Evolution, brain and the human mind

Mirela Ionescu

Titu Maiorescu University, Cognitive Behavioral Therapies Master of Science Program, Bucharest, Romania

The purpose of evolutionary psychology is, on one hand, to understand the human behavior oriented to transmitting genes from a generation to another and on the other hand, to discover and understand the human mind architecture, starting from the principles of evolutionist biology (Buss, 2015).

Evolution is thought to be an endless repetition of reproduction, so each generation takes the genes, passed on by the previous generation, and transmits them to the next generation alongside small random errors (mutations). Through these small steps, from each generation to the next, the genetic difference from the initial ancestor can become considerably large, the offspring of each generation being different from its parent (Dawkins, 1986). It should be taken into notice that the selection in which the offspring moves on is not random; the natural selection from the Darwinist perspective intervenes.

Evolution states that modern organisms present a structural diversity, from simple to complex, which reflect an evolutionist past and not an instantaneous creation (Tooby, & Cosmides, 1990). In this evolution chain the human is capable of hierarchical thinking, of understanding a structure made of elements arranged in a model, representing this arrangement with a symbol and the use of symbol as an element of another complex configuration (LeDoux, 1998). This capacity has its center in the neo-cortex, which for humans has reached such a complexity that we can call these models "ideas".

Through an endless process, humans can build more and more complex ideas so that at a moment in time, these ideas can represent "knowledge". Only Homo sapiens have a knowledge base that evolves, it develops exponentially and it is transmitted from a generation to the next one. It is impossible to understand how the human brain works without understanding how it evolved.

Theodosius Dobzhansky claimed that "Nothing in biology makes sense except in the light of evolution" (2013). Presently it is considered that the recent discovery of mirror neurons can

Corresponding author: Mirela Ionescu
Phone number:
E-mail address: mirela_ionescu@ymail.com

give many answers (Iacoboni, 2009). Thus it is possible for us to understand how and why "we read" the mind of others and we feel empathy for them. Many of our unique mental traits seem to have evolved by implementing new structures for the brain, structures which at their origins might have had other purposes.

There is the probability that the mirror neurons hold the main role in social learning and in the cultural transmission of aptitudes and attitudes (Gallese, Eagle, & Migone, 2007). Having this "culture", the man can adapt to new hostile environments and he will realize how to exploit inaccessible food reserves, just in one or two generations.

When it came to be, the human brain seems to be anchored in the present. But due to the last area that evolved, the frontal lobe, the human has the possibility of escaping from the present towards the future (Suddendorf, & Corballis, 1997; Miller, Freedman, & Wallis, 2002). The human frontal lobe is unique (Nauta, 2013). A possible element that the human being added to the anthropoid's intelligence is the flexibility related to the future (Parker, 1990). Intelligence requires imagination, and it won't contribute unless it transforms into something of quality. Intelligence also has other dimensions as: decision making, planning, creativity, anticipation, but all of these presuppose previous knowledge (Marzano, 1988).

Jean Piaget claimed the "intelligence is something that you use when you don't know what to do" (Piaget, 2012).

It is difficult to estimate how often high level intelligence can appear in the evolutionary systems. The difficulty is partially due to the "continuity principle", according to which the species must remain sufficiently stable not to self-destruct and competitive enough not to lose themselves in a narrow specialization (Van Atten, & Van Dalen, 2002; Cordes, 2006).

The human mind is built from a multitude of cognitive structures specialized to solve particular issues (Panksepp, 1998). All these structures interact flexibly, helping us solve new and complex problems. Cognitive structures, as a result of the evolution process, are involved in the relation between changing behaviors and changing environment conditions (Hayes-Roth, 1977; Shettleworth, 2009).

From the evolutionist psychology perspective, structures that allow learning must be innate, most of these structures being very specific; for example, there is a cognitive structure specific to language learning (Skehan, 1998).

Many researchers assume that the big intelligence leap of the hominid age was generated by those logical structures needed for grammar and language (Pinker, & Bloom, 1990). The language structures the way which we perceive the world (Knight, Studdert-Kennedy, & Hurford, 2000).

In Piaget's vision, the child develops language just as a useful thinking tool. The children learn grammar mentally, listening to a language, receiving new words and associations (cited in

Mercer, & Littleton, 2007). Language was considered an adaptive structure, but recently a version was released that states that the language is actually an artifact of a bigger brain (also adaptive structure), which then acquired an adaptive function in the evolutionary process (Cosmides, & Tooby, 1994). The evolution of language is thus seen as a product of cultural evolution. For individuals, intelligent mental life is an ever-changing image of the inner and outer world. Thereby it can be said that historical human evolution was the one that prepared the human for the daily knowledge of the world.

References

Buss, D. (2015). *Evolutionary psychology: The new science of the mind*. Psychology Press.

Cosmides, L., & Tooby, J. (1994). Better than rational: Evolutionary psychology and the invisible hand. *The American Economic Review, 84*(2), 327-332.

Cordes, C. (2006). Darwinism in economics: from analogy to continuity. *Journal of Evolutionary Economics, 16*(5), 529-541.

Dobzhansky, T. (2013). Nothing in biology makes sense except in the light of evolution. *The american biology teacher, 75*(2), 87-91.

Dawkins, R. (1986). *The blind watchmaker: Why the evidence of evolution reveals a universe without design*. WW Norton & Company.

Gallese, V., Eagle, M. N., & Migone, P. (2007). Intentional attunement: Mirror neurons and the neural underpinnings of interpersonal relations. *Journal of the American psychoanalytic association, 55*(1), 131-175.

Hayes-Roth, B. (1977). Evolution of cognitive structures and processes. *Psychological Review, 84*(3), 260.

Iacoboni, M. (2009). Imitation, empathy, and mirror neurons. *Annual review of psychology, 60*, 653-670.

Knight, C., Studdert-Kennedy, M., & Hurford, J. R. (2000). Language: a Darwinian adaptation. The evolutionary emergence of language. *Social function and the origins of linguistic form*, 1-15.

LeDoux, J. (1998). *The emotional brain: The mysterious underpinnings of emotional life*. Simon and Schuster.

Marzano, R. J. (1988). *Dimensions of thinking: A framework for curriculum and instruction*. The Association for Supervision and Curriculum Development, 125 N. West St., Alexandria, VA 22314-2798.

Mercer, N., & Littleton, K. (2007). *Dialogue and the development of children's thinking: A sociocultural approach*. Routledge.

Miller, E. K., Freedman, D. J., & Wallis, J. D. (2002). The prefrontal cortex: categories, concepts and cognition. Philosophical Transactions of the Royal Society B: *Biological Sciences, 357*(1424), 1123-1136.

Nauta, W. J. (2013). The problem of the frontal lobe: A reinterpretation. *J. psychiatr. Res, 8*, 167-187.

Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions*. Oxford university press.

Parker, S. T. (1990). Why big brains are so rare: Energy costs of intelligence and brain size in anthropoid primates. *Language and intelligence in monkeys and apes: Comparative developmental perspectives*, 129-154.

Piaget, J. (2012). *La psychologie de l'intelligence*. Armand Colin.

Pinker, S., & Bloom, P. (1990). Natural language and natural selection. *Behavioral and brain sciences, 13*(04), 707-727.

Shettleworth, S. J. (2009). *Cognition, evolution, and behavior*. Oxford University Press.

Skehan, P. (1998). *A cognitive approach to language learning*. Oxford University Press.

Suddendorf, T., & Corballis, M. C. (1997). Mental time travel and the evolution of the human mind. *Genetic, social, and general psychology monographs, 123*(2), 133-167.

Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and sociobiology, 11*(4-5), 375-424.

Van Atten, M., & Van Dalen, D. (2002). Arguments for the continuity principle. *Bulletin of Symbolic Logic, 8*(03), 329-347.