Evolutionary levels of human thought according to Merlin Donald

Antonio Jaime da Silva Moura Neto [1], *Helena de Jesus Vieira dos Santos Neto* [2]

Abstract

From synoptic analysis of Merlin Donald's hypothesis, proposed in the work *Origins of the modern mind*, a clinical case presented In order to show some concepts develop din his work. The methodology used was essentially bibliographical literature and comparison to the reported clinical case, using external symbolic storage. The peculiarities of the clinical case were raised by participant observation in the work place and by consulting the patient's medical record, safe guarding the inherent ethical principles, including the principle of confidentiality, kept throughout this clinical case. This work comprises basically two parts: the first, where the author's proposed evolutionary levels are approached, and the second that, after description of the clinical, these parameters are illustrated through undertaken observation.

Key words: Cultural evolution. Biological evolution. Thinking. Bioethics.

Resumo

Patamares evolutivos segundo Merlin Donald

A partir de análise sinóptica da hipótese de Merlin Donald, proposta na publicação *Origens do pensamento moderno*, é apresentado um caso clínico que se propõe a ilustrar alguns dos conceitos desenvolvidos na obra. A metodologia de pesquisa consistiu essencialmente em levantamento bibliográfico e comparação ao caso relatado, mediante o recurso a armazenagem simbólica externa. As peculiaridades do caso clínico foram levantadas por observação participante no local de trabalho, bem como por consulta ao prontuário do paciente, salvaguardados os princípios éticos inerentes a situação, nomeadamente o principio da confidencialidade que se mantém ao longo do trabalho. Este artigo é fundamentalmente constituído por duas partes: a primeira, na qual se abordam os patamares evolutivos propostos pelo autor e a segunda, em que, após a descrição do caso clinico, se ilustram esses patamares por meio da observação efetuada.

Palavras-chave: Evolução cultural. Evolução biológica. Pensamento. Bioética.

Resumen

Niveles evolutivos del pensamiento humano según Merlín Donald

A partir del análisis sinóptico de la hipótesis de Merlín Donald, presenta da en la publicación *Orígenes del pensamiento moderno*, se presenta un caso clínico que se propone a ilustrar algunos de los conceptos desarrollados en la obra. La metodología de la investigación se ha basa do esencialmente en búsqueda bibliográfica sistemática y comparación al caso narrado, mediante el recurso al almacenamiento simbólico externo. Las peculiaridades del caso clínico fueron planteadas por observación participante en el lugar de trabajo, así como por consulta al prontuario del paciente, salvaguardados los principios éticos inherentes a la situación, especialmente el principio de la confidencialidad, que se mantiene a lo largo del trabajo. Este artículo está fundamentalmente conformado por dos partes: la primera, en la cual se abordan los niveles evolutivos propuestos por el autor, y la segunda, en la cual, tras la descripción del caso clínico, se ilustran esos niveles por medio de la observación llevada a cabo.

Palabras-clave: Evolución cultural. Evolución biológica. Pensamiento. Bioética.

1. Master neto.aj@gmail.com **2.**Expert helenadejesus.neto@gmail.com – Hospital de Braga, Braga, Portugal.

Correspondence

Antonio Jaime da Silva Moura – Travessa da Rua do Caires,6-1`Distrito CEP 4700-208. Maximinos,/Braga, Portugal.

They declare that there is no conflict of interests.

Research article

The essence of the hypothesis launched by MerlinDonald is that the human mind evolved from the primate mind through a series of major adaptations, each of which led to the emergence of a new system of representations. Each new and successive representational system remained intact within the new current mental architecture, so that the modern mind is a mosaic structure of cognitive vestiges of the earlier stages of human evolution. The inquiry made by Donald, and which he searches for an answer is: *how did humans, given their non symbolic mammalian heritage, come to represent their knowledge in symbolic form, and through what stages must this development have passed?*

In the preface of the book *Origins of the modern mind*, entitled "Three stages in the evolution of culture and cognition by Merlin Donald" [1], Serrão admits tobeing *original the organization of adaptive evolution of hominids into three broad levels, successive in increasing complexity, with regards to the emergence and development of memory/intelligence function until the level of intelligence that characterizes the modern man, the type of man that we are* [2].For Donald, several millions years elapsed between the episodic culture of apes and theoretical culture of modern man, permeated by the existence of other cultures. Based on the existence of these different cultures, the author defined the evolutionary levels of human thought. To support this definition, Donald draws on Darwin and his theories about animal intelligence and the origins of language, and also the biological structure of language launched by Wernicke.

The author begins with the *episodic culture,* the first phase, which can be considered the starting point of the evolution of human thought, in which there was no distinction between men and apes. The earliest capacities of *Homo* were equal to the current primates in assigning meaning to perceptions. Donald calls this ability recognizing episodes: *If apes are taken as the starting point, their behavior, complex as it is, does not seem reflected, concrete, and tuned to situations. Even their use of signs and their social behavior are immediate answers, short-term responses, to the environment. In fact, the best word to characterize the cognitive culture of apes* (…) *is the term episodic* [3].

When entering an unknown location, an ape has immediately one of two reactions: feels threatened and flees or feels good and stays. In practice, it has here the episode recognition pattern that allowed the survival of the species during millions of years. Serrão alerts to the fact that recognition be *completely different from the procedural memory because the episodic memory retains details of the event, therefore making it singular and not generalized* [4].

Donald says that modern man's episodic culture allows him, unlike the *Homo* species, to represent a situation and reflect on it [5]. Human intelligence, at this level, allows building a global representation of an event or episode in which the actor is inserted through his sensory perception of the outside world. Donald says that typical *examples of episodic memories are found in the details of specific experiences: the death of a family member, the first love, etc.* By definition, for the author *the episodes are related to time and space, to dates and specific places. The important characteristic of this type of memory is its concrete perceptive nature and its ability to retain specific episodic details.* Therefore, he believes that human beings are sensitive to understanding the significance of environmental events and of storing them in episodic memory.

Learning resulting from the exercise of knowledge of episodes is given the name episodic culture. Contemporary apes, according to Serrão[4], live in this type of culture*, referred to as a rudimentary me based on affective memory.* The australopithecines and hominids would have lived in this episodic culture.

For Donald, the first important transition was the development of a *mimetic culture*. By living in groups, *Homo erectus*, a subgroup of the *Homo*, had to socialize and felt the need to communicate with each other. Unable to use language, he developed the ability to use the whole body as a communication and translation

device of perceived events. This is the feature that makes mimesis *fundamentally different from imitation and mimicry as it involves the invention of intentional representations*. With this system or culture, there was, according to Donald, as quoted by Moura,

(...) *changes in patterns of social expression in hominids. Thus, emotional expressions were expanded, more complex, not stereotyped and likely to be employed in intentional communication. When people do not have language, and are not suffering from any injury that takes away other fundamental cognitive capacities, they may continue to participate in all forms of human culture that do not require language. Certainly, these capabilities may, by themselves even in a simplified manner, build the basis for a culture* (…). *The mimetic ability or mimesis is based on the possibility of producing conscious self-started representational acts, that are intentional but not linguistic. These mimetic acts are defined primarily in terms of their representational function* [6].

All non-verbal communication is mimetic and can be performed by various actions, depending on the proposed goal: facial expressions, eye movements, signs, gestures, postures, movement patterns throughout the body, tone of voice, etc. There is also an ingredient that man, and only he can do, adds to the mimesis: rhythm. Rhythm adds another value to the gesture.

The greatest importance of mimetic *culture must have been in the collective shaping and therefore the structuring of society hominid in itself. The mimetic culture was a stable and successful adaptation; a survival strategy for hominids that lasted over a million years*[7]Currently, every human being uses mimesis. The gestures, facial expressions, pantomime, inarticulate vocalization, serve as resources for persons deprived of speech. According to Donald, for someone who does not have language capability, mimesis stands as the best way to represent reality, presumably dominating forms of conscious experience.

It was through mimesis that *Homo erectus* discovered the *other* through manifestation of his own identity. With the revelation of the *other*, it learned love. Thus, mating stopped being aggressive. Nowadays, mimesis is still essential for the expression of love – it is through it that feeling is expressed. Infatuation is essentially mimetic.

For Donald, this mimesis process is a pre-adaptation to language, laying the foundations for intentional expression in hominids. With mimesis became possible to develop cognitive areas that allowed the emergence of words and syntax, as vehicles of thought and symbolic communication.

The deaf-mutes totally illiterate as a child before the linguistic stage are good example of this attribute. Likewise, one can imagine how the communication of *Homo erectus* was in full mimetic culture 4. Taking the child as an example, he needs two to three years for the development and use of the phonological system that is already properly installed. *Homo erectus* would have experienced two to three million years of triumphant mimetic culture, during which time they created all the necessary tools for survival [8].

The second transition refers to the *mythic-oral culture*. This step involves what Donald calls *''lexical invention'' and phonological development, including a set of specific anatomical and neuronal changes*. For Moura, *with the development of the linguistic system, the resulting collective product isofa narrative thinking and 'mythical culture', and a new way of shared representation* [6].

One of the instruments of mimesis was the voice and tone of voice. On emitting sounds from its larynx, *Homo erectus* had already discovered and used the rhythm of vocal expression. With mimesis, the rhythm in laryngeal sounds evolved remarkably. The sounds and vocal screams came to refer to objects and not just situations. At this stage, everyone invented their own language. The true one in their understanding. And how will anyone understand each other? Groups of followers began to take form. They became followers of the other's truth, which they accepted and followed. Myth was

institutionalized, meaning the description of significant contents of individual experience. The mythic oral-culture.

Myths are the basis for the purposes of human communities. By living the same myth, social cohesion of the group is ensured. Associated with the building of myths is the discovery of transcendence, which is remarkable at this level. The man does because God commands it so. It is birth of Greek and Roman mythology. The myth is always true because it translates, represents, gives meaning to the content of self-consciousness of the human being:

The mythical culture tended quickly to the integration of knowledge. The spread out and concrete repertoire of mimetic culture was about controlling the integration myth. (...) *The social consequences of mythic integration were evident at cultural level: the narratives bestowed on the events a contextual sense for the individuals.* (...) *The myth governs the collective mind. The symbolic invention in a large scale allowed articulation of the inherent structure to incidental events* [9].

Human beings at this level marked the beginning of verbal communication in their oral, mythic and symbolic forms. This language was initially used not as an instrument of technological progress, for which it was not necessary, but as a means of conceptualizing the modern universe [4]. According to Donald [10], episodic, mimetic and mythical cultures are unifying and comprehensive concepts that express the dominant cognitive quality of the individual mind in relation to society. The two previous transitions represented qualitative jumps in relation to the cognitive past.

The move to *external symbolic culture*, the third transition, must have been recent. From Donald's perspective, three essential core cognitive phenomena appear to have been underdeveloped, or virtually absent in oral-mythic culture. These phenomena are the graphic invention, external memory, and the construction of theories. The graphical invention will have allowed the creation of entirely new classes of symbols, compared with those that were used in mimetic and oral-linguistic communication.

The second cognitive phenomenon relates to memory. *While oral-mythic cultures relied heavily on individual biological memory, modern cultures rely much more on external mechanisms of memory, mostly from various classes of graphic symbols, from illustrations and graphs to the ideograms and writing. [The] change is in the storage mechanisms, from internal memory to external memory*[11].

And in the third phenomenon that the most important cultural product of human cognitions: the building of theories. This cultural product, *superior* in Donald's words, is formal theory, an integrating mechanism that is more than symbolic invention: it is a system of thought and argument that predicts and explains. The author concludes by considering that successful theories empower.

It is through the external symbolic culture of the obsession with symbols and their management that modern man achieved significant success in logic and mathematics, which led to the invention of computers with a variety of consequences in our daily lives. This great success, according to Donald, represents a potentially irreversible shift in the cognitive balance of power to a cognitive human structure based completely on dominating external memory.

To complete this summarized approach on Donald's evolutionary levels of modern thought, it should be noted that for this author all forms of human representation, since the experimental episodic archaic basis, through mimesis and speech, even the latest visual graphic capabilities are now refined and expandable through the use of electronic mechanisms. Also according to Donald, modern minds are hybridizations, highly plastic combinations of all previous elements of human cognitive evolution, exchanged, combined and recombined. Now humans are mythical, theoretical, can return to the roots of episodic experience, examining and restructuring current episodic memories of events through the cinematic magic. And from time to time, we turn to the person of our own

narrative, pretending that nothing has changed. But everything has changed.

Despite reaching a stage of great cognitive development, the prospect of change is still very large. Probably, one cannot even glimpse the tip of the iceberg. Donald concludes his book with the following sentence, in which he accepts the current limitations of the human mind: *The third transition led to a major reconfiguration of the cognitive structure of the history of mammals, without major genetic changes. In principle, this process can continue, and we may not yet have seen the final modular configuration of the modern mind. Theories of human evolution should be developed allowing this possibility* [12].

Description of the case

The clinical case to be described and aims to endorse, in practice, the evolutionary levels outlined by Donald happened in the intensive care unit (ICU) of a Portuguese hospital, unidentified for ethical reasons. For the same reason, the patient was also not identified.

The incident occurred on March Sunday during the 1990s. It was early afternoon and there we waited about 30 minutes for one patient who had just arrived. With a terrified facial expression, result of the terrifying environment of the ICU, he emerged with what was perhaps the patient's last verbal expression, which characterized his fear. Although no doctor having informed his serious medical condition, he realized that no other Sunday of the rest of his life would start like that one.

The patient's daughter had turned 18 that same day. She would receive a memorable gift, one which she had craved for years: a motorcycle that her father was keen on trying. In this test, however, there was a collision with a tree, even though the patient had tried stoping the vehicle. The pilot was thrown forward and hit his head on the tree, which caused neck rotation.

Upon being taken to the emergency room, the quadriplegia was evident. Complementary tests confirmed the suspected diagnosis: the patient contracted a complete spinal cord injury at the C2 and C3 cervical vertebrae level. Irreversible. Respiratory failure, the first of many complications, he would survive in the short term. An immediate transfer to the ICU was necessary.

There were several complications during hospitalization. Besides the inevitable tracheal intubation for mechanical ventilation, which would later become a tracheotomy, the implantation of a cardiac pacemaker became necessary because of bradycardia (by dysfunction of the sympathetic), thus preventing an anticipated cardiac arrest. Furthermore, it would be indispensable the permanent monitoring of vital signs, continuous catheterization of a central vein, infusion of fluids and medication via pumps and syringes, and also indwelling catheters. The development of ileus is a constant, is often required manual extraction of fecalomas. The loss of control of the sympathetic system led to continuous intense muscle spasms of all four limbs. Temperature variations were also clearly evident during hospitalization, ranging from hypothermia and hyperthermia.

After eleven months, and after a rare period of hemodynamic stability and without any complications of an infectious nature, the patient's discharge started being planned. Social security (social service) managed placing a ventilator in his home as well as a secretion suction machine. People who would be the caretakers, his wife and daughter, accompanied the nurses for a week; finally, the patient was able to return home. During the first week, he received home support, both medical and nursing, after which he was placed in the care of relatives.

Not two months elapsed from the discharge when the patient was admitted to the emergency room with severe respiratory infection. Primary care was provided and readmission into the ICU was compulsory. His episodic memory worked again and it was notorious his disappointment. He would return the mythical antechamber of death. The next day he was no longer in the ICU. He had the right to die. But was still alive in the memory of the unit's staff who attended him. He marked them indelibly.

Application of evolutionary heights Merlin Donald

The patient's hospitalization was prolix and excruciating. As a reference nurse, I was the health worker who devoted more hours to the patient. The human relationship held for eleven months was so narrow and deep that after ten years the memory is still alive. The recalled facts were the main support source presented in this analysis based on Merlin Donald's theoretical contributions.

The following are narrated episodes of internment to which it was possible to associate Donald's evolutionary levels. In the preface of the this author's book, Serrão notes that *qualitative leaps from the episodic "culture" to mimesis, myth and symbolism, have a justification and may be understood from the perspective of a brain that adapts to the demands of the medium to ensure survival, until the release obtained with exterior symbolic culture*. The episodes of this adaptation and the stay of the patient at the intensive care unit began at his admission.

The first analogy I found between this case and the theory of Merlin Donald was upon admission, more specifically patient's verbal reaction responding to the identification of the place where he had just entered. Entering an ICU is, at least, dismaying. The characteristic environment of such units, consisting of high-tech devices such as ventilators and monitors, the *normal* noises emitted not only by these types of devices, but also by infusion pumps, language almost one hundred percent technical among health professionals, and the non-existent dialogue between the patients, create the myth that those who enter there are attached to machines and are unlikely to survive. For the uninitiated, a UTI is like the antechamber of death. Donald defines this kind of myth as a product of narrative mode, *a debated, disputed version, the product filtered over the generations of narrative exchanges about reality*[13]. As indicated, the myth governing the collective imagination.

The patient did not reach the third transition of evolutionary levels. About this transition, Donald says: *The first step in any new area of theoretical development is always anti-mythical: things and events must be stripped of their previous mythic meanings* [14]. Only then should be subjected to an *objective theoretical analysis*. This is a demystifying process that the patient did not reach. But his verbal reaction, which I mentioned having characterized superiorly characterized his state of mind stamped in his facial expression, was not only a consequence of the myth's function. The episodic memory acted as a catalyst for that verbal expression.

It has been mentioned that, for Donald, episodic memory is connected to time, space, date, and specific places, and are important features of concrete perception and of ability to retain specific details. The human being reveals sensitivity to understanding the significance of environmental events and stores it in the episodic memory. In consultation with the patient's records, it was found that his father had died not in that, but in another ICU about fifteen years before.

Barely had he laid down and the tracheal intubation tray was ready. The explanations were close to zero and informed consent was a mirage. My episodic memory reminds me of the simple justification for the facts that he would stop breathing and would require intubation and subsequent connection to the mechanical ventilation. As for the immediate direct consequences, mainly the fact that he would stop emitting sound, nothing was said.

Only after a few months did he accept his quadriplegic condition, with indwelling catheters, lack of sphincter control, requiring assisted ventilation, and an artificial heart rhythm. The depression was evident and easily perceived in the patient's facial mimesis, which conveyed his emotions through his expressions. The sadness, passivity and indifference demonstrated during care giving were part of his daily emotions. Thorough a certain time lapse, in tears, he struggled and conveyed his intended message: he did not want to live, despite being sentenced to life.

Ceased the phase of denial and without brain damage that would take fundamental cognitive abilities; the patient began to develop strategies to adapt to the new situation. The

use of mimesis was one. Barred from using language, he adopted for communication resources to facilitate with professionals in the intensive care unit.

The face, in particular, and according to Donald, *one of the mimetic organs most used in the human cognitive repertoire*[15], it was widely used by the patient. The whole face, his only mimetic organ, was used to communicate. From frowning when hyperthermia was felt, thorough the issuing of clicks produced by the tongue and palate when he felt the need to be aspirated, to the blinking of the eyes when he felt understood, by closing both eyes when our interpretation did not correspond, and by scrunching his nose when he did not like anything, various intentional representations were invented in the patient's day-to-day. Confirmed in this clinical case are some important properties of mimetic individual acts advocated by Donald, namely intentionality, generativity and communicability.

Of the six emotions classified by Damásio[16] as primary or universal - joy, sadness, fear, anger, surprise and disgust - five were clearly evident in the patient's facial expression throughout hospitalization. Even when perfectly understood his expression conveyed passivity, resignation. Joy was never transmitted by his mimesis - never even noticed the hint of a smile.

For the patient, the use of mimesis was a true survival strategy. With its use, the process of communication between him and ICU professionals was facilitated, enabling the delivery of care, including nursing care in a timely and appropriate. The main needs of the patient were fully encoded in his mimesis and were easily decoded by care givers, who immediately if were available to meet those needs. Almost all the care occurred in a mimetical context established by the patient and accepted by the team.

Regarding the exterior symbolic culture, the patient may not have been a good example of Donald's theory, at least not directly. His clinical situation did not allow it, for example, developing his own attributes to the graphic aspect. However, when the focus narrows to the other two cognitive phenomena, which according to Donald were developed in this external symbolic culture, can be considered that by the simple fact that someone does the work, in which the patient is the protagonist, manifestation plots of his biological memory will pass to his external memory through writing.

Another indirect form of manifestation of external symbolic culture refers to the external symbolic storage done by the health team. Consider: the health gains that a patient may benefit derives from the care of a healthcare team. These gains do not come from the provision of an individual caregiver, but come from the whole team. For this to be possible the nursing team has the traditional *shift change* and the usual medical staff service meetings, which are no more than moments of reflection and communication about the needs highlighted by the patients, the care, the patient's response in terms of healthcare and the evaluation of such care.

The professionals presenting these meetings start working in a network. And the patients become highly benefited from this exchange of views, this passage from individual to collective memory. Donald refers to *the memory system, once made public by integrating into the external symbolic storage system, becomes virtually unlimited in its capacity and much more accurate*[17]. And the result of this networking, of this memory made collective, is recorded in the patient's clinical record. Becoming an effective external symbolic storage.

Thereafter all members of the healthcare team can access these records, reflect, discuss, and investigate for improvement. About this, Donald points out that *individuals linked to a cultural network can access an external memory bank, read its code and content, permanently save new contributions, and interact with other individuals who use the same codes and access paths*[18]. He concludes further that *divide among themselves a common memory and as the database as this system expands far beyond the domain of any individual, the system becomes by far the most important factor of an individuals' cognition*.

Final Considerations

We believe that the patient in an ICU, who served as a basis to exemplify the basic theory of evolutionary levels of Merlin Donald, is only one among many. From the moment a human being is deprived of movement and speech, seeing themselves with limited autonomy, must develop compensation mechanisms. Communication, a fundamental human characteristic, is the main target of such compensation.

If a human being is understood, one can expect that the other will answer his requests. And this answer has to do with his own autonomy. Despite the limitations of quadriplegia, the patient can exercise his autonomy by communicating to the caregiver needs, desires, and intentions. If the nurse responds positively to the call, the patient will feel in control of himself, controlling his body - to some extent, autonomous. As a caregiver, I certify that the satisfaction felt with that wink, synonymous with understanding the message sent.

But it was not easy to reach this stage of understanding. Donald warns that *understanding the intentions of others requires a departure from the cognitive egocentrism*. This gradual withdrawal was not easy, as the evolution of patient's communication. In proportion that he adapted to the ICU and developed his way of communicating, the other professionals and I started moving away from our cognitive egocentrism to approach the patient. A long path was traveled since his admission, to the establishment of the symbiosis of understanding/satisfaction of basic affected needs. I believe I can say that there was evolution in the patient's thinking during the hospitalization period. This evolution does not contradict in any way the theory advocated by Donald, on the contrary.

In one of his classes, Daniel Serrão stated that for Merlin Donald, *Man as an intelligent being was not always as he is today.* He evolved. And with this evolution of intelligence that bioethics emerged in the twentieth century, a field of dialogue between areas of knowledge capable of reflecting the current level of evolution. A field for reflection resulting from the development of thought. Not limited knowledge, bioethics may show up as the regulatory locus of its implementation.

Let it be that nothing prevents the development of human thought, but may there be limits. Ethical limits that will not allow the inappropriate use of cognition. If this happens, it could determine the irreversibility of the evolutionary process of cognition, to the point of underestimating the human being. The construction of the human and the capacity of thought was something that humans had to build patiently; took the necessary time to go through each of these levels.

If facing current achievements one cannot retreat, attention to the crossroads of science is indispensable. Prudently and without precipitation becomes necessary to leave the adaptive mechanisms of cognition to act as a timely and coordinated the *Bridge to the future* - that Potter launched about 35 years ago. Humanity must take the time to cross this bridge, otherwise the fourth transition may become nicknamed as *From external symbolic storage and theoretic culture to the culture of human extinction.*

References

1.DonaldM.Origensdopensamentomoderno.Lisboa:FundaçãoCalousteGulbenkian;1999.
2.DonaldM.Op.cit.p.7.
3.DonaldM.Op.cit.p.185.
4.SerrãoD.Archeo-biologiaebioética:umencontronãoconflituoso.In:BorgesA,PitaAP,AndreJM, coordenadores.Arsinterpretandi:diálogoetempo.Porto:FundaçãoEng2AntóniodeAlmeida;2000.p. 249-54.
5.DonaldM.Op.cit.p.197.
6.MouraMLS.Dentroeforadacaixapreta:amentesobumolharevolucionista.Psic:teorepesq. 2005;21(2):144-7.
7.MouraMLS.Op.cit.p.245.
8.MouraMLS.Op.cit.p.250-1.
9.DonaldM.Op.cit.p.325.
10.DonaldM.Op.cit.p.327.
11.DonaldM.Op.cit.p.331.
12.DonaldM.Op.cit.p.456.
13.DonaldM.Op.cit.p.313.
14.DonaldM.Op.cit.p.333.
15.DonaldM.Op.cit.p.222.
16.DamásioA.Osenamentodesi.15ª ed.Sintra:PublicaçõesEuropaAmerica;2004.p.71.
17.DonaldM.Op.cit.p.375.
18.DonaldM.Op.cit.p.212.

Participation of the authors

Both authors participated equally in the elaboration of this text.

Received: 9.8. 2011 Reviewed: 15.2.2012 Approved: 7.5. 2012