The Theory of Needs: Revision for the 21st Century

Christian PETERSEN, Staša PUŠKARIĆ*

Rochester Institute of Technology, American College of Management and Technology, Don Frana Bulića 6, 20000 Dubrovnik

****Corresponding author***: e-mail: *stasa@acmt.hr*

HAR1

Human accelerated region 1 (HAR1) represents a small segment in the human genome which was identified recently (Pollard et al. 2006a, b). This discovery revealed the area in human genome that evolved the most rapidly among all other genes since the divergence from our ancestor *Homo habilis* (ape-like "handy man"). It is in fact a part of our RNA that was directly responsible for the rapid development of our brain, more specifically human cerebral cortex. It could be best described as an evolutionary miracle due to 18 changes in RNA base pairs that happened within less than 1 million years. Its structure is distinctly different from chimpanzee (Beniaminov et al. 2008), while its function is still a mystery. Ponting and Lunter (2006) postulated that human HAR1 RNA influenced the formation of innovative functions in the brain. Whatever its functions might be, the fact is that we have it and it is unique, distinguishing our species from all the others residing with us on Planet Earth. Also, it is one of over 30,000 genes we have in our genome. From this point of view we could say that the biochemical machinery we are using is genetically very close to that of chimpanzees and our ancestor *Homo habilis*. Therefore, whatever the material needs we have these closely resemble to those of other species. For the purpose of this communication we will call them Universal Needs.

The discovery of HAR1 opened the door to clearer insight into the realm of human needs. It is imperative to therefore separate cosmic needs and the needs of living organisms restricted to Planet Earth, which includes our basic primate needs, from the needs that arose from the rapid development of our brain. This aspect of our evolution seems to have been too fast for us to comprehend the ability we were given which could easily be interpreted as a curse and a blessing. Our actions and decisions we make as a society during the last few thousand years clearly indicate high level of confusion and cognitive bias that seldom lead to totally insane bloody conflicts.

Universal Cosmic Laws

We live in a perfectly organized environment with unwritten laws that are undisputable. Everywhere in the Cosmos the speed of light is the same, the forces of gravity, electromagnetism, strong and weak nuclear forces balance the material remains of the "Big Bang". We can say that we understand the functioning of the Cosmos quite well, although some issues still remain as a theory: e.g., is it because of the different properties of matter and antimatter that these two did not fully disintegrate into radiation in the aftermath of the "Big Bang" or is it because of the existence of a particle consistent with the Higgs boson for which the scientists from the Large Hadron Collider (LHC) at CERN (European Organization for Nuclear Research) have claimed the discovery on July 4, 2012; the superstring theory proposes that the fundamental ingredients of nature are ultra-tiny strings of energy whose different modes of vibration organized in eleven dimensions make up everything in the Universe; roughly 95 % of the Universe is made of dark energy and dark matter and we still can not see it. Knowing that all atoms of carbon that make the fabric of all living organisms on our Planet Earth originate from the death of a red giant star, a supernova, is direct evidence that we, along with all living creatures, are the constituting part of the Cosmos, the children of the Universe. That also means that we cannot defy the Laws of Nature. Additionally, everywhere in the Universe all the physical, chemical and geological processes tend to balance out with energy flowing and matter cycling. Therefore it could be postulated that balance is the Universal Law.

Universal Needs

The most basic and universal need of all living organisms is a planet with conditions that can support life, functioning as an island of life in a universe with hostile conditions to any life form. This need for an island in the Cosmos is the true universal need for any life form in the Universe. The conditions as well as the life forms that develop on such an islands might differ but the common nominator is still the existence of an inhabitable planet stable for a period of time long enough to form life. Any form of life on our planet needs energy (food) and water in liquid form.

The impact of instability on life can be easily observed on our own planet. Taken in consideration the five mass extinctions that occurred during our planets history caused by catastrophic natural changes of the ecosystems such as meteorite impacts or super volcano eruptions prove that when the given stability of any ecosystem is disrupted below a certain point in a short period of time mass extinctions are inevitable. All life forms require time to adapt considering that the more complex a life form the more time it needs to adapt to changes in its environment. We proved that we are capable of modifying the environment and even changing the climate on a global level. If the speed of

changes in the environment caused by ourselves and/or by natural forms of environmental stress becomes too rapid, we have to ask ourselves will we have enough time to adapt. Since we are natural creatures, the same choices apply to us as to all other living organisms: adapt, migrate or die. Recent studies have shown that only by fulfilling the needs of our economy humanity's ecological overshoot corresponded to 120% in 1999 while our demand for natural resources has exceeded the biosphere's regenerative capacity since the 1980s (Wackernagel et al. 2002). That means that we are actively using more that 1.2 Earths (while we have only one) and have overshot the carrying capacity of our planet since the 1980s. This is direct evidence that our course of actions is not sustainable and that we are living in a world out of balance.

How Nature Works

How do (or did since the appearance of life 3.7 billion years ago) living systems on our planet achieve sustainability absent human interference? Today we understand that well: living systems in which living organisms are in constant interaction with the nonliving constituents utilize renewable energy (primarily from the Sun) and recycle everything. Within the cycles of matter more complex systems can achieve higher stability (resistance to change, the ability to recover after disturbance and the ability to maintain a certain number of organisms) as it is influenced by higher diversity as well as climate (MacArthur and Wilson, 1967). Natural systems balance out through a system of feedback loops where in layman's terms negative feedback loops remove the energy out of the system and positive feedback loops return the energy into the system. Human beings are a natural system, so to get rid of excess energy (negative feedback loop) we sweat and to get additional energy into our system (positive feedback loop) we simply burn more cellular fuel, organic matter by moving our muscles - we shiver. Therefore, the energy involved in the interaction between different constituents from the region of quarks to cosmic distances being either very simple to very complex, living or nonliving, tends to achieve the perfect balance.

Sequence of Important Events in the Evolution of *Homo sapiens*

Homo sapiens (modern humans), the species all human beings on this planet today belong to, appeared (evolved) in Africa about 700,000 years ago, although anatomically modern humans (*Homo sapiens sapiens*) are known from the time of dramatic climate change about 100,000 years ago. An abrupt decline in the number of humans (also referred to as a genetic "bottleneck") correlates to the time of the latest Toba super-volcano eruption 72,000 BC (Rampino and Self, 1992; Rampino, 2002).

During the Late Epipaleolithic period (12,000-9,600 BC) the large-bodied mammals in the northern parts had disappeared so people had to survive by hunting smaller animals such as gazelle, deer and rabbit along with gathering different wild seeds, and broadening their diet with leguminous vegetables and acorns. The Younger Dryas period about 10,800 BC brought an abrupt climate change back to cold with glaciers returning to Europe. We did not just survive; our species experienced a positive trend in population dynamics. The cause of this unexpected leap forward was the development of new innovative hunting technologies (e.g. nets) by using creativity as a strategy for survival. The appearance of agriculture and domesticating of wild animals (livestock farming) resulted with not just a stabile source of calories but also created a surplus. Population size could increase more rapidly. Civilizations appeared from small migrating groups of people. Creativity diversified into a wide variety of interests (art, science) leaving us monumental structures such as Göbekli Tepe, Ankgor Wat, Egyptian pyramids, artifacts from Sumerian civilization, Machu Picchu, Sacsayhuamán, Mayan pyramids in Mexico, Easter Island statues, Stonehenge, Carnac stones and many others around the globe. Agriculture and farming required modifying natural habitats and ecosystems often resulting in substantial environmental degradation that led to collapses of whole civilizations (e.g. Easter Islands, Mayan civilization). Another consequence of agriculture and farming (or the need for extra calories i.e. energy) is the appearance of the need for land ownership. Greed was born. As many of these new farmers died from unnatural causes (killed in the raids of invaders), during these brutal "barbaric" times people begun finding solace in faith. Religions were born. Creativity gave birth to more sophisticated weapons for protection against thieves or invaders but as well as weapons to conquer others. The Battle of Megiddo (Egypt vs. Canaan, 1,500 BC) was the first well documented battle and the first recorded body count. Kingdoms and empires rose and fell with the innovative ways to use our brain to produce more and more sophisticated war strategies and weapons of mass destruction. Then we found oil - patches of concentrated energy from the sun in chemical form buried in the Earth's crust. Industrial revolution resulted with the development of artificial fertilizers, pesticides and herbicides that again enabled a "quantum" jump in the size of our population, creativity and innovation. Achievements in science resulted in astonishing technological developments with much more destructive and powerful weapons of mass destruction.

The Needs of Anatomically Modern Humans

Our Universe requires very precise conditions to exist. We could observe it as a fine tuned instrument. So are we, as we are just a tiny fraction of its glorious development in the aftermath of the Big Bang. A tiny spark of the amazing fireworks of its first expansion and all the supernovas that led to the Universe as we observe today. If we take a look at us from this perspective, we simply cannot deny the very strict fabric of the forces that modeled every corner of the Universe during the past 13.7 billion years. Therefore, looking at us as if we are the center of the Universe, or that the Universe is there just to fulfill our needs and wants does not make sense. It simply is not true. We are a constituting part of it. As a matter of fact an extremely small part of it. And most probably we are not alone.

It seems most likely that the 18 changes in RNA base pairs in HAR1 gene were directly responsible for the rapid development of our brain. Being a relatively weak species, the novel "wiring" between different parts of the brain enabled us to develop skills such as effective communication, planning, thinking, understanding and inventing which helped us to progress even in the harshest living conditions during our existence. It was after the aforementioned Toba eruption 72,000 BC that we started consuming increased amounts of calories that had outbursting effect on the development of synapses in our brain. Later, leaving the stressful nomadic way of life during which we were preoccupied with pure survival, settling down for longer periods of time and being able to store supplies of food, we finally achieved the conditions to start discovering the full potentials of our brain (i.e. information processing organ). We started discovering and understanding new interests, feelings and emotions. We actively began observing and understanding the environment we were living in developing skills such as arts, science, architecture, music, astronomy, medicine, and religions. Coinciding with this civilized way of life, we developed a new set of needs driven by the new genetic instructions from HAR1.

However, within this process, we took some aspects for granted, such as availability of fresh water, ability of natural systems to take care of our waste, biological diversity, pollination processes, etc. Everything was still abundant and functioning because of the ability of natural systems to deal with certain amount of disturbance. At that point we simply could not understanding that we are capable of altering global processes, that we can dramatically disturb global stability (balance) and do it all rapidly. For example, not very long time ago we believed that we could not have negative impact on fish populations by fishing practices as oceans seemed so huge that its resources are indefinite and that whatever we do, the regeneration capacity will replenish what we extract from it. Today we know that we were wrong. Not just about fishing, but to many other aspects as well, such as altering the global climate with emissions of greenhouse gasses into the atmosphere originating from geological reservoirs.

Therefore, we separated the needs of anatomically modern humans into three different levels:

1) **Basic, fundamental needs.**

a) A planet with processes that initiate life.

b) Balanced, relatively stabile ecosystems where changes occur gradually, not rapidly or suddenly.
c) Fundamental constituents that enable life: energy, water in liquid form absent pollutants, clean air and topsoil with prevailing aerobic biochemical processes.
d) Possibility of survival and acquiring long enough stability for upbringing of children. Being able to adapt to changes.

2) Second level basic human needs (prerequisite are basic, fundamental needs)

a) Belonging to a community (local, regional, global).
b) Being able to develop individual, intrinsic interests.
c) Knowledge as determined by 2b.
d) Effective communication of ideas rather than facts that lead to understanding, avoiding cognitive bias. Intelligence.

3) Third level needs of anatomically modern humans preconditioned by 1 and 2 (3a-f adopted from Maslow, 1954 and Glasser, 1998)**.**

a) Love.
b) Freedom.
c) Fun.
d) Power.
e) Esteem.
f) Aesthetic.
g) Spirituality (achieving higher/different states of mind).

This is who we are. Unique and very complex. We changed. We have been changing. We will change. The century ahead of us will show if we deserve being gifted by HAR1 or not. In the eyes of our children we will be either heroes or failures. We live in the age of exciting scientific discoveries and novel technologies. All of them have their bright, beneficial and benign consequences. All of them have their dark, dangerous sides as well. We live in the era of dramatically rapid human impact on the global environment. The challenges of this century include making sure that the dark and dangerous sides of our achievements are not revealed. Error and terror are both unacceptable. We do not have the luxury of taking things for granted any more as we have only one planet. Our Planet Earth. Our Home. It is not about if we are becoming smarter or more intelligent. It is about if we are becoming better. Ethical. Moral. We say that only lunatics can be terrorists. They are aware of the consequences but they do it anyway. We are aware that that there is no system in the Universe (except on Earth) which promotes one way matter flow for the purpose of faster cycling of money. We know it is not sustainable and that it cannot go on for a long period of time. We have only one Earth. With finite resources. We do it anyway. We understand but do not recognize and obey the Laws of the Universe. Therefore we commit crime against Nature. We can genetically modify organisms including ourselves. We can insert implants in our body and brain. This proves that we can consciously change ourselves. We can chose who we will become and how we will behave. The decision is yours.

So, dear fellow humans live long and prosper.