



## Bodies go to school, a favor granted by our brains

## Los cuerpos van a la escuela, un favor que nos hace nuestro cerebro

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### Abstract

Deliberation and dialogue on human behavior is always practiced within a reference framework. Probably the most frequently used is the mind-body duality. Nevertheless, we always live through somatic markers of experience and in a corporeal scenario. The article underlines that this scenario constitutes the framework to understand the necessity of culture. Hence to fully understand the concept of *education* requires transitions among fields of knowledge. Culture itself engendered an ontological and semantical gap between Humanities and Life Sciences. Interdisciplinary deliberation and dialogue radically improves the understanding of humanization processes of human beings.

*Keywords:* Corporal experience, somatic markers, corporeal scenarios, embodied mind

### Resumen

La deliberación y el diálogo sobre el modo de ser humano siempre se practica dentro de un marco de referencia. Tal vez, el más traído a colación es el de la dualidad mente-cuerpo. Sin embargo, vivimos siempre con marcadores somáticos de la experiencia y en un escenario de corporeidad. El artículo subraya que ese escenario constituye el marco para la comprensión de la necesidad de cultura. De ahí que la comprensión plena del significado *educación* requiera transiciones entre campos de conocimiento. La propia cultura excavó una brecha ontológica y semántica entre las Humanidades y las Ciencias de la vida. La deliberación y el

diálogo interdisciplinar mejoran radicalmente la comprensión de los procesos de humanización de los seres humanos.

*Palabras clave:* Experiencia corporal, marcadores somáticos, escenarios de corporeidad, mente corporeizada

## Deliberate *from or on* a reference framework

The reference framework includes an imaginative landscape, from which we extract part of the meaning threads (Lakoff, 2005). The landscape of images contributes to some extent to cloistering the meaning. The preferential imaginary functions as limit of unconscious reference. A noun can be polysemic, communicatively ambiguous and the attribution of a meaning may be origin of controversies, since the imaginative frameworks can be varied. This also provides the meaning of the concept of education.

The most widely used reference framework, even unconsciously, becomes accustomed to Cartesian dualism: disperses mind and body, thought and emotion. School, social institution for the incorporation of culture, was traditionally described as social space whose project was formulated as the culture of the spirit. The theoretical reconstruction of the humanization process, educational process, training process...or however we call it, from a representations framework focusing on the psychosomatic unit, is yet to be completed. Perhaps, evidence suggests the advisability of intensifying the work in that direction, supported by strong reasoning. The school formation structure is based on the structure of those named by Ll. Duch and C. Mèlich (2005) as “*corporeal scenarios*”<sup>1</sup>, behavior scenarios conditioned by the personal psychosomatic unit.

## Somatic markers and corporeal scenarios

Human life *primary experience* varies according to a *welcome facility* and its accidents. In that experience, *somatic markers*, corporal sensations

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<sup>1</sup> Duch, Ll.-Mèlich, J-C. (2005). *Escenarios de la corporeidad. Antropología de la vida cotidiana* 2/1. Madrid, Trotta.

and emotional states are crucial; life expresses first itself within a corporal relations framework, a *biosociability* (Otega, 2009). Welcome experience at birth is so essential that, both the newborn and the mother, have an innate biological system intended for fostering (Bowlby, Bowker 2014), which is part of the human *endophenotype*. Welcome primary experience somatically marked activates or keeps the maternity-affiliation experience and the progressive organization of its wrap (Becker, 2002): it is an *interaction space* and a *vital* domain; a space for the communicative action and the human<sup>2</sup> ecosystem. In that scenario body-to-body relations play the major role, which are the “corporeal scenarios” according to L. Duch and J-C. Mèlich. When the vital scenario is exclusively noticed as a domain of things and persons are dissolved into objects, we are confronted with greatly disturbed minds. This was the case of Genie (García Carrasco, 2007); according to doctor James Kent, “the deepest affectation—of mind—he had ever seen (Rymer, 1994).” Our vital space is not the physical space, but the significant space generated by our corporeality.

L. Duch and J-C. Mèlich underline that the “conception of the human body” is one of the most relevant matters in the incorporation into culture (2005).” Within the Cartesian reference framework (Le Breton, 2012), a confrontation between the human being and its body is created. We can see it synthesized at the contemporary expression *I own my body and I get to do what I want with it*. This attitude reduces the body to a Cartesian machine. According to M. Merleau-Ponty, instead, human agency finds itself *essentially incarnated* (Varela, 1992; Bobourg, 1996). The representation framework is anchored now at the *organic materiality of the alive human being*: the body is the one that feels, loves, thinks and suffers; the one for maternity, affiliation and welcome (Bárcena, 2006). This differs from those body images which predominate in textbooks: lacking-age bodies, cadaverous bodies, asexual bodies, Caucasian bodies, characteristic of forensic anatomy.

Reflection itineraries, derived from the corporeal reference framework, are numerous and are being explored from both Science and Humanities: the body in sculpture (Flynn, 2002), in painting (Salabert, 2003), in phenomenology (Pera, 2003), in music (Hemsey, 2003), in medicine (Laín,

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<sup>(2)</sup> This is not the space that J. Piaget searched at Piaget, J.-Inhelder, B. (1971, 1-42), original version from the text in 1948. Strictly speaking, the Piagetian *space* is, in the proper sense, only *geometric space*. It can be found at: “La représentation spatiale: introduction”. Obtained from: [http://www.fondationjeanpiaget.ch/fjp/site/ModuleFJP001/index\\_gen\\_page.php?IDPAGE=87&IDMODULE=46](http://www.fondationjeanpiaget.ch/fjp/site/ModuleFJP001/index_gen_page.php?IDPAGE=87&IDMODULE=46). (27-01-2015).

1989), in anthropology (Lieberman, 2013), in biology and neurosciences, at the borders and intersections between meaning territories. For example, F. Varela was interested in *bioneurophenomenology* (Varela, 2002). In each of these cases, mental imagery is about *real bodies*. The primary level of educational process is established as a scenario of real corporeality. Whence the title: *Bodies go to school*.

### Corporeality as shared scenario

The majority of current humanists are familiar with the idea that brain and body are involved within the mental activity as a whole. It is less frequent to understand the protection of the brain as a biocultural value, which importance is kept from birth to death: the *care* of the brain itself and the commitment of *assistance*, when brain gets hurt or older. In cognitive neuroscience there is already something very clear: It is not possible to think or talk about the mind without the brain, or about the brain without the mind (Goldberg, 2007).

“Corporeal reason”, “embodied schemes”, “body in mind”, “corporeal cognition” are expressions used to indicate that the body is the essential mediator of action, of communication and, most likely, of thought. Muñoz (2010) justifies it asserting that the body behaves depending on the organization and structuring of mental contents, those which, in turn, determine aspects of the action in which the body takes part.

The *corporeal mind hypothesis* could be expressed as: “human mental life is invariably accompanied by a continuous, unitary and sensibly experience linked to the corporal and environmental reality we are living through” (Aguilera, 2008). Beyond the corporal, sensorial and motor experience, perceptive interactions are generated, delivering images schemes. G. Lakoff and M. Johnson (2005) deduce that the understanding of the meaning takes place from figurative projections of the bodily dimension: corporal experience and thinking would be two functional levels within the human organic system itself (Johnson 1991).

In this scenario the purpose of education acquires unexpected facets, paying attention to, for example, the voice of the mentally disabled and the elders. The first ones indicate that the purpose of education is to seek the possibility of *what they can offer*, since imperfection is settled on principle in bodily design (Armstrong, 2012). On the other hand, the

elders argue (Ramón y Cajal, 1939) that mental cultivating delivers a crop of rewards, from which being able to enjoy “in the autumn of the years”<sup>3</sup>.

### Why do all human beings need culture to live?

Descartes would paternally clarify: our body needs food as our mind needs culture (Sánchez Ron, 2011).

The *necessity of culture* is satisfied by processes and actions which, at first sight, take place in a social scene, but are rooted into the scenario of corporeality, until reaching the domains where neuroscientists work (García Carrasco, 2014). We think that exploring roots downwards could be named as *corporal culture*<sup>4</sup>. Hence the understanding of going to school as a favor offered by our corporeality, for being our brains what they are<sup>5</sup>. This discourse was defended by Physical Education university professors, gathered in a congress at the University of Alcalá de Henares (Pastor, 2002), since they did not want to just seen as personal trainers and muscle experts.

### The concept of “Education” and transition among fields of knowledge

The intersubjective process of incorporation into culture is anthropologically necessary: in the same welcome setting, the organism satisfies its protective-affective need, its food-energetic need and the information needs for the development of the mind. This systemic set of three need axles represents the substrate where the educational process rises. This is evidenced by the long period abandonment survivors at early ages: they suffered the damage, irreparable in many cases (García Carrasco, 2007), of staying too long out of this welcome intersubjective space, when it was most needed. They turned out to be anthropologically

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<sup>3</sup> “But now the days are short / I am in the autumn of the year / And now I think of my life/ As vintage from fine old kegs/ From the brim to the dregs/ It poured sweet and clear“. “*It was a very good year*“. Song composed by Ervin Drake in 1961.

<sup>4</sup> An example of this path can be considered “Cours sur le corps” by Evelyne Buissière (2005), Site de l’Académie de Grenoble. Obtained from: [http://www.ac-grenoble.fr/PhiloSophie/file/cours\\_corps\\_ebuisserie.pdf](http://www.ac-grenoble.fr/PhiloSophie/file/cours_corps_ebuisserie.pdf). (1-1-2015)

<sup>5</sup> “Bodies go to school” is part of the title about psychomotricity. Obtained from: [http://www.captel.com.ar/downloads/1010054435\\_el%20cuerpo%20va%20a%20la%20escuela.pdf](http://www.captel.com.ar/downloads/1010054435_el%20cuerpo%20va%20a%20la%20escuela.pdf). (01-01-2015).

unrecognizable; the damage was, in deep-long-lasting isolation cases, incurable. They were qualified as “wild children”, *Wild Child* (Bartra, 1996).

*Education*, because of having a psychosomatic scenario, is the concept with the biggest unifying or integrative power among all human sciences, and with the most interdisciplinary meaning. This is specially noticed by those who raise disabled children.

The *holistic understanding* of the humanization or the process of incorporation into culture requires practicing transitions towards different fields of knowledge, since it takes place in the psychosomatic unit, due to its plasticity, despite its vulnerability, and because of the contribution of its recovery capacity or resilience. In this psychosomatic context, the brain plays a key role and, therefore, the value given to this organ is an essential material in the understanding of the human necessity of culture.

This opinion was shared by those who promoted the program *Brain and Behavior*<sup>6</sup> at Harvard University in 1993. Neuroscience, Molecular Biology, Psychology, Philosophy, Economy and Linguistics specialists joined the project. To this group belonged Howard Gardner, professor at Harvard Graduate School of Education. The group, coordinated by Shawn Arriman, also promoted a program of professionals training at Faculties of Education. Within this training project of educational professionals, neuroscientific knowledge featured prominently. It is not because they have to absorb all other reflection about the process (Carter, 2002), but because its contribution is indispensable in a scenario of psychosomatically different real corporealities.

The *evolution* of the species concept was the major scientific milestone of the 19<sup>th</sup> century<sup>7</sup>. The DNA discovery, the biology built from the gene and the genetic mechanisms mark the 20<sup>th</sup> century for history. There appears to be general consensus within scientific community about neuroscience holding a pre-eminent position in biology in the 21<sup>st</sup> century (Kandel, 2007).

We believe that Humanities-Neurosciences transition is so important and its consequences are so relevant, that the interdisciplinary process justifies, according to F. Mora (2007), the expression *Neuroculture* and, according to other authors, the one of *Neuroeducation* (Eustache-Guillery, 2016). This interdisciplinary transition increasingly permeates many fields

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<sup>6</sup> Mind Brain Behavior. Interfaculty Initiative. Obtained from: <http://mbb.harvard.edu/> (27-01-2016)

<sup>7</sup> 1859 is the date of the first edition of Darwin's book about the origin of species.

of knowledge (Cairns-Smith, 2000): neuronal foundation of evolution and mind development, neuronal basis of biological history of our species and the seasons of the life of a human being (Bertranpetit, 2000), neuronal implication of gender differences (Liaño, 1998), neuronal basis of learning (Blakemore, 2006), *Neuroethics* (Evers, 2013), *practical neuroethics* (Bonete Perales, 2011) or neuronal basis of ethical behavior (Gazzaniga, 2006), brain functioning and superior mental functions (Tardif-Doudin, 2016), attention and domain of practice (Lachaux, 2013). This interdisciplinary work dissolves frontiers established by the paradigm inherited in Anthropology: the drastic separation between body and mind, the complete disintegration between animal condition and human condition, the segregation between cognition and emotion (García Carrasco, 2009). Many neuroscientists face philosophical themes; many philosophers reflect from neurology's conclusions. Patricia Churchland, for example, works at the Department of Philosophy, at Salk Institute for Biological Studies and at the Computational Laboratory, both at the University of San Diego (California). Her most influential work could be "Neurophilosophy" (1986), in which the progress in neurobiology is recognized as sufficient to undertake, *from this basis*, the understanding of memory, of learning, to deepen understanding of the consciousness and free will. This interdisciplinary nature increases the possible understanding framework of the educational phenomenon, although the logical distance between a scientific breakthrough and a practical decisions zone can be very big and with a range of possible alternatives. Hence critical thought has to distinguish between myth and justified alternative. At all events, undoubtedly, the theory of education currently stays within a transition zone between Humanities and Sciences for being implicated in a biopsychoneurological phenomenon necessary in our species. In all those levels, the human being requires culturally induced cares.

Throughout most of the last century, speeches about education were dominated by rational psychology with philosophical undertones, by psychoanalysis, by sociology and by the so-called natural psychology argued from the introspection. However, three authors, probably the most influential in the pedagogical thinking since the second half of the 20<sup>th</sup> century—S. Freud (1970), J. Piaget (1977) and L.S. Vygotsky (2000)—provided arguments so that the effort to understand the educational process can reach the biological basis, especially the neurological ones. The controversy about that interdisciplinary possibility and its epistemic

difficulties have already been studied in another publication, arguing about the plasticity of the nervous system (García Carrasco, 2014).

### **Between Biology and Humanities, culture has dug both, an anthological and a semantic gap**

Many events could have obtained the theory of education from their usual ruts. It could have been done by becoming aware of the Holocaust (Melich, 2004). Those events represented monumental examples of the vulnerability of the human being and the abusers' power to damage (Zimbardo, 2008). Inserting the emotional system in a systematic way within the theory of education shakes the attribution of *rational animal* (Damasio, 2005). In fact there is a semantic misunderstanding between a genuine neuroscientific text and a typical humanistic text although both encompass discussion on the same theme. In a dialogue, the humanist P. Ricoeur (1981) and the neurologist P. Changeux (1986) described said distancing as a “semantic gap” (Changeux-Ricoeur, 2003). In 2005, there was a meeting in New York, organized by the American Philosophical Association (APA), in which two philosophers and two neuroscientists confronted their ideas: M. Bennett, D. Dennet, P. Hacker and J. Searle (2008). The minutes of said discussion were published under the heading of *Brain, Mind and Language*.

They highlighted that Neurosciences and Humanities represent “logically different types of intellectual inquiry”. Neurophysiology and Psychology use “categorically dissimilar concepts”. Assigning psychological attributes directly to the brain is ontologically incoherent. Neuroscience can investigate biological requirements, biochemical conditions and neuronal correlatives of such processes, but there is no legitimacy in assimilating all processes. The distance between a bioneurological process in the limbic brain and the phenomenology of an emotional state in a human being seems to be insurmountable. However, many authors—as it seems to be usual within the cognitive neuroscience field—assign to the brain the attributes that philosophical tradition used to confer to the mind (Bennett et al., 2008).

The questions raised are logically different in each of the two fields: the humanistic questions are conceptual and the neurological ones are

factual. “Old concepts” of mind and body, thought and imagination, consciousness and self-consciousness, are not empirical concepts. The extraordinary progress in neurosciences coexists with a profuse unjustified assignment of meanings. The brain is not a subject logically appropriated of psychological predicates (Bennett et al., 2008), unless in a metaphoric and metonymic way. The subject of those predicates and functions is the human subject, as an organic-mental whole. However, a “brain-centrism” has been extended, understanding that it is possible to give an integral explanation of the behavior in neuronal terms (Pérez, 2011). In this conflict, the so-called mind-body problem is involved; the evolutionary outcrop of consciousness, described as the *most difficult problem* of the universe (Jakendorf, 1998). Therefore, I am aware of the difficulty of the transition between Humanities and Neurosciences, with the aim of expanding the understanding of the *education process*.

Nowadays, with effort and a great deal of debate, interdisciplinary approach attempts are taking place which are named bioneurophenomenology (Varela, 2002).

In principle, I understand education as an intersubjective process of cooperation for personal display (*giving of oneself*), from any given initial situation (*inclusion*) and throughout life. Taking awareness of education circumstances, the *relevance* of a variety of processes appears: “memory, attention, reflection, language, knowledge, intelligence, sensitivity, perception, the Self, moral awareness, self-awareness” (Ey, 1976, 34). These processes and the individual differences which concur make the approximation of the educator to the brain functioning unavoidable. This is not due to a direct benefit for the action, but due to those originated from the deepest understanding of the way of being and the differences from the fact of being humans.

Struggling within the border of the mind-body issue, some conclude that we are *only* the result of a mere pile of neurons (Crick, 1994); others, hopeful, expect that, psychological problems may be solved with pharmacology or neuroscientific advice once we know everything about nervous system biology (Carter, 2002). The brain-centrism and the neuronal reductionism are constituent elements of the gap between neuroscience and theory of education, because they radically segregate Humanities from the scenarios of corporeality, silencing their main protagonist: the psychosomatic unit and lots of conscious and unconscious mental processes. Main evidence of said unit can be seen by those people who

experience in their minds a deterioration of their skills and abilities, because of the deterioration of the biological organization of their brains, due to aging or disease or, perhaps, because they have been damaged in an accident or in a process of abuse or violence.

The conceptual approach of neuroscience to pedagogy, from the point of view of the most prominent current publications, pursues two overall aims: (i) *modifying perspectives*, proposing concepts, clarifying processes, dismantling myths about the cognitive and affective display of humanization process of human beings (Maturana-Varela, 1990); (ii) *deducing* from bioneurological knowledge *general rules and methods* of educational intervention scientifically justified (Blakemore-Frit, 2007).

### Interdisciplinary transition improves the understanding

I think that a *third aim* is justified. The transition towards bioneurosciences helps to a *better global understanding* of the phenomena which all educators face, because education always takes place in a scenario of corporeality. It would be an illustrated deliberation work (Sánchez Ron, 2011), a work of *study*. It is close to what we call a *research report*: to try to answer the anthropological question of the vital necessity of culture, appealing to available knowledge, in order to lead coherence with everything else. Consider an example:

*Birth; the first journey of our life is marked by dependency.*

The event of *birth* was considered transcendental by contemporary philosophy; it was considered as the key to understand how much it means to live as a human being. F. Bárcena (2000), guided by H. Arendt and many other humanists, has shown the profit which the theory of education obtains when delving to in the *sense of birth*. The “first journey”, from a woman’s womb at daylight, is the handiest and most vibrant book about life. Two chapters of that first journey highlight its importance for our purpose. The first one describes a small conflict in human evolution: the increase in brain size, the bipedal position and the narrowness of the birth canal. Birth is surprising and difficult; women’s pain during childbirth is real. In comparison, quadrumanous apes’ birth is less laborious and faster. Arsuaga (2012): “This acute situation could have been reached due to the disproportion between the fetus’ head and

the osseous birth canal, as a result from the bipedal position and the expansion of the brain along human evolution” (p.170).

In the majority of anthropoid species, the baby is born with approximately half the size that its brain will reach as an adult. A human newborn’s brain is approximately 28% of an adult’s brain size. From the point of view of *biological autonomy*, the human baby is born in a state of great dependence and immaturity; more remarkable than any other primate species. This *altricial character* was already deduced by paleoanthropologists with *Homo erectus* fossils (ca. 1.6 million years ago). Our babies are born neuronally less finished than those of other primate species.

J. L. Arsuaga, specialist researcher in hip archeology, thinks that the fetus at the end of *Homo sapiens* is as big as it can be and that its development is interrupted by insurmountable obstetric limitations, in order to be able to pass through the birth canal. If it continued growing, the childbirth would not be healthy. He concludes one of the chapters of his book stating: “Everything revolves in human evolution [...] around childbirth”. The female hip offers an original aspect, from which J.E. Campillo deduces the “woman prominence in the evolution of the human species” (2005, 14).

The brain capability of the species, at childbirth, conditions life on the resolution of two problems: (i) it must exist a welcome social environment which provides the necessary energy to complete the body development; particularly the brain. “The brain of a newborn represents 12% of their body weight, but consumes 60% of the energy of the infant” (Campillo, 2005, 148). (ii) Human childhood is not only the longest known, but also the child psychological development is extremely demanding. It required that the welcome would become defined within a system of qualified attention and special care for many years; it also demanded unconditional involvement of males in the breeding work.

Therefore, the cerebral complexity, the immature birth and, as a result, the prolonged childhood have to be placed at the beginning of the list of peculiarities of human beings within the living world. Still 10-year-old children have a cranial capacity of only 95% in comparison with the adults. In any other species *breeding* is such an important chapter of their biological profession, as it is for the *Homo sapiens* species.

A. Montagu (1972) describes as *extero gestation* the situation of *vital dependence* and *unconditional welcome*, by the actors of a social

network: a social space of potential development; sociologists speak about a *primary social group*. However, very soon, the human baby gives signals of complex social aptitudes, which will never be developed up to that level by apes. M. Tomasello (2007) calls it the “revolution of the nine months”. They still cannot walk with ease, they do not speak, but they already show that they can recognize the presence of intentional agents within their environment; they advise their purposes, the intention of their looks, they participate of their field of attention, they attract attention and show wishes; the act of pointing acquires sense. The human baby shows that their vital environment is especially formed by a shared space of communications, where the baby’s sensorial experience will be socially organized. They show an extraordinary social precociousness.

Maternity, welcome and breeding, the necessary biosocial cooperation of the primary group, created a feedback loop favorable for the selection of cooperation social skills (Arsuaga-Martinez, 1998, 202).

Many anthropologists attributed the potential of brain development to the skill involved in the tools design, manufacture and refinement. But *technical intelligence* showed its full potential long after the evolution of two ethological innovationpacks: (i) The first innovation was the original human bipedal position, ca. 3.6 m. years ago; certainly, since *Australopithecus* times. It is the morphological structure which allows us to stop and observe a landscape standing up or to stop while having a face to face conversation. Said structure meant a whole cluster of morphological transformations (Coppens, 2000) and semiotic possibilities for the communication. (ii) The second sheaf of innovations makes reference to the particular social ontology of the human species, as evolutionary consequence of the development estate of their brains at birth.

It is not possible to understand the behavior of a primate of any age being alone; its ontogenesis is incomprehensible outside the social group it lives with. A group is not only a source of stimuli or an interactions network, it also has a great capacity for mental structuring, as shown by H. Harlow’s research about the experiments on total and early isolation: the consequences were devastating. What makes a difference is not living in a group; this is done by ants wonderfully (Hölldobler-Willson, 1996).

The human species is the only one which provides undoubted evidence of a *teaching process*. The teaching process involves capacities to interpret, analyze and judge *behavioral performances of other individuals*; represent oneself and imagine alternative processes through

which these can be improved based on an aim, and with the active purpose of achieving it. It is understood why language is the main *instrument* in this complicated process.. Human language could have emerged within a social ontology and due to the evolutionary pressure which could have taken place within it (Tomasello, 2013).

Social ontology, context in which our end as human beings takes place, reconfigures all our biological profession, including birth. Not only is birth the culminating process of the reproduction, but also one of the most significant events of social ontology. Social ontology represents the real interpretive framework of human sexuality, rather than reproduction, which is a common fact in the rest of the species. According to O. Lovejoy, the adaptive advantage of the hands release as a bipedal was not the tools manufacturing, but hauling food for the family and the food handling. If we simultaneously consider the difficulty of obtaining food, the child dependency already commented, with the corresponding brain development, and we wonder: Why do we need to be so intelligent? The answer, from our point of view, would focus on the complexity of social life management. The mechanisms human beings would use to deal with their social problems could be applied to the resolution of those material and technical problems. Deepening the understanding of these socialization mechanisms means to deepen in the bioethological profession of human beings, to which our brains are intended to serve.

It is surprising that Biology textbooks for teenagers are so sparing and superficial when considering this cardinal chapter of our biology.

*Love, care, assistance are three aspects of the biological profession of human beings.*

*Human birth* can be considered a biological ephemeris or from an anthropological perspective. In selecting the latter, the binding state amalgamated by the emotion, the unconditional welcome emotionally sealed, which we call love, are transformed into a model for conceiving the human condition (Maturana, 1988).

R. Eisler (2006) argues that the primitive major stream of the human culture was supportive, non-competitive; change came later. M. Gimbutas (1996) archaeologically documents the process. It could be argued that, not only the feminist movement and all the claims for the ethics of solidarity in the contemporary world feed and nurture a return to the origins movement, selecting the woman as the protagonist (Cashford-

A.Baring, 2014), because we believe that labor plants, as a hinge around which anthropology turns, the vital welcoming stage. In the antithesis we can find the criterion which chooses the *Ancestral Territorial Contest* as source from which the human cooperation arises (Guiarca, 2012). It is another way of expressing the conviction that the definitive feature of the human condition is the principle of domination. “Dominate the Earth” was the mission assigned to human beings in the Genesis narrative. Recent research agree that this has been the perspective in whose core is installed the hegemony of the man over the woman, whose cultural hinge was the power rather than the birth of life.

Against W. Jaeger’s (1957) opinion, Mediterranean primitive culture did not have the mythical center in the culture of the noble warrior. Shlain (2000): “In the Mediterranean [...] prehistorians have discovered convincing evidence that the main deity in all emerging agricultural civilizations surrounding its watershed was a mother goddess (ca. 10,000 years ago)” (p. 21).

Facts are convergent. If the biological profession of human beings is marked by the birth/welcome, inescapable for the survival of the species, *becoming aware* of vulnerability, dependency and soulful feelings associated with the process, it justifies that, as bridging mechanisms, the need and the ability to maintain relationships of intimacy, of emotional bonding, are characteristics of the human being. . It also justifies that the labor of care is our ethological feature throughout life (Lynch, 2014). Decentering of culture in relation to domination, and refocusing on bonding and solidarity, “combines passion for justice with love for reason” (Nussbaum, 2012,18).

In the oldest known literature there is substantial evidence revealing that for the literary author it was essential that characters *paid attention* to cognitive and emotional processes and to inner states of other individuals, *became aware* of themselves and *discussed* about those circumstances (Nussbaum, 2008). Those processes are essential properties of the human vital condition; that is the way of life of human beings: we have described it as their biological profession. What we call “love” is a biological preparation and an ethological disposal; it is nothing abstract nor a mere feeling. The substance of that disposal is not indicated by the *declaration of love*, but the *labor of love*, the labor of care and the labor of solidarity; in all three, we underline how much effort, time and psychosomatic energy they involve. The *labor of love* is required for the maintenance of

relationships, emotionally committed, emotionally constructive, whose paradigm we have been saying, is the relation of unconditional welcome which any birth requires. It involves very demanding attention and sensitivity forms. It involves physical, mental and emotional labor; it identifies a level of *primary interpersonal relationships*.

All those interaction systems manage within scenarios of corporeality; in other words, what we call “*biological preparation*” and “*cultural development*”, because they constitute essential elements of our way of life. There are many processes involved in that ability, which we call: *endopathy*, *empathy*, *affective projection*, *sentimental projection*, *sympathy*, *intuitive psychology*, *adoption of perspectives*, *theory of the mind*. Scientists, philosophers and writers (Scheler, 2005; Stein, 2004) use this constellation of terms to refer to the fact that human nature seems to be ready and prepared for an intense life of community practices of relationship, whose objective is contributing to the mind conformation and expansion within scenarios of corporeality.

Observing the vulnerability condition of other individuals may awaken consciousness of one’s own vulnerability condition. The fact of having had an experience of infringement, or the conviction and the sense of feeling vulnerable can encourage the understanding of the infringing experiences observed.

Perhaps the concept of *theory of the mind* is the most encompassing of the empathic processes and the most successful in the contemporary psycho-pedagogical literature. It is mentioned herein to refer to *perceptions* “reading”, *emotional states* “reading” and *thoughts* “reading”. Primary evidence is provided by the body, by the non-verbal communication.

### **Corporal scenario of our social activity**

The concept of *empathy*—studied for centuries by theology and philosophy—is today recovering interest within psychology, ethology and neuroscience. The most basic meaning of empathy refers to the fact that the perception of an emotional demonstration (*emotional gesture*) activates an emotional state of equivalent category in which it is noticed. To explain this process S.D. Preston and F. de Waal propose the following mechanism: the observer (subject) accesses the emotional state, which

observes (object), through neural and bodily representations, *somatic markers* of the experience. The representations automatically activate the organic answers which correspond to the observed emotional state; everything seems to indicate that our body behaves like a *simulator system* of another person states. According to S.D. Preston and F. de Waal a *perception-action mechanism* would be in the root of the explanation of many processes which promote or facilitate social facts; it would work as a simulation system enabling to share feelings with the person being observed.

In the early 1990s, at the University of Parma, neurons with a peculiar behavior were discovered in the motor cortex of macaques. These neurons triggered when the animal acted with a purpose and also when it saw another one doing the same (V.Gallese, 1998). From there on and after the research by using imaging technologies, the research of the human brain started to spread. Gallese (1988): “The individual has an innate and preprogrammed ability to internalize, incorporate, assimilate, imitate, etc. the state of another person, and mirror neurons are the basis of this ability” (p. 527).

This ability is the body matrix where all human behaviors of protection, care (*caregiver*), identification, assistance, education are settled. Precisely, the innate social abilities require a structured environment of assistance for its balanced deployment. This is another argument of what we have named at the beginning as the *vital necessity of culture*, of cultivation of the mind. The intersubjective scenario of care works as a social *biofeedback system*, as if the two systems for the embodied simulation were somehow connected. The disconnection of those systems gives rise to an *insufficient awareness*, in which the lack of empathy, the deep sensation of emptiness and social isolation, the unjustified aggressiveness, the objectification of other’s identity...would be features.

Experimental verifications related to mirror neurons argue in favor of the existence within the body of an *embodied simulation* system of others’ behavior, which reaches the intentionality of its actions (*intentional harmony*) (Gallese 1988, 531).

The mirror-neuron system has been also widely studied in human beings (Rizzolatti-Sinigaglia, 2006) using functional magnetic resonance imaging (fMRI). Intersubjective human experience is also embodied within a psychosomatic structure; it has been found in complex

psychomotor schemas, in orofacial patterns. It has been experimentally verified that the system works for the understanding of other individuals' intentionality (Iacoboni, 2009).

The outcome of these investigations is widely known in the domain of human sciences and general conclusions are being drawn pointing in the same direction that we are arising. "The human brain has evolved to educate and be educated" (García, 2008). Deepening this knowledge could qualitatively transform the teaching strategies of informal education, school pedagogy and interventions for the resilience and recovery of people who are mentally different.

From birth to the grave, biography is the permanent transit from one vital scenario to another; all somatically marked, all scenarios of corporeality, even the school. There is no more solid and undeniable evidence, within the school scenario, other than the one that takes place, in first place, the public presentation of two corporealities, each with their own stories, with their own possibilities and with their own risks.

## Bibliography

- Aguilera Dreyse, B. (2008). Una Alternativa para el Problema Mente-Cuerpo: Emergentismo y Cognición Corporizada y Situada. Recuperado de [http://repositorio.uchile.cl/tesis/uchile/2008/aguilera\\_be/html/index-frames.html](http://repositorio.uchile.cl/tesis/uchile/2008/aguilera_be/html/index-frames.html).
- Armstrong, T. (2012). Neurodiversity. [*El poder de la neurodiversidad. Las extraordinarias capacidades que se ocultan tras el autismo, la hiperactividad, la dislexia y otras diferencias cerebrales*]. Barcelona: Paidós.
- Arsuaga, J.L. (2012). *El primer viaje de nuestra vida*. Madrid, Ed. Temas de hoy.
- Arsuaga, J.L.-Martínez, I. (1998). *La especie elegida. La larga marcha de la evolución humana*. Madrid: Temas de Hoy.
- Bárcena Orbe, F. (2006). *Hanna Arendt: una filosofía de la natalidad*. Barcelona: Herder.

- Bárcena Orbe, F. (2000). *La educación como acontecimiento ético: natalidad, narración y hospitalidad*. Barcelona: Paidós;
- Bartra, R. (1996) *El salvaje en el espejo*. Barcelona: Destino.
- Bennett, M.-Hacker, P. (2003). *Philosophical Foundations of Neuroscience*. Willey-Blackwell.
- Begley, Sh.- Davidson R. (2012). *The Emotional Life of Your Brain*. [El perfil emocional del cerebro]. Barcelona: Destino.
- Bennett, M.-Dennett, D.-Hacker, P.- Searle, J. (2008). *Neuroscience and Philosophy: Brain, Mind, and Language*. [La naturaleza de la conciencia. Cerebro, mente y lenguaje]. Barcelona: Paidós.
- Bonete Perales, E. (2011). *Neuroética práctica.: una ética desde el cerebro*. Bilbao, Desclée de Brouwer.
- Bertranpetit, J.-Junyent, C. (2000). *Viaje a los orígenes. Una historia biológica de la especie humana*. Barcelona: Península.
- Blair, R.J.R., (2005). Responding to the emotions of others: Dissociating forms of empathy through the study of typical and psychiatric populations. *Consciousness and Cognition*, vol.,14-4, 698-718.
- Blakemore, S-J.-Frith, U. (2006). *The Learning Brain. Lessons for Education*. [Cómo aprende el cerebro. Las claves para la educación]. Barcelona: Ariel.
- Boburg, F. (1996). *Encarnación y fenómeno. La ontología de Merleau-Ponty*. México: Universidad Iberoamericana.
- Bowlby, J.-Bowker, J. (2014). *The Making and Breaking of Affectional Bonds*. [Los vínculos afectivos: formación, desarrollo y pérdida]. (Edición renovada) Madrid: Morata.
- Cairns-Smith, A.G. (2000). *Evolving the Mind: On the Nature of Matter and the Origin of Consciousness*. [La evolución de la mente. Sobre la naturaleza de materia y el origen de la conciencia]. Madrid: Cambridge University Press,
- Campillo Alvarez, J.E. (2005). *La cadera de Eva. El protagonismo de la mujer en la evolución de la especie humana*. Barcelona: Ares y Mares.
- Carter, R. (2002) *Mapping the Mind*. [El nuevo mapa del cerebro. Guía de los descubrimientos más recientes para comprender el funcionamiento de la mente]. Barcelona: Integral.
- Cashford, J.-Baring, A. (2014). *The Mith of the Goddess. Evolution of an image*. [El mito de la diosa]. Barcelona, Siruela; Klein, F. (2009). *Cuando Dios fue mujer*. Barcelona: Arcopress.
- Coppens, I. (2000). *Le Genou de Lucy*. París: Odile Jacob.

- Crick, F. (1994). *The Astonishing Hypothesis: The Scientific Search for the Soul. [La búsqueda científica del alma: una revolucionaria hipótesis para el siglo XXI]*. Madrid: Debate.
- Curtiss, S. (1977). *A Psycholinguistic Study of a Modern-Day "Wild-Child"*. New York: Academic Press.
- Changeux, J.P. (1986). *L'homme neuronal. [El hombre neuronal]*. Madrid: Espasa.
- Changeux, J.P.-Ricoeur, P. (2003). *La nature et la règle. Ce qui nous fait penser. [La naturaleza y la norma: lo que nos hace pensar]*. Madrid: Fondo de Cultura Económica.
- Churchland, P. (1986). *Neurophilosophy: toward a unified science of the mind-brain*. MIT-Massachusetts: Univ. Press.
- Damasio, A. (2005). *En busca de Spinoza. Neurobiología de la emoción y de los sentimientos*. Barcelona: Crítica.
- Depraz, N. (2001). *La conscience. Approches croisées, des classiques aux sciences cognitives*. París: Armand Colin.
- Depraz, N.-Varela, F.-Vermersch (2011). *À l'épreuve de l'expérience. Pour une pratique phénoménologique*. Bucarest: Zeta Books.
- Duch, Ll.-Mèlich, J-C. (2005). *Escenarios de la corporeidad. Antropología de la vida cotidiana 2/1*. Madrid: Trotta.
- Eisler, R. (2006). *El cáliz y la espada. Nuestra historia, nuestro futuro*. Chile: Cuatro Vientos.
- Eustache, F.- Guillery, B. (2016). *La Neuroéducation: la mémoire au coeur de l'apprentissage*. Paris: Odile Jacob.
- Evers, K. (2013). *Neuroéthique. Quand la matière s'éveille. [Neuroética: cuando la materia se despierta]*. Katz: Buenos Aires.
- Ey, H. (1976 v.o. 1967) *La conciencia*. Madrid: E. Gredos.
- Flynn, T. (2002). *The Body in Sculpture. [El cuerpo en la escultura]*. Madrid: Akal.
- Freire, P. (1974). *Concientización*. Bogotá: Asociación de publicaciones educativas.
- Freud, S. (1970). *Studien über Hysterie. [La histeria]*. Madrid: Alianza.
- Gallese, V.-Goldman, A. (1998). *Mirror neurons and the simulation theory of mind-reading.- Trends in Cognitive Sciences*, vol., 2-12, 493-501.
- Gallese, V.-Mignone, P.-Eagle, M.N. (2009). *La simulación corporeizada: las neuronas espejo, las bases neuropsicológicas de la intersubjetividad y algunas implicaciones para psicoanálisis. Clínica e investigación relacional*, vol.,3-3, 525-556

- García Carrasco, J. (2007). *Leer en la cara y en el mundo*. Barcelona: Herder.
- García Carrasco, J.-Hernández Serrano, M.J.-Martín García, A.V. (2014). Plasticity as a framing concept enabling transdisciplinary understanding and research in neuroscience and education. *Learning, Media and Technology*. Taken from <http://dx.doi.org/10.1080/17439884.2014.908907>.
- García Carrasco, J. (2009). Educación, cerebro y emoción. *Aula: Revista de Pedagogía de la Universidad de Salamanca*, vol.,15, 91-115.
- García García, E. (2008). Neuropsicología y educación. De las neuronas espejo a la teoría de la mente. *Revista de psicología y educación*, vol., 1-3, 69-90.
- Gazzaniga, M. (2006). *El cerebro ético*. Barcelona: Paidós.
- Gimbutas, M. (1996). The Language of the Goddess. [*El lenguaje de la diosa*]. Madrid: Dove.
- Goffman, E. (1989). Stigma. Notes on the Management of Spoiled Identity. [*La identidad deteriorada*]. Buenos Aires: Amorrortu.
- Goldberg, E. (2007). The Wisdom Paradox: How Your Mind Can Grow Stronger As Your Brain Grows Older. [*La paradoja de la sabiduría. Cómo la mente puede mejorar con la edad*]. Barcelona: Crítica.
- Grandin, T. (2006). Thinking in Pictures: Other Reports from My Life with Autism. [*Pensar con imágenes. Mi vida con el autismo*]. Barcelona, Alba Editorial; Id. (2012). Animals in Translation. [*El lenguaje de los animales*]. Barcelona: RBA Libros.
- Grandin, T. (2014). The Autistic Brain: Thinking Across the Spectrum. [*El cerebro autista. El poder de una mente distinta*]. Barcelona: RBA.
- Guiarca (2012). *Somos hijos de la guerra*. Lulú Editorial (edición digital bajo pedido).
- Hacker, P. (2011). *Human Nature: The Categorical Framework*. Blackwell P.
- Hemsey de Gainza, V.-Kesselman, S. (2003). *Música y Eutonía. El cuerpo en estado de arte*. Argentina: Lumen.
- Holldöbler, B.- Wilson, E. O. (1996). Journey to the Ants: A Story of Scientific Exploration. [*Viaje a las hormigas*]. Barcelona: Grijalbo.
- Iacoboni, M. (2009). Imitation, empathy, and mirror neurons. [*Las neuronas espejo. Empatía, neuropolítica, autismo, imitación o de cómo entendemos a los otros*]. Madrid: Katz Editores.

- Jackendoff, R. (1998). *Consciousness and the Computational Mind. [La conciencia y la mente computacional]*. Madrid: Antonio Machado.
- Jaeger, W. (1957 v.o.1933). *Paideia: los ideales de la cultura griega*. México: Fondo de Cultura Económica.
- Johnson, M. (1991). *The Body in the Mind. [El cuerpo en la mente. Fundamentos corporales del significado, la imaginación y la razón]*. Madrid: Debate.
- Kandel, E.R. (2007). In *Search of Memory: The Emergence of a New Science of Mind. [En busca de la memoria. El nacimiento de una nueva ciencia de la mente]*, Buenos Aires: Katz Editores,
- Laín Entralgo, P. (1989). *El cuerpo humano. Teoría actual*. Madrid: Espasa Calpe.
- Lakoff, G. –Johnson, M. (2005). *Metaphores we Live by. [Metáforas de la vida cotidiana]*. Madrid: Cátedra.
- Le Breton, D. (2012 v.o. 1990). *Antropología del cuerpo y modernidad*. Buenos Aires: Nueva Visión.
- Lewontin, R.C. (1984). *Human Diversity. [La diversidad humana]*. Barcelona: Prensa Científica S.A
- Liaño, H. (1998). *Cerebro de hombre, cerebro de mujer*. España: Ediciones B.
- Lieberman, D.E. (2013). *The Story of the Human Body: Evolution, Health, and Disease. [Historia del cuerpo humano. Evolución, salud y enfermedad]*. Barcelona: Ediciones de Pasado y Presente.
- Maturana, H.-Varela, F. (1990). *El árbol del conocimiento. Las bases biológicas del conocimiento humano*. Madrid: Debate.
- Maturana, H. (1988). *Ontología del conversar*. En Rv. “Terapia psicológica”. VII, n°. 10, pp. 15-23.
- Melich, J.C. (2004). *La lección de Auschwitz*. Barcelona: Herder.
- Mehler, J.-Dupoux, E. (1992). *Naître humaine. [Nacer sabiendo. Introducción al desarrollo cognitivo del hombre]*. Madrid: Alianza Editorial.
- Montagú, A. (1972). *Homo Sapiens: dos millones de años sobre la tierra*. Madrid: Guadiana.
- (1969). *La dirección del desarrollo humano*. Madrid: Tecnos.
- Mora, F. (2007). *Neurocultura. Una cultura basada en el cerebro*. Madrid: Alianza.
- Lynch, K.-Baker, J.-Lyons, M. (2014). *Affective Equality: Love, Care and Injustice. [Igualdad afectiva. Amor, cuidados e injusticia]*. Madrid: Morata.

- Muñoz Tobar, C. (2010). El cuerpo en la mente. La hipótesis de la corporeización del significado y el dualismo. *Praxis. Revista de Psicología*, nº 18, 91-106.
- Nussbaum, M. (2012). Women and Human Development. *[Las mujeres y el desarrollo humano]*. Barcelona: Herder.
- Nussbaum, M.C. (2008). Upheavals of thought: the intelligence of emotions. *[Paisajes del pensamiento. Inteligencia de las emociones]*. Barcelona: Paidós.
- Otega, F. (2009). Neurociências, neurocultura e autoajuda cerebral. *Interface: Comunicação, Saude, Educação*, vol.,13, 247-60.
- Pastor Pradillo, J.L. y otros Editores (2002). *La presencia del cuerpo en la escuela*. Ediciones de la Universidad de Alcalá de Henares.
- Pera, C. (2003). *El cuerpo herido: un diccionario filosófico de la cirugía*. Barcelona: El Acanalado.
- Pérez Alvarez, M. (2011). *El mito del cerebro creador*. Cuerpo, conducta y cultura, Madrid: Alianza.
- Piaget, J. y Colaboradores (1971). *La epistemología del espacio*. Buenos Aires: El Ateneo.
- Piaget, J. (1977). Biologie et connaissance; essai sur les relations entre les régulations organiques et les processus cognitifs. *[Biología y conocimiento: ensayo sobre las relaciones entre las regulaciones orgánicas y los procesos cognoscitivos]*. Madrid: Siglo XXI Editores.
- Piaget, J. (1978). *Introducción a la epistemología genética*. T. I., México: Paidós.
- Piaget, J. (1970). Genetic epistemology. *[Epistemología genética]*. Barcelona: Colección Beta.
- Piaget, J.-Inhelder, B.-García, J.-Voneche, J. (1981). *Epistemología genética y equilibración*. Madrid: Editorial fundamentos.
- Piaget, J.-Inhelder B. (1971). *La représentation de l'espace chez l'enfant*. Paris: Presses univ. de France.
- Pinker, S. (2003). The Blank Slate: The Modern Denial of Human Nature. *[La tabla rasa. La negación moderna de la naturaleza humana]*. Barcelona: Paidós Ibérica.
- Putnam, H. (1988). Reason, Truth, and History. *[Razón, verdad e historia]*. Madrid, Tecnos.
- Ramón y Cajal, S. (1939). *El mundo visto a los ochenta años*. Madrid: Librería Beltrán.
- Ricoeur, P. (1981). *El discurso de la acción*. Madrid: Cátedra.

- Rizzolatti, G.-Sinigaglia, C. (2006). *Mirrors in the Brain: How Our Minds Share Actions, Emotions, and Experience*. [*Las neuronas espejo. Los mecanismos de la empatía emocional*]. Barcelona: Paidós.
- Rymer, R. (1994). *Gennie. Histoire d'une enfant victime de son père et de la science*. París: Robert Laffont.
- Salabert, P. (2003). *Pintura anémica, cuerpo succulento*. Barcelona: Laertes.
- Sánchez Ron, J.M. (2011). *La nueva ilustración. Ciencia, tecnología y humanidades en un mundo interdisciplinar*. Oviedo: Ediciones Nobel.
- Scheler, M. (2005). *Wesen und Formen der Sympathie*. [*Esencia y formas de la simpatía*]. Salamana: Ed. Sígueme.
- Shlain, L. (2000). *The Alphabet versus the Goddess. [El alfabeto contra la diosa. El conflicto entre la palabra y la imagen, el poder masculino y el poder femenino]*. Madrid: Debate.
- Stein, E. (2004 v.o. 1917). *Zum Problem der Einfühlung*. [*Sobre el problema de la empatía*]. Madrid: Trotta.
- Tardif, E.-Doudin, P-A. (2016). *Neurosciences et cognition: perspectives pour les sciences de l'éducation*. Bruxelles: De Boeck.
- Tomasello, M. (2007). *Por qué cooperamos*. Madrid: Katz Ediciones.
- (2013). *Los orígenes culturales de la comunicación humana*. Madrid: Katz Ediciones.
- Tomasello, M. (2007). *Los orígenes culturales de la cognición humana*. Madrid, Amorrortu.
- Varela, F. (1992). *De cuerpo presente. Las ciencias cognitivas y la experiencia humana*. Barcelona: Gedisa
- Varela, F. (2002). *El fenómeno de la vida*. Santiago de Chile: Dolmen Ediciones.
- Varela, F. (1997). *De cuerpo presente. Las ciencias cognitivas y la experiencia humana*. Barcelona: Gedisa.
- Vygotski, L.S. (2000) *El desarrollo de los procesos psicológicos superiores*. Buenos Aires: Aique.
- Zimbardo, Ph. (2008). *El principio Lucifer: el porqué de la maldad*. Barcelona: Paidós Ibérica.

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