



MACROJOURNALS

The Journal of **MacroTrends** in Technology and Innovation

Evolutionary Psychology for Environmental Health Enhancements

Roberts Jūrmalietis

*Environmental Research Center, Faculty of Science and Engineering,
Liepaja University, Latvia*

Abstract

Since multifaceted global crisis faced by contemporary humankind is related, at great extent, to human mind peculiarities psychological tools should be included more broadly in environmental, health, economic, etc. problem-solvings to ensure sustainability of human world. Substantial functional role within this set of tools should be played by evolutionary psychology potentially representing itself a paradigmatic background for all the psychology, not just a distinct branch; nevertheless, despite of evolutionary psychology's promising methodological capacities and achievements it is often used fragmentarily and still heavily criticized. The presented article reviews, substantiates and proposes evolutionary psychology's interpretative and inspirational inputs for human mind related environmental health problem-solvings as being particularly important to overcome global crisis and to ensure human life quality improvement.

Keywords: evolutionary psychology approach, biophilia, biomimicry, ecotechnology, anti-ethnocentric approach

1. Introduction

Different research and management strategies have been implemented to overcome human survival and well-being threatening manifestations of mankind's current global crisis, and particular emphasis have been put on human unsustainable behavioral choices with a research focus on its psychological roots. Despite of cultural overprints the very background of even contemporary human mind is still biological, accordingly, exactly biopsychology could serve as a reasonable paradigm for interpreting unsound, maladaptive human behaviors. An evolutionary psychology has been chosen within a spectrum of biopsychological approaches for recent article discussions; its paradigm and selected recognitions will be reviewed, substantiated, analyzed

with application proposals targeted on environmental health enhancements. The latter concept represents itself an intelligent framework for global crisis / sustainable behavior interpretations if applied on basis of holistic health biopsychosocial / ecological model (Engel, 1977; Stineman, Streim, 2010) (simple but conceptually powerful paradigm not so often implemented in real-life health care practice) – since it integrates, among other, ideas of environment as both biophysical (natural and built) and social one, complementarity of environmental and health consciousness / behavior, moral-spiritual health (which includes, e.g., judgement of unsound environmental behavior as a pathology, appreciation of religious therapy, etc.), subjective well-being as a „gates” for overall health improvements, etc., and particularly emphasizes role of environmental context.

2. Discussion

Despite of global concern on humankind`s sustainability it looks like we still are lacking substantial achievements since historic Earth Summit in 1992: symbolically, sources quote UN Secretary-General Ban Ki-moon`s opinion that “the challenges facing humanity today are much the same (in comparison with 1992), only larger” (see, e.g., Lancet Editorial..., 2012). Sustainability crisis reflects in global ecological, health, social, economic, etc. problems which, at great extent, represent themselves different facets and outward manifestations („symptoms”) of a crisis in human mind (Caldwell, 1996; Capra, 1992; Russell, 1988). Consequently, psychology as a science of mind has a crucial role to favor sustainable development through revealing clues of un-sustainable behavior and proposing psychological tools to ensure a sustainable one. Still, necessity for inputs in behavior change sometimes has been underestimated due to results of sociological surveys indicating rise in public environmental consciousness (e.g., in consumer awareness and willingness to act on environmental concerns) (Sustainable Consumption..., 2008). However, particular consciousness phenomena (like attitudes) do not accurately predict appropriate behaviors (see, e.g., Entem, 2007; Kollmuss, Aageyman, 2002); moreover, self-reports on sustainably sound behaviors cannot be recognized as reliable indicators of actual behaviors. A classical demonstrative example for the latter is so called Tucson Garbage Project: research revealed a difference between Tucson (USA) residents` self-reported data about their consumption habits and contents of their waste bins (Rathje, Murphy, 2001).

Unhealthy lifestyles represent themselves a particularly important facet within a spectrum of unsound human behaviours; they are related, at great extent, to basically dual nature of reasoning processes: conscious, deliberate, logically clarified thinking (Logos of Aristotle`s Rhetoric; particularly valued in Western culture when it comes to decision-makings) has been implemented simultaneously with out-of-awareness rooted mental activities. Actually, the latter has been frequently hidden by conscious reasoning – knowingly or unconsciously: the boundary is often blurred – and it means that humans are not always rational beings as regards to their decision-makings – in fact, much of our seemingly paradoxical thinking leading to maladaptive health, social, environmental, etc. behavior has been rooted in the realm of sub-conscious and unconscious; in other words, communication between the “real” world / environment and its perceiver is, according to popular expression, “not logical but *psychological*” – a dichotomy

whose consequences were figuratively exemplified in E.Derman's (physicist, businessman and writer) comment on mathematical tamability of markets: „In physics you are playing against God, Who does not change His mind very often. In finance, you are playing against God's creatures, whose feelings are ephemeral, at best unstable, and the news on which they are based keeps streaming in (Lien, Schlossberg, 2006: 15).

Despite various psychology schools differ in their conceptual perceptions of mind's hidden dimensions, their actual power to make impact on human daily choices have been broadly recognized by practitioners who – deliberately or un-intentionally, demonstratively or intuitively – use these mind qualities in psychological manipulation (term has been used here in a morally neutral sense, i.e. with no restrictions to maliciously intended activities: actually, psycho-manipulation in a broad sense should be perceived as an inevitable part of each culture, even as an adaptive necessity) for business, managerial, political, social, therapeutic, educational, environmental, etc. purposes. Within a spectrum of psychological knowledge promising for sustainable and healthy psycho-manipulation the present article targets on evolutionary psychology (furthermore – EP) – a rapidly growing however controversially judged approach in mind research which paradigmatic specificity is explanation of human psychological traits and behavior in the light of Ch. Darwin's well-known theory of evolution: traditionally applied to anatomy and physiology, nowadays Darwinian ideas have been broadly used for psychological interpretations (e.g., explaining emotions as important environmental adaptations, see Cornelius, 2000; Cosmides, Tooby, 2000; Nesse, 1990, etc.) with an ambition even to represent themselves a grand meta-theory for unconnected, fragmented mini-theories in psychology (Buss, 1995; Confer, et al., 2010; Evans, Zarate, 2005; Fitzgerald, 2010; Pinker, 2005) – just like in a case of biology where exactly evolution idea represents itself a framework paradigm (see, e.g., Daws, Boyd, 2005; Durrant, Ellis, 2013). Such an approach could be parallelized with environmental psychologists' statement that human mind cannot be comprehended if interpreted out of environmental context and, accordingly, environmental psychology should potentially represent a paradigmatic background for all the psychology (Gifford, 2002).

Within this EP's general statement, more specifically – in the light of pragmatic interests (i.e. manipulation possibilities) – the following core idea should be emphasized: contemporary human minds include inborn psychological mechanisms which mirror rigidly fixed adaptations reflecting our common ancestral environments ¹ (Tooby, Cosmides, 1992) – quoting D.M.Buss, modern humans walk on streets with stone-age brains in their heads (Laland, Brown, 2006) – and, accordingly, such an adaptive-lag can cause behaviors being maladaptive for recent human world. Indeed, a lot of our common perceptions and behaviors which are undoubtedly dangerous to health and environment, or are at least just strange, can be easily explained in the mentioned EP perspective. Appropriate classic examples include interpretation which takes into account action of supernormal stimuli (i.e. exaggerated versions of existing stimuli which elicit a stronger response in the receiver than the corresponding normal stimuli do): e.g., human taste

¹ Human single origin idea or "Out of Africa" hypothesis was proposed already by Ch.Darwin and have been supported now by empirical evidences, see Falk, Balling, 2010; Manica et al., 2007.

preference for food rich in salt, fat and sugar was adaptive in prehistoric environment with limited availability of these important life-supporting resources; unfortunately, this preference once focused on rare necessities still works in a contemporary Western world (where food is super-abundant, easily accessible) leading thus to maladaptive behavior – excessive consumption of sweet, salty and fatty foods which results in expanding public health problems; consequently, great availability of these goods has become a supernormal stimulus (Barrett, 2010; Perez, 2011). EP paradigm offers also explanation for seemingly irrational Ophidiophobia and Arachnophobia (fear, which could be „enhanced” with feelings of deep disgust) being now widespread in a temperate climatic zone (specific phobia of spiders is the most prevalent animal-related phobia in humans, see, e.g., Gerdes, 2009) where snakes and spiders do not represent themselves a serious threat to humans. However these animals used to be dangerous for our ancestors (still, recently in Sub-Saharan Africa as a territory of humankind's origin about 1.5 million people per year have been poisoned by snake venom, according to Chippaux, 2011), and that is the reason why, according to EP interpretations, modern humans` fear of snakes and spiders often appear to be even more expressed than fear of such more serious contemporary dangers like cars, guns, frayed electrical wires, or just crossing streets (see, e.g., Confer et al., 2010). At the same time, one cannot ignore lack of mentioned phobias within certain cultures, which has been indicated, e.g., by spiders and snakes being used as traditional food sources (Klemens, Thorbjarnarson, 1995; Nagas fancy eating..., 2011).

Another example – male sexual jealousy: EP interprets it as an adaptation towards paternity uncertainty problem leading to misdirection of investments in rival`s offspring and in relationships with a mate (accordingly, men experience more jealousy towards sexual not emotional aspects of infidelity while women have the opposite attitude; references see Easton et al., 2007). However, in a contemporary world, contrary to a pre-historic one, there are possibilities for advanced birth control and DNA tests, accordingly, man`s jealousy related activities towards preventing cuckoldry problem could be judged as superfluous (Buss, 1995, 2000; Confer et al., 2010). *Summa summarum*, these examples demonstrate how EP approach could help to reveal archetypes hidden behind a wide variety of seemingly paradoxical cultural / psychological phenomena / facts and, accordingly, to bring meaning in the messiness of human life. Undoubtedly, cultural imaginations are powerful (with having even a hypnotic force, see, e.g., Crabtree, 1992) enough to create their own convincing but subjective, even deceptive, meanings of life (symbolically, as Pope Benedict XVI once said “if Purgatory did not exist, we should have to invent it”; see Messori, 1985, quoted in Baikovs, 2012: 4) which can possess placebo-like psychological value or create extra problems (like exaggerated consumer society values, exoteric religion as a tool for suppression). Nevertheless, as regards to particular ancestral maladaptive behaviors cultural experience could be helpful to deal with them. Thus, an overeating wish should be considered as an adaptive trait in our ancestral environment with scarce food resources – “we're programmed to stuff ourselves for a rainy day” as chemist J.Vinson said (quoted in Mozes, 2012) – however in contemporary Western environment full with cheap and easy available food where eating for survival turns to eating for pleasure (hedonic hunger) (see analysis in Monteleone et al., 2012) this wish becomes maladaptive, health threatening (see also above discussion on supernormal stimuli). Chinese cultural

experience could make an input to solve this problem, namely, Chinese habit to eat with chopsticks appears to be helpful to stop this overeating practice thus combating the obesity (Wansink, Payne, 2008). However, not all the pre-historic adaptive traits should be considered as malicious for contemporary humans – thus, selective imitation of our distant ancestors lifestyle could be helpful for our health improvement (see below S. Ilardy's "Caveman therapy").

EP approach has been used to explain a wide spectrum of contemporary social psychological problems; nevertheless, EP is a target for a lot of critical remarks: its interpretations are blamed, e.g., for simplism, genetic determinism, universalism / exaggerated generalizations, testability problems and lack of empirical evidences, wrong statements about stability of ancestral environment, etc.; some of these critics are paradigmatically destructive (Buller, 2005; Holcomb, 2005; Richardson, 2010) while other support just a necessity to reconsider EP basic tenets in order to strengthen research field (Bolhuis et al., 2011); evolutionary psychologists respond opponents' strictures with counterarguments predominantly explaining particular critics as misinterpretations of the field (e.g., Confer et al., 2010; Kurzban, 2002; Liddle, Shackelford, 2009; Sell et al., 2005), thus, Durrant and Ellis emphasize that „no evolutionary psychologist would argue that human behavior is rigidly fixed by virtue of our genetic inheritance” (Gallagher, Nelson, 2003: 23). Figuratively, it could be stated that humans have an inborn, invariable set of archetypes (i.e. universal archaic images comprising collective unconscious, Юнг, 1996) as a „heritage” from Pleistocene times (?!), but their specific „faces”, manifestations have been shaped by a particular culture / subculture, by local collective imaginations. Like it was already stated above these imaginations could be strong enough to create a convincing perceptual world (*psychotope*) emboldened (in Western culture) with sophisticated technologies (*biotope*) thus generating an impression modern humans are intellectually independent from their biological roots – however existing cultural imagination veneer cannot completely hide powerful biological driving forces of our behavior, like domination urge, sexuality (in fact, contemporary Western culture is facing overall its sexualisation), xenophobia and like. Nevertheless, it does not mean that “unveiling” would necessarily reveal “initial, unspoiled human soul”: like, e.g., famous anthropologist C. Geertz emphasizes only few anthropologists still believe that universal truths about humans could be gained through “coming back” to roots, i.e. through research on “so-called primitive tribes uncorrupted by modern culture” (from J. Horgan's interview with C. Geertz, see Horgan, 1998: 156). Besides, even in primitive societies cultural imaginations appear to be powerful enough „to rule out biological determination of (e.g.) gender roles” (Shepard, 2010: 274).

Intellectual attacks on EP, sometimes full with even „implacable hostility” as R. Dawkins pointed (Geher, 2006) are caused not only by rational, purely academic opposition but also by ethical considerations: EP has been blamed for supporting natural fallacy, in other words, for justifying Id-rooted (i.e. „biologically driven” according to S. Freud's terminology) behavior being judged in contemporary society as immoral, even cynical – like rape and other violence (or just women voluntary involvement in relationships of convenience, see, e.g., Pollet, Nettle, 2009); moreover, EP sometimes has been painted as a sexist, racist, and even eugenicist doctrine (Geher, 2006). Actually, the situation is quite opposite: EP research is trying to state „what is” not „what

ought to be”, declaring that deeper understanding of, e.g., causes of rape would facilitate its prevention (McKibbin et al., 2008); in fact, one can say that evolutionary psychologists try to perform an honest, culture-values free observation of modern human mental life. However, performing such an accurate observation is, according to G.B.Shaw’s famous dictum (Caldwell, 2007: 15) often called a cynicism; more generally, all the postmodern way of social interpretations suffers from such an attitude. Besides, although „heretical” paradigmatic idea about „just” adaptivity related roots of human complicated mental life (including our value systems, religious beliefs, etc.) can inflame rebellious postmodern imagination (shock as a postmodern value!), it is quite uncomfortable for our belief in human superiority over other life forms, for belief in our free will, in our powerful mind being independent of biological roots (the latter could be symbolically reflected in the following S.Hoking’s quote „We are just an advanced breed of monkey on a minor planet of a very average star. But we can understand the Universe. That makes us something very special”; Susskind, 2008: 433), in a God caring on us, etc. The mentioned EP core idea is, self-evidently, unacceptable for theologians as well: as it has been emotionally stated, e.g., by South African researcher C.Joubert (2012: 244), „EP explanations are not only banal or ludicrous, but inherently dangerous to our self-understanding and our lives together in society”.

Nevertheless, present article is not targeted to discuss all the controversies and misunderstandings within the field – an emphasis has been put on pragmatic applications of EP recognitions, first of all, on utilization of EP paradigm as a methodological tool to deal with public environmental & health consciousness issues as an important environmental health dimension. In fact, EP *per se* is, according to adapted quote from S. Pinker (2002), not a theory, but an approach, a particular way of applying evolutionary idea to the mind. Such an approach, a thinking perspective could be used for interpretations despite of many empirically unproved academic recognitions and in spite of even paradigmatic objections – the guiding criteria for judgment is practical expedience (thus, for example, academically controversially interpreted „savanna principle” should be accepted if it appears to be favorable for design of psychologically comfortable environment). Such a statement, seemingly „heretical” at first glance, correctly reflects postmodern relativistic position that accepting of knowledge depends not on its correspondence with ultimate / deep reality (which, anyway, is cognitively inaccessible at its very roots; discussions see, e.g., Balklavs-Grīnhofs, 2008) but on its practical usefulness (Oberst, Stewart, 2003); this idea has been broadly supported also by contemporary fundamental science’s, first of all, quantum physics’ recognitions; in brief, its essence could be reflected symbolically by a N.Bohr’s remark from A.Einstein’s and N.Bohr’s famous public debate about quantum mechanics: „the wave function doesn't describe a “real” micro-world but only “knowledge” that is useful for making predictions” (Hawking, Penrose, 1996: 134; there is a long list of sources about quantum thinking’s implications on development of psychology, see, e.g., Bohm, 1980; Busemeyer, Bruza, 2012; Mensky et al., 2011; Penrose et al., 2011; Wilson, 1990; besides, it is important to emphasize that these quantum thinking capabilities doesn’t necessarily depend on person’s professional expertise in quantum physics *per se*, see, e.g., Capra, 1975). In a such pragmatic perspective even false information rooted phenomena like placebo, induced near-to-death experiences, suppression of unwanted memories and like

become valuable, adaptive. Freudian psychoanalysis can serve as an impressive encouraging example of contradictorily judged psychology school's (characterized sometimes even as pseudoscience, Hines, 2003) profound inspiring impact on all the Western culture, and on contemporary psychology in particular (more in details see, e.g., Reņģe, 2008); moreover, exactly the controversy of the field, being even emotionally discussed could serve as an inspirational source.

EP as a way of thinking stimulates, among others, an anti-ethnocentric world-perception (since the same stone-age brains are in the heads of all the humans on Earth, see above) which favors pragmatically important findings through bias-free acquiring of non-Western cultural mileage (e.g., aboriginal ecotechnologies, folk medicine and psychotherapy, local worldviews for modern physics enhancement, ecocentric philosophies encouraging pro-environmental behavior, see, e.g., Capra, 1975; Kangas, 2004) and even animal behavior related experience. Cultures which closely co-exist with animal world have protractedly applied healing experience gained through observation of animal self-medication (moreover, it has been even believed that traditional medicine *per se* is not human invention at all, see Huffman, 2001) – an experience which has been forgotten at great extent within a contemporary Western urban culture. Nevertheless, formerly prejudicially perceived reports on animal self-medication (zoopharmacognosy) are receiving now more researchers' attention, its efficiency has been supported by more and more scientific evidences (Huffman, 2001; Huffman, Vitazkova, 2006; Krief et al., 2005; Villalba, Provenza, 2007). One of the most striking examples on animal self-medication research is related to African great apes – thus, observations on chimpanzees consuming bitter leaves of *Vernonia amygdalina* (Delile) and on neighboring traditional medicine practitioners who also use this plant led to phytochemical studies which proved *Vernonia*'s numerous therapeutic properties (Huffman, Vitazkova, 2006; Ijeh, Ejike, 2011; see also a list of relevant references included in the latter source). Such an expanding zoopharmacognostic research represents itself a manifestation of a rapidly developing field of nature studies with a wide range of practical applications – a biomimicry, a way of thinking which core idea is learning from organisms and ecosystems instead of doing research to intensify resource extraction from them (Benyus, 2002). As regards to learning from our pre-historic ancestors as a particular object of interest for EP a remarkable biomimicry example could be represented by S. Ilardi's developed therapy which mimics ancient hunter-gatherer societies' lifestyle including so called paleo-diet, outdoor activities, physical exercises, direct social communications instead of virtual ones, etc. (Ilardi, 2009). However, EP interpretations should not restrict themselves within hominid taxons – thus, odours' powerful influence on humans, often at subliminal level (a trait pragmatically used in aromatherapy, sexual manipulation, consumer behavior controlling, etc.) could be explained (in accordance with EP thinking) through peculiarities of mammal brain evolution: initially brain enlargement was related at great extent to olfactory functions enhancement (Rowe et al., 2011), however the further evolution process (in primates, and especially in humans) included decrease of smell sense capabilities (Gilad et al., 2003, quoted in Kaas, 2013) – but still, olfaction remains as an imprint left in a background (subdued e.g. by vision), as a sense with a truly „magic power” – just like our rigid pre-historic adaptations.

An anti-biased, anti-ethnocentric perception described could be particularly fruitful for development of innovation, with a precaution, though, that valuable experience owned by, e.g., so called primitive cultures (including hypothetic experience possessed by our pre-historic ancestors) is spoiled by a lot of superstitions. Thus, *Vernonia* related ethnic knowledge described above could be contrasted, e.g., by widespread European folk superstitious belief about snake's forked tongue as a biting organ, about owls and bats as evil nocturnal creatures, about European nightjars's *Caprimulgus europaeus* (L.) habit to milk domestic animals (in, e.g., German and Russian languages these birds are even called "goat milkers" – Ziegenmelker and Козодой accordingly), about grass snake *Natrix natrix* (L.) as a cow milker, etc. Mix of superstitions and reliable information could be found also in recent information technologies dominated communities, and, just like in a case with rural cultural knowledge there is a need to "separate the wheat from the chaff" instead of complete *a priori* denial or dogmatic acceptance: both biased mechanistic science adepts and fanatic believers in pyramidology, UFOs, astrology, cryptozoology (like bigfoots), etc. should be judged as close-minded persons.

Philosophical reconsidering of human nature through anti-ethnocentrically oriented EP inspirations doesn't mean necessarily a threat to anthropocentric and / or Christian religious beliefs (see also discussion above). Thus, even human superiority feelings seemingly hurt by neuroscience findings that our free will could be just an illusion, just a fictional construction (as S.Pinker would say; see Libet et al., 1999) could, vice versa, promote imaginations about deep, hidden, perceptually inaccessible, "flavored with mysticism" reality (e.g., Kant's noumenon) behind the "mundane" mechanistic science's offered world (figuratively, as, according to the Bible, God said, "You cannot see My face, for no man can see Me and live!", Online Parallel Bible, 2004-2013). Mentioned recognition about neuroscience research impact on free will idea interpretation could be demonstrated, e.g., through findings about brain direct stimulations targeted to cause particular body movement: these stimulations do not always simply result in reflexive unconscious activities (like, say, in a case of popular patellar reflex) – instead, motor responses have been preceded in these experiments by experience of relevant conscious wish, i.e. people were certain they did the movement in accordance with their free will; descriptions of related neurobiology experiments see, e.g., Brooks, 2008 (description of his personal experience); Haggard, 2011; Wegner, Wheatley, 1999; nevertheless, the free will research field still appears to be controversially interpreted, see, e.g., Batthyany, 2009; Klemm, 2010.

Pragmatically, as an EP's core idea of particular importance should be recognized biophilia conception which actually represents itself a paradigm shift in environmental health related designs. Term "biophilia" has been popularized by E.O.Wilson who describes it as our innately emotional affiliation towards nature („the connections that human beings subconsciously seek with the rest of life", Wilson, 1992: 350), emphasizing that „expressions „biophilia" and „biophilia hypothesis" will serve well if they do no more than call attention to psychological phenomena that rose from deep human history, that stemmed from interaction with the natural environment" (Wilson, 1993: 40). Although essentially simple, biophilia idea appeared to be inspiring, conceptually powerful enough – just like EP perspective *per se* – to be widely used for environmental psychology and health related interpretations and designs (see, e.g.,

Heerwagen, 2009; Kellert et al, 2008; Ulrich, 1993; Windhager et al, 2011); concept's successful application has been supported by appropriate empirical evidences (Ulrich, 1993; Van den Berga et al., 2003). Thus, Ulrich's research (1984) found that hospital patients had faster post-surgery recovery if their rooms had outdoor views of trees instead of view on a brick wall (example of biophilia's psychosomatic effect); Heerwagen and Orians (see Heerwagen, 2009) study revealed that employers in windowless offices used two times more nature posters and photos to decorate their rooms than people who had visual access to nature scenery outdoors; several studies emphasized indoor presence of nature elements favorable impact on people cognitive performance, probably through impacts on emotions (Sacharin, 2009; Ulrich, 1993), well-known are environmental consciousness and health benefits gained by animal-assisted therapy, despite the field has received critics on inconsistent research methodology (Palley et al., 2010) – these are just some examples to demonstrate biophilia paradigm in action. Biophilia effects discussed are related first of all to aesthetic emotions which, according to EP approach, have been recognized as an evolved adaptive trait (classic example is represented by human aesthetic preference predominantly towards safe and productive habitats) – just like biophobia related aesthetic emotions, e.g., disgust towards spiders, disease-causing parasites, feces, rotting food, visible signs of infection, etc. (Dutton, 2003; Orians, 2001). Nevertheless, not always „beauty is a truth”: aesthetic signals could be deceptive both in human world (the multi-billion dollars beauty industry could serve as an example) and among animals; an example of the latter: stickleback *Gasterosteus aculeatus* (L.) males in poor health condition own larger patch of red abdominal areas (mating color) than males in ordinary condition and, accordingly, could be more successful in attracting female (Candolin, 1999, quoted in Skamel, 2003: 182). Besides, cultural overprint has influenced beauty perception of urban dwellers resulting in increasing numbers of „biophobics” (Kellert, 1997, quoted in Sampson, 2011) and even developing so called „cult of ugliness” (Porteous, 1996). Symbolically, when governor W. Bradford stepped off the „Mayflower” and first saw untamed American forests, he judged them as „a hideous and desolate wilderness”, as „the enemy of civilized life” (Porteous, 1996: 77).

In order to perform conscious, controlled use of biophilia conception instead of its intuitive apply it would be a real challenge to crack the aesthetic codes within biophilia archetype which “would give some kind of magical solution to any design problem” (Mazzi, 2010). An example of such a probable code is well-know golden ratio (called also golden mean, divine section, etc.): golden ratio based proportions can be widely find in nature and in human designs (discussions see, e.g., Livio, 2002; Olsen, 2006), and there are even claims (unproven ones, though, see Livio, 2002) it plays a crucial role in human aesthetic perception, i.e. golden ratio represents itself a proportion with an in-built universal beauty (Pipes, 2008) and even “magical” properties; belief in the latter manifests itself, e.g., in sacral geometry, in ritual magic, in practical pyramidology (i.e. golden proportion pyramid models being used for healing, food preservation, energy generation, etc. purposes). Pyramidology / „pyramid power” idea has been spoiled with a lot of unbelievable, fairytale-like claims (e.g., pyramids as tools for time-travelling) and is recognized as being pseudoscientific (see discussion in, e.g., Nickell, 2004); at the same time, pyramid therapy has been broadly used, e.g., in Cuban traditional medicine which is tightly integrated within official health care system (with pyramid healing included in medical education) in Cuba

(Dresang et al., 2005; Kadetz, Delgado, 2010; Traditional Medicine..., 2007) representing thus a remarkable demonstration of anti-biased attitude towards unconventional healing experience (see above discussion on biomimicry). Also author's preliminary experiments (May-September 2013) supports golden ratio pyramids influence on biological processes like vegetable (tomato) and milk biodegradation rate, salad *Lactuca sativa L.* seed germination rate, stopping spasms in the patient's extremities (cause not revealed) and osteochondrosis patient's hip mobility improvement (temporary, for about 2 months; improvement starts immediately after 1 hour lasting exposure); indisputably though, the latter could be caused also by placebo effect like in a case of, e.g., sham surgery, see Kirkley et al., 2008; Moseley et al., 2002.

Pragmatically important manifestation of biophilia paradigm is represented by so called „savanna principle / hypotheses” which states that since human mind have been evolved as an adaptive response to stable features of their ancestral environment (called “environment of evolutionary adaptedness”, or EEA), namely, African Pleistocene savanna, this long ancient savanna dwelling history should have left an imprint on our minds (Heerwagen, 2003; Kanazawa, 2004; Bolhuis et al., 2011); accordingly, modern human brain is, quoting S.Kanazawa (2004, 2010), unconsciously biased to view the environment as if it would still be the ancestral one and even having difficulties to emotionally comprehend entities that did not exist in EEA. Corresponding to Savanna hypotheses, humans should aesthetically prefer environments with key properties specific for savanna ecosystems (not mandatory savannas themselves), first of all (according to J.Appleton's prospect-refuge theory), with a high prospect combined with a high refuge – open grassland, clustered trees with spreading canopies, i.e. an environment with opportunities “to see without being seen” (Orians, Heerwagen, 1992). There are certain empirical evidences supporting aesthetic preferences for savanna-type environments (see review on, e.g., Orians, Heerwagen, 1992; Hunziker et al., 2007), and savanna “mimics” (Heerwagen, 2003) are included in environmental psychology designs, e.g., in visual advertisings to stimulate consumers' favorable emotional associations, in parks all around the world, in a leisure environment (golf courses, hotels, camping pitches) to enhance their attractiveness for consumers, in a structure of interior designs, etc.

Nevertheless, it would be an academic and pragmatic methodological oversimplification to claim that prospect-refuge theory, despite of its conceptual power, would represent itself the only principle to ensure attractiveness of environmental design in a particular real life situation – J.Appleton's idea should be enhanced with, e.g., Kaplans' information processing theory (Kaplan, Kaplan, 1989), emphasizing environmental information's role in habitat's psychological appreciation (e.g., perceived mystery as Kaplans' model's element of landscape attraction which could be evolutionary explained through adaptive function of curiosity as a drive to seek for a new information beneficial for acquiring of environmental resources, see Kaplan, Kaplan, 1989), with A.Maslow's frameworking conception of hierarchy of needs, with an idea of culturally shared imagination being powerful enough to shape even our sensory / “physical” perception (see, e.g., Pearson et al., 2008, 2011), with psychological typologies reflecting individual specificities of mental / behavioral responses (like ERI testing of McKechnie, 1970, or value types of Schwartz, 1992, 2009), etc.

In order to ensure holistic, integrative application of biophilia and other EP approach related ideas for designs, an ecotechnological / ecological engineering perspective appeared to be fruitful. Ecological engineering defined as “the design of sustainable ecosystems that integrate human society with its natural environment for the benefit of both” (Mitsch, 2012: 5) in practice represents itself a cost-effective and, at the same time, environmentally sound ecosystem design (which includes both creation and just manipulation of ecosystems) used for wastewater treatment, food production, nature protection, pest management, tourism environment development, cultural environment restoration, therapeutic environment creation, sustainable behavior facilitation (favoring relevant lifestyles and identity feelings through ecotechnological designs` psychological impact), etc. needs (Kangas, 2004; Jūrmalietis, 2009); frugality should be recognized as a core methodological principle with a spectrum of subdued, mutually interrelated principles like self-design, multifunctionality and complementarity (including integration of health biopsychosocial model – ecotechnology designs are targeted on all the three health dimensions), biodiversity enhancement, waste recycling, etc.

Psychological aspects should be considered as being particularly important for ecotechnological developments, they reveal themselves, e.g., through **1)** complementarity of aesthetic and ecologic properties of designs (e.g., ecotone zone as J.Appleton`s prospect-refuge conception related design; see also examples in Jūrmalietis, 2010); **2)** promoting therapeutically and ethically / spiritually important Zen-like mental integration (see also below) within the natural environment (re-sacralization of nature) as a necessary prerequisite for ecotechnology related lifestyle development; **3)** aesthetical inspiration / creativity as a prerequisite for succesful research and design (like H.D.Thoreau emphasized „The true man of science will know nature better by his finer organization; he will smell, taste, see, hear, feel better than other man. His will be a deeper and finer experience. We do not learn by inference and deduction and the application of mathematics to philosophy, but by direct intercourse and sympathy”, quoted in Walls, 1995: 41); **4)** recognizing ecotechnological approach as a part of cultural heritage (e.g., European traditional rural gardening practice enhanced by appropriate mythology) stimulating / reviving thus interest towards traditional ecotechnology related sustainable lifestyle and know-how (historical roots of ecotechnological practice have been find, e.g., in ancient China; this experience is helpful for recent developments, see Jingsong et al, 1998; Kangas, 2004); **5)** recognizing psychological factor`s important role in biotic interrelationships (also animal-assisted therapy, see above), for survival of organisms, and even for quality of animal world products (quality of milk, eggs, meat, etc., see, e.g., Terlouw, Rybarczyk, 2008).

Flowforms can serve as an demonstrative example for emotional experience enhanced biomimicry constructions as elements integrated within ecotechnological design. Flowform represents itself a set of opened vessels arranged in a cascade, through which water flows to a pool / ecotechnological wetland; these bowls are shaped / sculptured to coax water into vortices (thus imitating mountain stream) instead of flowing along the axis like in a channel (Taylor, 2006). Such a cascade design possess simultaneously ecologic (like water mixing and oxygenation, indoor air quality improvement) and psycho-therapeutic (because of aesthetics of stream`s audial and visual properties which could enlive larger environments) functions.

Flowforms have been used within a wide spectrum of environmental designs related to agriculture, horticulture, aquaculture, wastewater treatment, public parks, zoos, indoor environment, etc. Nevertheless, flowform development is not just a mechanistic copying of Nature's selected features – instead, research is targeted to reveal hidden archetypes, basic principles, „cracking codes”. John Wilkes, a main inventor of flowform design, and his collaborator used decades for insights and for development of a wide variety of flowform designs (Schwuchow et al., 2010) – actually, their efforts could be recognized as a kind of biophilic meditation, as a creative aesthetic insight, as a Zen-like constasy (i.e. mystical-aesthetic experience related to everyday world, particularly to humble phenomena – „ordinary things shining from within”; accordingly, constasy contrasts with enstasy and extasy, see Померанц, 1989; this attitude has been expressed by Zen master Bankei Yotaku: „My miracle is that when I feel hungry I eat, and when I feel thirsty I drink”, see Repts, Senzaki, 1998: 91); flowform designs are emotionally saturated with ideas like flowforms are imitating heart rhythms, like flowforms represent themselves the way water wish to move, etc.

3. Conclusions

Despite of EP's interpretative capacities described and its growing impact on development of different disciplines, certain fields (like business sciences, including marketing and advertisement, organizational cooperation) still use EP principles often in a simplistic, fragmented, intuitive manner (see, e.g., Miller, 2009; Saad, 2011); some schools of environmental management ignore them at all or use just selected recognitions without references to the paradigm or relevant conceptual models (see, e.g., Kļaviņš et al., 2008; Rīgas pilsētas..., 2009); also health psychology is limited in EP paradigmatic approach enhancements (see, e.g., Tybur, 2012), etc. Consequently, the following concluding recognitions on EP approach's pragmatic potentials should be stated:

- “Fixed human biological nature” as EP's paradigmatic concept hides within powerful driving forces / archetypes which do influence (or even determine, often subconsciously) our mind processes and behavioral choices – accordingly, EP approach is particularly fruitful for environmental health enhancements, including sustainable education, therapy, environmental design, etc. related developments;
- EP perspective should be applied systemically (models instead of separate recognitions, ecotechnological integrative perspective used), for a wide spectrum of environmental health and performance supporting designs related to landscape planning and urban planning, environmental advertisements and consumer behavior management, outdoor micro-environmental designs (like nature trails, gardens), indoor designs in hospitals, supermarkets, offices, etc.;
- EP developments should be implemented in an interdisciplinary and complementary manner, i.e. through cognitive collaboration with biomimicry experience, ecotechnology / ecological engineering, health science, environmental psychology, anthropology, quantum physics (e.g. as inspirational source), postmodern philosophy and even with such seemingly pseudoscience related topics like “embodied mathematics” (e.g., golden

section, fractals), etc., thus enhancing EP application spectrum, and avoiding one-sided, biased EP interpretations;

- EP approach, through emphasizing shared mental traits for both primitive and „developed”/„civilized” human cultures / subcultures, stimulates an anti-biased / anti-ethnocentric perception, paradigmatic openness towards different cultural and even animal behavior related experience;
- Biophilia perspective as one of EP`s core concepts should be applied as a guiding principle to interpret psychological / aesthetic relevance of biopsychosocial health enhancement targeted designs as well as to favour / inspire biomimicry based research.

Bibliography

Baikovs, G., 2012. Vecās Derības kanons [a] (Old Testament canon, in Latvian), in: Bībele kā Liecība: Uzticama, Pārbaudāma, Saprotama (Bible as A Testimony: Reliable, Verifiable, Comprehensible), chapter 5 (draft version). Online: <http://gudribassakums.lv/2012/07/27/bibele-ka-lieciba-uzticama-parbaudama-saprotama/> [Accessed 14.10. 2013].

Balklavs-Grīnhofs, A., 2008. Mūsdienu zinātne un Dievs (Contemporary Science and God, in Latvian). LU Akadēmiskais apgāds.

Barrett, D., 2010. Supernormal Stimuli: How Primal Urges Overran Their Evolutionary Purpose. W. W. Norton & Company.

Batthyany, A., 2009. Mental causation and free will after Libet and Soon: reclaiming conscious agency, in: Batthyany, A. & Elitzur, A. (eds.), Irreducibly Conscious. Selected Papers on Consciousness. Winter, 28 pp. Online: <http://consc.net/online/5.4a.2> [Accessed 11.01.2013].

Benyus, J.M., 2002. Biomimicry: Innovation Inspired by Nature. William Morrow.

Bohm, D., 1980. Wholeness and the Implicate Order. Routledge.

Bolhuis, J.J., Brown, G.R., Richardson, R.C., Laland, K.N., 2011. Darwin in mind: new opportunities for evolutionary psychology. PLoS Biol 9 (7), 8 pp. Online: www.plosbiology.org [Accessed 23.03.2012].

Brooks, M., 2008. 13 Things that Don't Make Sense: The Most Baffling Scientific Mysteries of Our Time. Doubleday (from Latvian Translation in 2011).

Buller, D.J., 2005. Adapting Minds: Evolutionary Psychology and the Persistent Quest for Human Nature. MIT Press.

Busemeyer, J. R., Bruza, P. D., 2012. Quantum Models of Cognition and Decision. Cambridge.

Buss, D.M., 1995. Evolutionary psychology: a new paradigm for psychological science. Psychological Inquiry 6 (1), 1-30.

Buss, D.M., 2000. *The Dangerous Passion: Why Jealousy Is as Necessary as Love and Sex*. The Free Press (Simon & Schuster).

Caldwell, L.K., 1996. *International Environmental Policy: From the 20th Century to the 21st Century*. Duke University Press.

Caldwell, W.W., 2007. *Cynicism and the Evolution of the American Dream*. Potomac Books.

Capra, F., 1975. *The Tao of Physics: An Exploration of the Parallels between Modern Physics and Eastern Mysticism*. Shambhala Publications.

Capra, F.A., 1992. Systems view of the world. *Resurgence* 151, 34-37.

Chippaux, J.-Ph., 2011. Estimate of the burden of snakebites in sub-Saharan Africa: a meta-analytic approach. *Toxicon* 57 (4), 586-599.

Confer, J. C., Easton, J. A., Fleischman, D. S., Goetz, C. D., Lewis, D. M., Perilloux, C., Buss, D. M., 2010. Evolutionary psychology: controversies, questions, prospects, and limitations. *American Psychologist* 65 (2), 110–126.

Cornelius, R.R., 2000. Theoretical approaches to emotion. ISCA Tutorial and Research Workshop on Speech and Emotion (Newcastle, Northern Ireland, September 5-7, 2000), 3-10. Online: <http://www.cs.columbia.edu/~julia/papers/cornelius00.pdf> [Accessed 09.10.2013].

Cosmides, L., Tooby, J., 2000. Evolutionary psychology and emotions, in: Lewis, M., Haviland-Jones, J. M. (Eds.), *Handbook of Emotions* (2nd Ed.), Chapter 7. Guilford, New York, pp. 91-115.

Crabtree, A., 1992. Dissociation and memory: a 200 year perspective. *Dissociation*, V(3), 150-154.

Daws, A.G., Boyd, C.P., 2005. Evolution and the study of human behaviour: a primer for the scientist—practitioner. *Behaviour Change* 22 (02), 114-121.

Dresang, L.T., Brebrick, L., Murray, D., Shallue, A., Sullivan-Vedder, L., 2005. Family medicine in Cuba: community-oriented primary care and complementary and alternative medicine. *J Am Board Fam Med* 18 (4), 297-303.

Durrant, R., Ellis, B.J., 2013. Evolutionary psychology, in: Nelson, R.J. & Mizumori, S.J.Y. (eds.), *Handbook of Psychology* (2 nd ed.), Vol. 3: Behavioral Neuroscience. John Wiley & Sons, pp.26-52

Dutton, D., 2003. Aesthetics and evolutionary psychology, in: *The Oxford Handbook for Aesthetics*. Oxford University Press. Online: http://www.denisdutton.com/aesthetics_&_evolutionary_psychology.htm [Accessed 06.10.2013].

Easton, J.A., Schipper, L.D., Shackelford, T.K., 2007. Morbid jealousy from an evolutionary psychological perspective. *Evolution and Human Behavior* 28, 399–402.

Engel, G.L., 1977. The need for a new medical model: a challenge for biomedicine. *Science, New Series* 196 (4286), 129-136.

Entem, A., 2007. Do environmental attitudes predict organic purchasing and environmental organization involvement? *SS-AAEA Journal of Agricultural Economics*. 23 pp. Online: <http://ageconsearch.umn.edu/bitstream/113244/2/Paper8.pdf> [Accessed 01.11.2012].

Evans, D., Zarate, O., 2005. *Introducing Evolutionary Psychology*, second ed. Icon Books Ltd.

Falk, J.H., Balling, J.D., 2010. Evolutionary influence on human landscape preference. *Environment and Behavior* 42(4), 479–493.

Fitzgerald, C.J., 2010. Examining the acceptance of and resistance to evolutionary psychology. *Evolutionary Psychology* 8(2), 284-296.

Gallagher, M., Nelson, R.J., 2003 (Eds.). *Biological psychology*. Volume 3, in: Weiner, I.B. (Editor-in-Chief), *Handbook of Psychology*. J.Wiley & Sons, New York, 756 pp.

Geher, G., 2006. Evolutionary psychology is not evil! (... and here's why ...). *Psychological Topics* 15 (2), 181-202.

Gerdes, A.B.M., Uhl, G., Alpers, G.W., 2009. Spiders are special: fear and disgust evoked by pictures of arthropods. *Evolution and Human Behavior* 30, 66-73.

Gifford, R., 2002. *Environmental Psychology: Principles and Practice*, third ed. Optimal Books.

Haggard, P., 2011. Decision time for free will. *Neuron* 69, 404-406.

Hawking, S., Penrose, R., 1996. *The Nature of Space and Time* (13 th printing, with a new afterward by the authors, 2010). Princeton University Press.

Heerwagen, J.H., 2003. Bio-inspired design: what can we learn from nature. *BioInspire* 1, 9 pp.

Heerwagen, J., 2009. Biophilia, health, and well-being, in: Campbell, L.K. & Wiesen, A. (Eds), *Restorative Commons: Creating Health and Well-Being Through Urban Landscapes*. Gen. Tech. Rep. NRS-P-39. Newtown Square, PA : U.S. Department of Agriculture, Forest Service, Northern Research Station, pp. 38-57.

Hines, T., 2003. *Pseudoscience and the Paranormal*. Prometheus Books.

Holcomb III, H.R., 2005. Buller does to evolutionary psychology what Kitcher did to sociobiology. *Evolutionary Psychology* 3, 392-401.

Horgan, J., 1998. *The End of Science: Facing the Limits of Knowledge in the Twilight of the Scientific Age*. Abacus.

Huffman, M.A., 2001. Self-medicative behavior in the African great apes: an evolutionary perspective into the origins of human traditional medicine. *BioScience* 51, 51 (8), 11 pp.

Huffman, M.A., Vitazkova, S.K., 2006. Primates, plants, and parasites: the evolution of animal self-medication and ethnomedicine, in: Elisabetsky, E., Etkin, N.L. (eds.), *Ethnopharmacology*, vol. II. UNESCO, Eolss Publishers, Oxford (e-book in the e-library at <http://www.eolss.net>).

Hunziker, M., Buchecker, M., Hartig, T., 2007. Space and place – two aspects of the human-landscape relationship, in: Kienast, F., Wildi, O. & Ghosh, S. (eds.), *A Changing World: Challenges for Landscape Research*. Springer, pp. 47-62.

Ijeh, I.I., Ejike, C.E.C.C., 2011. Current perspectives on the medicinal potentials of *Vernonia amygdalina* Del. *Journal of Medicinal Plants Research* 5(7), 1051-1061.

Ilardi, S.S., 2009. *The Depression Cure: The 6-Step Program to Beat Depression without Drugs*. Da Capo Lifelong Books.

Jingsong, Y., Rusong, W., Maizen, W., 1998. The fundamental principles and ecotechniques of wastewater aquaculture. *Ecological Engineering* 10 (2), 191-208.

Joubert, C., 2012. Evolutionary psychology: why it fails as a science and is dangerous. *Answers Research Journal* 5, 231–246.

Jūrmalietis, R., 2009. Ecotechnology as a sustainability methodology, in: Proc. of 3rd International Conference „Environmental Science and Education in Latvia and Europe” (October 23, 2009). RTU, Riga, pp. 43-45.

Jūrmalietis, R., 2010. Dzenbudisms un ekotehnoloģija: metodoloģiskā komplementaritāte postmodernajā vidē (Zen-Buddhism and ecotechnology: methodological complementarity within a postmodern environment, in Latvian), in: 9. starptautiskās zinātniski metodiskās konferences „Cilvēks un vide” rakstu krājums. Liepājas Universitāte, pp. 28-38.

Jung K.G.: Юнг, К.Г., 1996. *Человек и его символы* (Man and His Symbols, in Russian). Б.С.К., Санкт-Петербург.

Kaas, J.H., 2013. The evolution of brains from early mammals to humans. *WIREs Cogn Sci* 4, 33–45.

Kadetz, P., Delgado, J.P., 2010. Slaves, revolutions, embargoes, and needles: the political economy of acupuncture in Cuba. *Asian Medicine* 6, 95-122.

Kanazawa, S., 2004. The Savanna principle. *Managerial and Decision Economics* 25, 41-54.

Kanazawa, S., 2010. The Savanna principle: what the human brain can and cannot comprehend, and why. *Psychology Today*. Online: <http://www.psychologytoday.com/blog/the-scientific-fundamentalist/201002/the-savanna-principle> [Accessed 05.04.2012].

Kangas, P. 2004. *Ecological Engineering: Principles and Practices*. CRC Press.

- Kaplan, R., Kaplan, S., 1989. *The Experience of Nature: A Psychological Perspective*. Cambridge University Press.
- Kellert, S.R., Heerwagen, J., Mador, M., 2008. *Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life*. Wiley, New York.
- Kirkley, A., Birmingham, T.B., Litchfield, R.B., Giffin, J.R., Willits, K.R., Wong, C.J., Feagan, B.G., Donner, A., Griffin, S.H., D'Ascanio, L.M., Pope, J.E., Fowler, P.J., 2008. A randomized trial of arthroscopic surgery for osteoarthritis of the knee. *N Engl J Med* 359, 1097-1107.
- Kļaviņš, M. (ed.), Nikodemuss, O., Segliņš, V., Melecis, V., Virčavs, M., Āboliņa K., 2008. *Vides zinātne (Environmental Science, in Latvian)*. LU Akadēmiskais apgāds, Rīga.
- Klemens, M.W., Thorbjarnarson, J.B., 1995. Reptiles as a food resource. *Biodiversity & Conservation* 4 (3), 281-298.
- Klemm, R., 2010. Free will debates: simple experiments are not so simple. *Advances in Cognitive Psychology* 6, 47-65.
- Kollmuss, A., Ageyman, J., 2002. Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research* 8 (3), 239-260.
- Krief, S., Hladik, C.M., Haxaire, C., 2005. Ethnomedicinal and bioactive properties of plants ingested by wild chimpanzees in Uganda. *Journal of Ethnopharmacology* 101, 1-15.
- Kurzban, R., 2002. Alas poor evolutionary psychology: unfairly accused, unjustly condemned. *The Human Nature Review* 2, 99-109. Online: <http://human-nature.com/nibbs/02/apd.html> [Accessed 05.08.2012].
- Laland, K.N., Brown, G.R., 2006. Niche construction, human behavior, and the adaptive-lag hypothesis. *Evolutionary Anthropology* 15, 95-104.
- Lancet editorial: sustainable development for health: Rio and beyond, 2012. *The Lancet* 379 (9832), p. 2117. Online: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(12\)60923-4/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)60923-4/fulltext) [Accessed 06.01.2013].
- Libet, B., Freeman, A., Sutherland, K. (eds.), 1999. *The Volitional Brain: Towards a Neuroscience of Free Will*. Imprint Academic.
- Liddle, J.R., Shackelford, T.K., 2009. Why evolutionary psychology is “true”. *Evolutionary Psychology* 7 (2), 288-294.
- Lien, K., Schlossberg, B., 2006. High probability trading setups for the currency market. Investopedia Inc.
- Livio, M., 2002. *The Golden Ratio: The Story of Phi, The World's Most Astonishing Number*. Broadway Books, New York.

Manica, A., Amos, W., Balloux, F., Hanihara, T., 2007. The effect of ancient population bottlenecks on human phenotypic variation. *Nature* 448 (7151), 346–348.

Mazzi A., 2010. Biophilic Design: More Than a Distraction. Online: <http://thepatronsaintofarchitecture.blogspot.com/>). [Accessed 12.10.2013].

McKechnie, G.E., 1970. Measuring environmental dispositions with the environmental response inventory, in: Archea, J., Eastman, C. (eds.), EDRA 2: Proceedings of the 2nd Annual Environmental Design Research Association Conference. Carnegie-Mellon University, Pittsburgh, pp. 320-326.

McKibbin, W.F., Shackelford, T.K., Goetz, A.T., Starratt V.G., 2008. Why do men rape? An evolutionary psychological perspective. *Review of General Psychology* 12 (1), 86 –97.

Mensky, M., Barušs, I., Kafatos, M., Neuman, Y., Schäfer, L., Kak, S., Stapp, H., Kuttner, F. Raman, V., Rosenblum, B., 2011. Quantum Physics of Consciousness. Cosmology Science Publishers

Miller G., 2009. Spent: Sex, Evolution and the Secrets of Consumerism. William Heinemann.

Mitsch, W.J., 2012. What is ecological engineering. *Ecological Engineering* 45, 5-12.

Monteleone, P., Piscitelli, F., Scognamiglio, P., Monteleone, A. M., Canestrelli, B., Di Marzo, V., Maj, M., 2012. Hedonic eating is associated with increased peripheral levels of ghrelin and the endocannabinoid 2-arachidonoyl-glycerol in healthy humans: a pilot study. *Journal of Clinical Endocrinology & Metabolism* 97 (6), 917-924.

Moseley, J.B., O'Malley, K., Petersen, N.J., Menke, T.J., Brody, B.A., Kuykendall, D.H., Hollingsworth, J.C., Ashton, C.M., Wray, N.P., 2002. A controlled trial of arthroscopic surgery for osteoarthritis of the knee. *N Engl J Med.* 347(2), 81-88.

Mozes A., 2012. Why you overeat even when you're full. *US News & World Report. Health.* Online: <http://health.usnews.com/health-news/news/articles/2012/05/03/why-you-overeat-even-when-youre-full> [Accessed 10.10.2013].

Nagas fancy eating snakes, rats, squirrels, dogs, cats, spiders!, 2011. *DNA (Daily News & Analysis)*, Oct 23. Online: http://www.dnaindia.com/lifestyle/report_nagas-fancy-eating-snakes-rats-squirrels-dogs-cats-spiders_1602237 [Accessed 23.05.2012].

Nesse, R.M. 1990. Evolutionary explanations of emotions. *Human Nature* 1 (3), 261-289.

Nickell, J., 2004. *The Mystery Chronicles: More Real-Life X-Files.* The University Press of Kentucky.

Oberst, U.E., Stewart, A.E., 2003. *Adlerian Psychotherapy: An Advanced Approach to Individual Psychology.* Bruner-Routledge.

Olsen, S., 2006. *The Golden Section: Nature's Greatest Secret.* Walker & Company, New York.

Online Parallel Bible, 2004-2013. Exodus 33:20. Online: <http://bible.cc/exodus/33-20.htm> [Accessed: 02.10.2013].

Orians, G.H., 2001. An evolutionary perspective on aesthetics. *Bull Psychol Arts* 2, 25-29.

Orians, G.H., Heerwagen, J.H., 1992. Evolved responses to landscapes, in: Barkow, J., Cosmides, L., Tooby, J. (Eds.), *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. Oxford University Press, New York, pp. 555-574.

Palley, L.S., O'Rourke, P.P., Niemi, S.M., 2010. Mainstreaming animal-assisted therapy. *ILAR Journal* 51 (3), 199-207.

Pearson, J., Clifford, C.W.C., Tong, F., 2008. The functional impact of mental imagery on conscious perception. *Current Biology* 2, 38 pp.

Pearson, J., Rademaker, R., Tong, F., 2011. Evaluating the mind's eye: the metacognition of visual imagery. *Psychological Science* 22, 1535-1542.

Penrose, R., Hameroff, S., Stapp, H.P., Chopra, D., 2011. *Consciousness and the Universe: Quantum Physics, Evolution, Brain & Mind*. Cosmology Science Publishers.

Perez, G.O., 2011. *Methodological Naturalism and Planetary Humanism: A Worldview for the 21st Century*. Xlibris Corporation.

Pinker, S., 2002. *Evolutionary Psychology and its Enemies: An Interview with Steven Pinker*. Online: <http://www.butterfliesandwheels.org/> [Accessed 13.04.2011].

Pinker, S., 2005. Foreword, in: Buss, D.M. (ed.), *The Handbook of Evolutionary Psychology*, John Wiley & Sons, pp. xi-xvi.

Pipes, A., 2008. *Foundations of Art and Design*, second edition. Laurence King.

Pollet, T.V., Nettle, D., 2009. Partner wealth predicts self-reported orgasm frequency in a sample of Chinese women. *Evolution and Human Behavior* 30 (2), 146-151.

Pomeranc G.: Померанц, Г., 1989. Парадоксы дзэн (Zen paradoxes, in Russian). *Наука и религия (Science and Religion)* 5, 38-43.

Porteous J.D., 1996. *Environmental Aesthetics: Ideas, Politics and Planning*. Routledge.

Rathje, W., Murphy, C., 2001. *Rubbish!: The Archaeology of Garbage*. University of Arizona Press.

Reņģe, V., 2008. Diskusijas par Freida mantojumu (Discussions about Freud's heritage, in Latvian). *Latvijas Universitātes raksti* 729, 53-69.

Reps, P., Senzaki, N. (eds.), 1998. *Zen Flesh, Zen Bones: A Collection of Zen and Pre-zen Writings*. Tuttle Publishing.

Richardson, R.C., 2010. *Evolutionary Psychology as Maladapted Psychology*. A Bradford Book.

Rīgas pilsētas ainavu teritoriju izdalīšana, analīze un novērtēšana: pārskats (Selection, analysis, and evaluation of Riga city landscape territories: an overview, in Latvian), 2009. Univ. of Latvia, Riga. Online: http://www.sus.lv/files/ainava_ataskaite_kopaa.pdf [Accessed 12.03.2012].

Rowe, T. B., Macrini, T. E., Luo, Z.-X., 2011. Fossil evidence on origin of the mammalian brain. *Science* 332 (6032), 955-957.

Russell, P., 1988. Psychological roots of the environmental crisis. *Man . . . Health . . . Environment: Closing Symposium of European Year of the Environment*. Luxembourg, March 1988. Online: <http://www.peterrussell.com/Speaker/Talks/Luxembourg.php> [Accessed 18.09.2013].

Saad, G., 2011. The missing link: the biological roots of the business sciences, in: Saad, G. (ed.), *Evolutionary Psychology in the Business Sciences*. Springer, Heidelberg, pp. 1-16.

Sacharin, V., 2009. *The Influence of Emotions on Cognitive Flexibility*. A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy (Psychology) in the University of Michigan. Online: http://deepblue.lib.umich.edu/bitstream/handle/2027.42/64652/vsachari_1.pdf;jsessionid=CF8DA3FF79FD079DDB452B95063A3351?sequence=1 [Accessed 14.09.2012].

Sampson, S.D., 2011. *Loving life. The Whirlpool of Life*. Online: http://scottsampson.blogspot.com/2011_02_01_archive.html [Accessed 04.10.2013].

Schwartz, S.H., 1992. Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries, in: M. Zanna (Ed.), *Advances in Experimental Social Psychology*, Vol. 25, Academic Press, New York, pp. 1-65.

Schwartz, S.H., 2009. Basic Human Values (paper is based on excerpts from publications, modified for the purposes of the Cross-National Comparison Seminar on the Quality and Comparability of Measures for Constructs in Comparative Research: Methods and Applications, Bolzano (Bozen), Italy, June 10-13, 2009. Online: http://www.ccsr.ac.uk/qmss/seminars/2009-06-10/documents/Shalom_Schwartz_1.pdf [Accessed 07.01.2012].

Schwuchow, J., Wilkes, A.J., Trousdell, I., 2010. *Energizing Water: Flowform Technology and the Power of Nature*. Rudolf Steiner Press.

Sell, A., Hagen, E.H., Cosmides, L., Tooby, J., 2005. Evolutionary psychology: applications and criticisms, in: Nadel, L. (ed.), *Encyclopedia of Cognitive Science*, Wiley, pp. 47-53.

Shepard, J.M., 2010. *Cengage Advantage Books: Sociology*, tenth edition. Wadsworth, Cengage Learning.

Skamel, U., 2003. Beauty and sex appeal: sexual selection of aesthetic preferences, in: Eckart Voland, Karl Grammer. *Evolutionary Aesthetics*. Springer, pp. 173-200.

Stineman, M.G., Streim, J.E., 2010. The biopsychological paradigm: a foundational theory for medicine. *PM&R* 2(11), 1035-1045.

Susskind, L., 2008. *The Black Hole War: My Battle With Stephen Hawking to Make the World Safe for Quantum Mechanics*. Little, Brown & Company.

Sustainable Consumption: Facts and Trends from A Business Perspective, 2008. World Business Council for Sustainable Development.

Taylor, D., 2006. *The Friends Cascades*. Australian National Botanic Gardens, Canberra. Online: <http://www.anbg.gov.au/gardens/visiting/exploring/public-art/friends-cascade/index.html> [Accessed 01.11.2013]

Terlouw, E.M.C., Rybarczyk, P., 2008. Explaining and predicting differences in meat quality through stress reactions at slaughter: the case of large White and Duroc pigs. *Meat Science* 79 (4): 795-805.

Traditional Medicine in Cuba, 2007. Online: <http://www.realcubaonline.com/traditional-medicine-in-cuba/> [Accessed 12.06.2013].

Tooby, J., Cosmides, L., 1992. The psychological foundations of culture, in: Barkow, J., Cosmides, L., Tooby, J. (Eds.), *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. OUP, New York:, pp 19–136.

Tybur, J.M., 2012. An evolutionary perspective on health psychology: new approaches and applications. *Evolutionary Psychology* 10(5), 855-867.

Ulrich, R.S., 1984. View through a window may influence recovery from surgery. *Science* 224 (4647), 420-421.

Ulrich, R. S. 1993. Biophilia, biophobia, and natural landscapes, in: Kellert S.R. & Wilson, E.O. (Eds), *The Biophilia Hypothesis*. Island Press, Shearwater Books, Washington DC. pp. 73-137.

Van den Berga, A.E., Kooleb, S.L., van der Wulpb, N.Y., 2003. Environmental preference and restoration: (how) are they related? *Journal of Environmental Psychology* 23, 135–146.

Villalba, J.J., Provenza, F.D., 2007. Self-medication and homeostatic behaviour in herbivores: learning about the benefits of nature's pharmacy. *The Animal Consortium* 1: 9, 1360–1370.

Walls, L.D., 1995. *Seeing New Worlds: Henry David Thoreau and Nineteenth-Century Natural Science*. University of Wisconsin Press.

Wansink, B., Payne, C.R., 2008. Eating behavior and obesity at Chinese buffets. *Obesity* 16 (8): 1957-1960.

Wegner, D.M., Wheatley, T., 1999. Apparent mental causation: sources of the experience of will. *American Psychologist* 54 (7), 480-492.

Wilson, E.O., 1992. *The Diversity of Life*. Harvard University Press.

Wilson, E.O., 1993. Biophilia and the conservation ethic, in: Kellert S.R. & Wilson, E.O. (Eds), *The Biophilia Hypothesis*. Island Press, Shearwater Books, Washington DC, pp. 31-41.

Wilson, R.A., 1990. *Quantum Psychology: How Brain Software Programs You & Your World*. New Falcon Publications

Windhager, S., Atzwanger, K., Bookstein, F.L., Schaefer, K., 2011. Fish in a mall aquarium — an ethological investigation of biophilia. *Landscape and Urban Planning* 99 (1), 23–30.