanism

In 1990, Max More, one of the main transhumanists, defined "Transhumanism⁵ as a class of philosophies of life that seek the continuation and acceleration of the evolution of intelligent life beyond its currently human form and human limitations by means of science and technology, guided by life-promoting principles and values.". The movement (Bostrom, 2005) sees human species in its current form as being in a rather comparatively early phase.

Transhumanists are transitional human beings, an intermediary form between the human and posthuman the "earliest manifestation of new evolutionary beings" as F.M. Estfandiary (FM 2030) says. They have "prostheses, plastic surgery, intensive use of tele-communications, a cosmopolitan outlook and a globetrotting lifestyle, androgyny, mediated reproduction (such as in vitro fertilization), absence of religious beliefs, and a rejection of traditional family values."

How this can happen? Using the biotechnology at hand the insertion of a non-human gene, a gene from another species, can be inserted bringing a more extreme change but also extreme outcomes such as enhanced night/ full spectre vision, extreme hearing

⁵ <https://www.theverge.com/a/transhumanism-2015/history-of-transhumanism>

qualities, extreme lifting/ running/ endurance skills etc. Using CRISPR-Cas9 technology such transformations are quite easy and without using embryonic stem cells.

Present biotechnology has led to **smart skin**, the world's fastest stretchable, wearable integrated circuits that can be worn like a temporary tattoo to monitor people's vital signs remotely, in intensive care units, **microchip implants** to enable his creator Amal Graafstra, founder of bio-hacking company Dangerous Things to download information to and from his phone, **hearing colour antennas** like the one Neil Harbisson who suffers from achromatopsia wears to hear colour, **bionic eyes** that could help up to 85% of clinically blind people, to mention some of the ever evolving technology of today.

Humanity+⁶ is an NGO that promotes discussion of possibilities for the improvement of human capacities, seek academic acceptance and co-ordinate action in the field. H+ is the symbol that people in support of transhumanism use to speak about better humans, already called "Homo Evolutis", a version of a person that is beyond human.

Post Humans

Post humans (Ferrando, 2014) are possible future beings whose basic capacities exceed those of present humans. They could be completely synthetic artificial intelligence, or they could be enhanced uploads or they could be the result of making many smaller but accumulatively profound augmentations to a biological humans, using advanced nanotechnology (, genetic engineering, psychopharmacology, anti-aging therapies, neural interfaces, advanced information management tools, memory enhancement drugs, wearable computers and cognitive techniques. Post humans are considered to have experiences that we can not even imagine and live without bodies as information patterns on super-fast computer networks, enjoying different mind architectures.

Are designer babies "posthumans"?

Francis Fukuyama (Fukuyama, 2002) thinks that genetic enhancements may change our descendants to such an extent that they lose their humanity. According to Fukuyama, "*environmental influences operate only within limits set by genes*", meaning that even ambitious education programs leave their subjects' humanity intact. A genetically enhanced child is more fittingly described as a "posthuman."

Are geniuses accidental posthumans because they're above the norm? Transhumanists see designer babies as a goal rather than an issue (Hansson, 2008).

Are Designer babies a threat to society by creation of a "master-race"

Some of the most challenging moral and ethical questions about a licence to design babies concern the societies it might lead to. The movie **Gattaca** depicts a future in which genetically enhanced people take the lead, viewing unenhanced people as fit only to clean up after them. Liberal democracy is a cooperative venture in which all are seen as having something to offer.¹⁷ Will genetic enhancement bring this social arrangement to an end, creating societies in which unenhanced people are viewed by their genetic superiors in much the same way that we currently view guinea pigs?

Dividing humans in two different classes: the "desirables", the "superior race", the laboratory-engineered "valid" and the "undesirables", the "inferiors" or the genetically

⁶ <https://whatistranshumanism.org>

inferior “invalid” may lead people marked as belonging to the 2nd group to be at risk of exposure to harmful acts of discrimination, stigma and marginalization.

Ectogenesis, Artificial Wombs and Daedalus

All of us remember the ancient Greek myth of Daedalus and Icarus (Haldane, 1924). Daedalus, father of Icarus crafted wings out of bird feathers, wax and string in his effort to escape from King Minos and as they raised up in the sky, the hot sun melted the wax causing the destruction of the son whom the father wished to save. A great metaphor to let us think and think again about our motives and our actual deeds and their impact on those we wish to protect.

Beyond the myth and its own teachings, J.B.S. Haldane, a British scientist back in 1924, chose the name of Daedalus to emphasize the quality of the scientist who “*is not concerned with Gods and is not haunted by old taboos*”. He was the first to speak about ectogenesis and describe how human pregnancy could one day give way to artificial wombs foreseeing that by 2074 ectogenesis (James, 1987) will be the main technique human babies will be born with “*... less than 30% of children now born of women*”. In 1951, Dupont and Schwarz produced the first ectogenetic child and today we are closer to perfecting the technology that would make Haldane’s vision into reality. Dr Hung-Ching Liu of the Weill Medical College at Cornell University has engineered endometrial tissue in the lab to create an artificial uterine lining to implant an embryo. Due to legislation, he allowed -as he said- the baby to grow for 6 days. More research experiments are being done in other laboratories, while such research with animals is thriving. The time when babies will be gestated in artificial wombs is around the corner, bringing motherhood and mother-baby bonding into a new dimension (Rosen, 2003).

Where do we draw the line?

Beyond that, the question to ask is “Is there a line to be drawn” The issue is not just an issue of what health and disease is, but also what life is and why is there life on this planet. We need to find a good balance between what supports life and what destroys it (Turners, Gouni, 2018). Then, there are questions concerning power, exertion of power and what should power be used for.

Even when talking about health and disease, it is hard to find definitions of disease suitable to serve as a moral guideline for genetic technologies. Social constructivists consider diseases to be states to which society takes a negative attitude. Cancer seems to satisfy the requirements of this definition, but so might homosexuality and practicing a religion different from the norm in another society. Objectivist accounts avoid these difficulties by making the definition of disease independent of our attitudes. The view that “*I suffer from a disease when I fail to perform any of my biological functions*” is not enough any longer as human experience is not restricted to our mere biology but extends to other, non-physical spheres as well, on an individual level, and it extends to include social and cultural aspects as well.¹²

A further moral complication emerges from the different approaches to treating disease and those who suffer from them. Genetically modifying an embryo to remove a gene linked with a higher than average risk of asthma may prevent asthma, but it need not prevent the existence of the person who might have suffered from it. Compare this with the use of PGD to avoid having a child at a high risk of asthma. This seems to prevent the disease only by preventing the patient’s existence. Exactly as we abort a child after screening if the child presents a syndrome or other disease.

Adding an extra copy of the NR2B gene to a human embryo, on the other hand, has the quite distinct aim of producing someone who, in some area, functions beyond a level considered normal for human beings and as such qualifies as an “enhancement.”

Is there another way?

Is the way parents rear a child also a way of designing a child?

There is a very important principle to be considered here. That of respect versus that of manipulation and intervention to get wanted results. Unfortunately, we have seen, and we have heard the sad stories of pain every time a baby is faced with interventions in their pre/perinatal early postnatal experience and how this is carried on in their whole life as adults (Gouni et al, 2005-2018). The Hippocratic principle “Do no harm” is by itself a safe guideline to be used in all situations. No matter what we are talking about, technology or natural non-intervention conception, gestation and upbringing of children, this simple rule can do miracles.

We are not to stop evolution and human development. Life goes on and up, hopefully. But we need to learn from our experience and our arrogant moments of our past so that we can respect life on Earth.

Parental environments and societal environments have always wished for the best of their offspring. That’s why they provide for their schooling and paedia (education), arrange for their children’s settings, nutrition, relations, resources available etc. And this is what has led us to this point we are now.

Epilogue

Providing the best for our children starts with looking after and healing the issues of the generation living today. Providing for the generation of children already born. Providing for the new adults who are to invite newcomers in their family environment, even though the concept of family is in a transformation form. Support them so that they can experience ample love, attention, opportunity, education, healthy environments of co-creation, co-operation and peace so that they can attain high levels of spirituality which by itself can provide the compass which will take future generations to elevated heights on an individual level as well as higher collective consciousness.

The moral parallel between loving conception, gestation, birthing and upbringing of children and genetic enhancement will be drawn if all science raises its own responsibility level and the market or politicians understand their essential role in human communities.

The message sent out to mankind by the Peace Nobelist Elie Wiesel⁷ in 1986 is a message of peace, atonement and human dignity are now more significant than ever: *“We must not see any person as an abstraction. Instead, we must see in every person a universe with its own secrets, with its own treasures, with its own sources of anguish, and with some measure of triumph”*.

References (extensive)

1. Agar N, 2006, Action Bioscience

⁷ <https://www.bu.edu/federal/2016/07/03/elie-wiesel-hon-74-spokesman-for-peace-and-human-rights-dies-at-87/>

2. Bainbridge William Sims, 2003, Religious Opposition to Cloning, *Journal of Evolution and Technology* - Vol. 13 – Oct. 2003, <http://jetpress.org/volume13/bainbridge.htm>
3. Bashford, Alison; Levine, Philippa (3 August 2010). *The Oxford Handbook of the History of Eugenics*. Oxford University Press. p. 327. ISBN 978-0199706532.
4. Baylis Françoise, 2019, *Altered Inheritance: CRISPR and the Ethics of Human Genome Editing* 1st Edition, Harvard college, 9780674241961 (EPUB), 9780674241978 (MOBI), 9780674241954 (PDF), USA
5. Begley, Sharon; Joseph, Andrew (17 December 2018). "The CRISPR shocker: How genome-editing scientist He Jiankui rose from obscurity to stun the world". *Stat News*. Retrieved 17 December 2018.
6. Bostrom, Nick (2005). "A history of transhumanist thought" , *Journal of Evolution and Technology*. Retrieved February 21, 2006.
7. Boyle R, Savulescu J. 2001, Ethics of using preimplantation genetic diagnosis to select a stem cell donor for an existing person. *BMJ* 2001; 323: 1240-1243.
8. Bulluck, Pam (14 April 2019). "Gene-Edited Babies: What a Chinese Scientist Told an American Mentor". *The New York Times*.
9. Calabrese E. J. (2018). Muller's nobel prize research and peer review. *Philosophy, ethics, and humanities in medicine: PEHM*, 13(1), 15. doi:10.1186/s13010-018-0066-z
10. D Josefson, 2000, Couple select healthy embryo to provide stem cells for sister. *British Medical Journal* 2000; 321: 917.
11. Devolver K., 2005, Preimplantation HLA typing: Having children to save our loved ones. *Journal of Medical Ethics* 2005; 31: 582-586.
12. Dickens, BM., 2005, Preimplantation genetic diagnosis and "saviour siblings". *Inter J Gynecol Obstet* 2005; 28: 91-96.
13. Dobson R., 2000, "Designer baby" cures sister. *BMJ* 2000; 321: 1040.
14. Edwards B., 2004, Ethics of PGD: thoughts on the consequences of typing HLA in embryos. *RBMOnline* 2004; 9: 222.
15. ESHRE Taskforce 9: the application of preimplantation genetic diagnosis for human leukocyte antigen typing of embryos. *Human Reproduction* 2005; 20: 845-847.
16. F. Shenfield, G. Pennings, P. Devroey, C. Sureau, B. Tarlatzis, J. Cohen, and The ESHRE Ethics Task Force Taskforce 5: preimplantation genetic diagnosis
17. Ferrando, Francesca, 2014, "The Body" in Post- and Transhumanism: An Introduction. Peter Lang, Frankfurt: 2014
18. FM-2030, 1989, *Are You a Transhuman?* (New York: Warner Books, 1989)
19. Fukuyama Francis, 2002, *Our Posthuman Future: Consequences of the Biotechnology Revolution*. New York, NY: Farrar, Straus and Giroux. ISBN 0-374-23643-7
20. He Jiankui, Laura; Zhang, Jane; Moon, Louise (29 November 2018). "Who are the investors supporting He Jiankui , the Chinese scientist behind the gene-edited babies?". *South China Morning Post*.
21. Galton Francis, Sir, 1883, *Inquiries Into Human Faculty and Its Development*. Macmillan.
22. Galton, Francis (July 1904). "Eugenics: Its Definition, Scope, and Aims". *The American Journal of Sociology*. X (1): 82. Bibcode:1904Natur..70...82.. doi:10.1038/070082ao.

23. Gluckman E, Rocha V. Cord blood transplantation: state of the art. *Haematologia* 2009; 94: 451-454.
24. Gouni, 2005, Prebirth Psychology in Action: Presentation at the 16th International Congress ISPPM, 2005, "The Anthropology & Psychology of Pregnancy & Birth" Heidelberg, Germany
25. Gouni, 2007, How we and the world turn a blind eye! It is time to welcome our children! (Moscow congress, 2007)
26. Gouni, 2007, Prenatal and Perinatal Experience and Autonomy: Presentation at the Greek-Cypriot Congress for Children with Disabilities, 2007, THEOTOKOS, Athens, Greece
27. Gouni, 2008, From the Heart to the Ear: Presentation at the Second European Congress of Early Prevention in Children with Verbal Communication Disorders, 26-28 September, 2008 Sofia, Bulgaria Organized by: The NBU (New Bulgarian University) Sofia, Bulgaria, The IEPSP (Institute for Experimental Phonetics and Speech Pathology, Belgrade, Serbia) The P.A.L.O. (The Hellenic Organization of Hearing, Speech Therapy & Communication Disorders, Patra, Greece
28. Gouni, 2008, It is Never too Late! Now is the Moment! Presentation at the XVIIIth International ISPPM Congress: Prevention- Early Dialogue, 2008, Heidelberg, Germany.
Gouni, 2008, Prenatal Cont®acts for a Lifetime: Presentation at the Parma congress, 2008
29. Gouni, 2011, The Roots that Sprout Wings, Presentation at ISPPM congress in Frankfurt
30. Gouni Olga, Slobodan Sekulic, & Anastasia Topalidou. (2016). The Contribution of Prenatal Psychology to Our Understanding about Prenatal Dynamics and Fetal Behaviour. *Psychology Research*, 6(12), 693-711.
31. Green Ronald M., 2007, *Babies by Design: The Ethics of Genetic Choice*, Yale University Press, ISBN 978-0-300-12546-7
32. H. Van de Velde, I. Georgiou, M. De Rycke, R. Schots, K. Sermon, W. Lissens, P. Devroey, A. Van Steirteghem, and I. Liebaers, 2004, Novel universal approach for preimplantation genetic diagnosis of -thalassaemia in combination with HLA matching of embryos. *Human Reproduction* 2004; 19: 700-708.
33. Haldane, 1923, *DAEDALUS or Science and the Future*. A paper read to the Heretics, Cambridge, on February 4th
34. Haldane, 1924, *DAEDALUS or Science and the Future*. Book, England
35. "Selected Genetic Papers of JBS Haldane", New York: Garland, 1990
36. Hansen, Randall; King, Desmond (1 January 2001). "Eugenic Ideas, Political Interests and Policy Variance Immigration and Sterilization Policy in Britain and U.S". *World Politics*. 53 (2): 237–263. doi:10.1353/wp.2001.0003. JSTOR 25054146.
37. Handyside AH, Kontogianni EH, Ardí K, Winston RM. 1990, Pregnancies from biopsied human preimplantation embryos sexed by Y-specific DNA amplification. *Nature* 1990; 344, 768-770.
38. Handyside AH, Pattinson JK, Penketh RJ, Delhanty JD, Winston RM, Tuddenham EG., 1989, Biopsy of human preimplantation embryos and sexing by DNA amplification. *Lancet* 1989; 333: 347-349.
39. Hansen M, Bower C, Milne E, de Klerk N, Kurinczuk JJ. , 2005, Assited reproductive technologies and the risk of birth defects-a systematic review. *Hum Reprod* 2005; 20: 328-338.

40. Hansson SO. 2008, Three Bioethical Debates in Sweden. *Cambridge Quarterly of Healthcare Ethics* 2008; 17: 261-269.
41. Humber, James M., Almeder, Robert (1998). *Human Cloning*. Springer Science & Business Media. p. 10. ISBN 9781592592050.
42. Huxley, Aldous, 1932, *Brave New World*. New York: Harper Brothers
43. Ishiguro Kazuo, 2005, *Never let me go*, Faber and Faber, 1-4000-4339-5 (first edition, hardback)
44. James, David N. (1987). "Ectogenesis: a reply to Singer and Wells". *Bioethics*. 1 (1): 80–99. doi:10.1111/j.1467-8519.1987.tb00006.x. PMID 11649763
45. Drexler Eric, 1992, *Nanosystems: Molecular Machinery, Manufacturing, and Computation*, (New York: John Wiley & Sons)
46. Kevles D. J. (1999). *Eugenics and human rights*. *BMJ (Clinical research ed.)*, 319(7207), 435–438. doi:10.1136/bmj.319.7207.435
47. Knoepfler Paul, 2015, *Gmo Sapiens: The Life-changing Science Of Designer Babies*, World Scientific Publishing Co, Pte, Ltd, ISBN 978-9814667005
48. Krueger, W. K. (2014). *Ordinary Grace: A novel*. New York: Atria Paperback.
49. Kuliev A, Rechitsky S, Tur-kaspa I, Verlinsky Y. *Preimplantation Genetics: Improving Access to Stem Cell Therapy*. *Annals of New York Academy of Sciences* 2005; 1054: 223-227.
50. Kuliev A, Rechitsky S, Verlinsky O, Tur-Kaspa I, Kalakoutis G, Angastiniotis M, Verlinsky Y. , 2005, *Preimplantation diagnosis and HLA typing for haemoglobin disorders*. *RBM Online* 2005; 11: 362-370.
51. Kuskonmaz B, Gocer S, Ersoy-Ewans S, Cetin Ozman F, Cetin M, Uckan D., 2007, *Hyperacute graft-vs.-host disease after related HLA-identical umbilical cord blood transplantation*. *Pediatrics Transplantation* 2007; 11: 818-820.
52. Latham, K. E. (2005). "Early and delayed aspects of nuclear reprogramming during cloning, *Biology of the Cell*. pp. 97, 119–132
53. Leather S. 2003, *Saviour siblings. Is it right to create a tissue donor baby?* London: Progress Educational Trust, 2003. <http://www.progress.org.uk/Events/PastEventsSSL.html>
54. Lie RT, Lyngstadaas A, Orstavik KH, Bakketeig LS, Jacobsen G, Tanbo T., 2005, *Birth defects in children conceived by ICSI compared with children conceived by other IVF-methods; a meta-analysis*. *Int J Epidemiol* 2005; 34: 696-701.
55. Madanamoothoo A, 2011, *Saviour-sibling and the psychological, ethical and judicial issues that it creates: should English and French legislators close the Pandora's Box?* *Eur J Health Law*. 2011, May;18(3):293-303
56. Mastenbroek S, Twisk M, van Echten-Arends J, et al. , 2007, *In vitro fertilization with preimplantation genetic screening*. *The New England Journal of Medicine* 2007; 357: 9-17.
57. MD Damewood, 2001, *Ethical Implications of a New Application of Preimplantation Diagnosis* *JAMA* 2001; 285: 3143-3144.
58. McMurray Bob (2016) *Nature, nurture or interacting developmental systems? Endophenotypes for learning systems bridge genes, language and development, Language, Cognition and Neuroscience*, 31:9, 1093-1097, DOI: 10.1080/23273798.2016.1227859

59. Muller HJ. 1927, Artificial transmutation of the gene. *Science*. 1927c;66(1699):84–7.
60. Muller HJ., 1927, Effects of X-radiation on genes and chromosome. Presented at the American Association for the Advancement of Science Meeting, Nashville TN, December 1927. Lilly library, Muller mss, Indiana University, Bloomington, IN, 1927a.
61. Muller HJ., 1927, Letter to Hartman. Lilly library, Muller mss. Indiana University, Bloomington, IN. October 28, 1927e.
62. Muller HJ., 1950, Some present problems in the genetic effects of radiation. *J Cell Comp Physiol*. 1950;35(Suppl 2):9–70
63. Muller HJ., 1928, The effects of X-radiation on genes and chromosomes. *Science*. 1928c;67:82.
64. Muller HJ. , 1927, The problem of genic modification. Presented in Berlin, 5th Genetic Congress 1927a. Bloomington, IN: Lilly library, Muller mss, Indiana University; 1927d.
65. Muller HJ., 1928, The production of mutations by X-rays. *Proc Nat Acad Sci*. 1928a; 14(9):714–26.
66. Mumford, James (2013). *Ethics at the Beginning of Life: A Phenomenological Critique*. OUP Oxford. ISBN 978-0199673964.
67. Munné S, Gianaroli L, Tur-Kaspa LL, et al, 2007, Substandard application of preimplantation genetic screening may interfere with its clinical success. *Fertility and Sterility* 2007; 88: 781-784.
68. Nerlich B, Johnson S, Clarke D., 2000, The first 'designer baby': The role of narratives, clichés and metaphors in the year 2000 media debate. *Science as Culture* 2003; 12: 471-498.
69. Nicholson R., 2003, *Saviour siblings: is it right to create a tissue donor baby?* London: Progress Educational Trust, 2003. <http://www.progress.org.uk/Events/PastEventsSSL.html>
70. Pennings G, Schots R, Liebaers I., 2002, Ethical considerations on preimplantation genetic diagnosis for HLA typing to match a future child as a donor of haematopoietic stem cells to a sibling. *Human Reproduction* 2002; 17: 534-538.
71. Preimplantation donor selection (editorial). *The Lancet* 2001; 358: 1195.
72. Plus, M. (2011). "Fetal development". Nlm.nih.gov. Retrieved 31 October 2011.
73. Querol S, Mufti GJ, Marsh SGE, Pagliuca A, Little A-M, Shaw BE, et al. Use of cost effectiveness analysis to determine inventory size for a national cord blood bank. *Med Decis Making* 2009; 94: 536-41.
74. Reefhuis J, Honein MA, Schive LA, Correa A, Hobbs CA, Rasmussen SA., 2009, Assisted reproductive technology and major structural birth defects in the United States. *Hum Reprod* 2009; 24: 360-366.
75. Robertson JA, Kahn JP, Wagner JE., 2002, Conception to obtain hematopoietic stem cells. *Hastings Cent Rep* 2002; 32: 34-40.
76. Robertson JA, Kahn JP, Wagner JE. , 2002, Contraception to obtain hemotopoietic stem cells. *Hastings Cent Rep* 2002; 32: 34-40.
77. Rocha V, Gluckman E. , 2007, Outcomes of transplantation in children with acute leukaemia. *The Lancet* 2007; 369: 1906-1908.
78. Rosen Christine, 2003, Why not artificial Wombs, *New Atlantis*

79. Saey Tina Hesman, 2019, ScienceNews, retrieved on 9 Oct 2019 from <https://www.sciencenews.org/article/nobel-prize-winner-david-baltimore-crispr-babies-ban>
80. Sheldon S, Wilkinson S., 2004, Should selecting saviour siblings be banned? *J Med Ethics* 2004; 30: 533-537.
81. Silver Lee, 2000, Reprogenetics: third millennium speculation, *EMBO Reports* vol 1/ no 5, DOI: 10.1093/embo-reports/kvd096
82. Silversides A. , 2007, Interface of private and public faces proposed cord blood bank. *Canadian Medical Association Journal* 2007; 177: 705.
83. Spriggs M, Savulescu J., 2002, "Saviour siblings". *J Med Ethics* 2002; 28: 289.
84. Spriggs, M., & Savulescu, J. (2002). "Saviour siblings". *Journal of medical ethics*, 28(5), 289. doi:10.1136/jme.28.5.289
85. Sutcliffe AG, Ludwig M., 2007, Outcome of assisted reproduction. *The Lancet* 2007; 370, 351-359.
86. Swedin Eric, 2006, *Designing Babies: A Eugenics Race with China*, World Future Society
87. Turner R.J., Troya GN Turner, Gouni O. (edit), 2018, *Prenatal Psychology: 100 Years*, cosmoanelixis, <https://www.amazon.com/Prenatal-Psychology-100-Years-Experience/dp/1984323822>
88. Twisk M, Haadsma M, van der Veen F., 2007, Preimplantation genetic screening as an alternative to prenatal testing for Down syndrome: preferences of women undergoing in vitro fertilization/intracytoplasmic sperm injection treatment. *Fertility and Sterility* 2007; 88: 804-810.
89. Verlinsky Y, Rechitsky S, Schoolcraft W, Strom C, Kuliev A., 2001, Preimplantation Diagnosis for Fanconi Anemia Combined With HLA Matching. *JAMA* 2001; 285: 3130-3133.
90. Wolf SM, Kahn JP, Wagner JE., 2003, Using preimplantation genetic diagnosis to create a stem cell donor: issues, guidelines and limits. *J Law Med Ethics* 2003; 31: 327-339.