Evolutionary Psychology: Interfaces Between Natural Selection and Human Behavior

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Abstract

The theory of evolution by natural selection postulates that involuntary adaptations in species gave them advantage for survival and reproduction, so the creatures that had the characteristics that made them better adapted to their niche were able to pass on their genes, and thus perpetuate the specie. In the evolutionary perspective, the brain is an organ that has evolved over millions of years to solve problems related to survival and reproduction in the same way as other body parts also came under pressure from natural selection. Understanding how the processes occurred and how natural selection has refined our skills and behavioral consequences has been the aim of Evolutionary Psychology. This article aims, through a narrative review, to describe the evolutionary psychology and its relevance to the understanding of human behavior. For this purpose, this article was composed by topics that may help in understanding this field of study and its applicability in psychology. Possibly the challenge remains to Latin American psychology is not just integrate Evolutionary Psychology effectively in academic teaching , but to ensure that dialogues between areas of knowledge which differ and that permit a more complete understanding of the human being.
Keywords: evolutionary psychology, behavior, cognition.

Darwin`s theory of evolution through natural selection changed the perspective about life development. It postulated that modifications in species can improve or reduce chances of surviving and reproduction. Organisms that had characters which give better adapted to his niche were able to disseminate their genes and to perpetuate the specie. Since his development, Darwin`s theory is the best one that explains the origins of the species, and is largely confirmed by fossils and genetic evidences (Coyne, 2009).

In his seminal work *On the Origins of Species, by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle of Life*, or simply *The Origins of Species*, Darwin proposed the grounds of evolution theory. In a word, he pointed out that species evolve from single individual variations, normally existent due to genetic variance. Environmental pressures raise the probability of surviving of those that have some characters, being naturally selected, and thus there are greater chances to transmit these characters to the offspring. This variability can generate different characters by variability, and thus even generating a new species (Darwin, 2009).

Natural selection has huge application in biology, mainly genetic spread mechanisms and species morphological differences studies. Although that, there is one application that is not so many explored, but explosive, mainly over humans. If natural selection foments aspects that rise surviving chances, we can consider that behavior, as an animal character, can be also derived or fitted by natural selection. Behavior is selected

as a phenotype, because it can improve survivor odds (Hampton, 2010). Evolution is not only over organs and limbs, but is also in the behavior. Darwin, in the lasts lines in the *Origins*, risks saying that "psychology will be based on solid grounds […] of the gradual and necessary acquisition of each mental faculties and abilities" referring that studies over human behavior could have natural selection as theoretical influence, aiming to explain human behavior since an evolutionary viewpoint, and allowing to understand the behavioral bias as based on selection. Darwin`s forecast waited almost 120 years to start getting visible in sociobiology, proposed in 1975 by Edward O. Wilson, and recently (1990`s) gained headway by psychologist Leda Cosmides and anthropologist John Tooby studies over evolutionary psychology (Yamamoto, 2009).

This paper aims to describe evolutionary psychology and to point out its relevance by a narrative review, by showing its importance to explain human behavior. For that, we will to discuss origins of EP, showing some of central contributions and discussing the relevance of integration between EP and different psychology theories, mainly cognitive psychology.

Evolutionary Psychology

In the evolutionary view, brain is an organ that has been evolving through millions of years to solve problems related to surviving and reproduction, alike other bodies' parts have been submitted to the same. Random genetic mutations, that gave brain function alterations in connections and structures, have provided to our ancestral differentiated behavioral abilities (Coyne, 2009). It is main objective of evolutionary psychology (EP) to research and understand how these behaviors and abilities had evolved.

The objective of Evolutionary Psychology (EP) is to contribute to psychology doing integration between behavior and natural selection with another four areas: Sociobiology, Behavioral Ecology, Memetics and Gene-culture co-evolution. EP has great insertion in psychology, and is not exclusive to psychologists, but provide contributions of biologists, anthropologists, sociologists, philosophers and physicians. There have been a visible rise of studies in EP for the last years, becoming a well-known and well-established area in US and Europe, but it is incipient in Brazil (Yamamoto, 2009). PE has as its greater contribution to science by revealing universal aspects of human nature that can be applied to different areas, and expanding the scope of psychology by providing integration between human and biological sciences (Bolhuis, Brown, Richardson & Laland, 2011).

Four assumptions are applied to EP: first, human mind organization is fitted to Pleistocene hunter-gatherers, and not to the current world; second, psychological mechanisms that guide behavior are gradual adaptations, wrought by natural selection; third, there are many adaptive problems that gave rise to different mental modules; and finally, there is a universal human nature. These assumptions are still the grounds in the area, although deserve more research to better scientific evidences (Bollhuis, Brown, Richardson & Laland, 2011). It is important to say that evolutionary viewpoint do not exclude culture, and behavior is a result of the interaction between universal human mental mechanisms and unique environmental events (Lordelo, 2010).

EP wants to expand its conclusions about natural selection linking to psychology, including behavior as one of the main selected characters that improve survival rates. Humans have its behaviors based on the same evolutionary principles that guide other organisms. But this argumentation does not convince at all; besides human be an organism like other, it would be possible that our species had special principles due to symbolical, cultural and historical specific background. It is important to question if humans could be applied evolutionary model (Ades, 2009; Craig, Vugt, Dunbar & Robin, 2012).

Main contributions of EP

Evolutionary theory applied to human behavior is a powerful tool that can generate new perspectives, to inform and to complement information came from another fields, since psychology to economy. Insights came from EP can help many aspects of human behavior (Craig, Vugt, Dunbar & Robin, 2012).

EP is influenced by individual experiences and contemporary circumstances. For example, sex needs love and romance, exclusive human features that are strongly influenced by culture;

on the other hand, biology influences directly sex. There interfaces are studied by EP (Gleitman, Reisber & Gross 2009; Fisher, 2012).

Parental care can be understood by EP as a behavior that has relevance in an evolutionary view. Parental behaviors are important to the success for further gene transmission. It is very important that parents give care to the offspring because this is the way to keep genes living and to transmit them away. Keeping this care behavior, although can sometimes generate adversities for parents, helps to pass the gene to the next generation. Family is also an important structure that maintains higher chances to transmit genes, its size is fitted to obtain the better chances to reproduce, considering social factors. Human offspring is vulnerable and with slow development to adult age, and parents need invest energy, feed and care until near 20 years old. This huge investment fits human care, selecting behaviors that improve chances to the next generation reproducing (Lawson, & Mace, 2011; Vieira, Rimoli, Prado & Chelini, 2009).

Emotion is an innate response to a environmental stimulus, and it influences another adaptative programs (Oliva et al, 2006). Some emotions appear to be a behavioral solution in many animals: fear is activated by neural circuits that identify something that is a threaten (Plutchik, 1984; Oliva et al., 2006). Meanwhile, other emotions appear to be most associated to social interactions, e. g., guilty. Harm someone else can generate revenge; to avoid this, it is a powerful strategy generating a strong feeling of doing something wrong. In this way, guilty has an adaptative function (Keltner, Haidt & Shiota, 2006).

Psychopathology can also be understood by EP. Psychology is concerned to nearby causes, like familial, genetically and environmental ones. EP, on the other hand, looks to the ultimate causes, e. g., selective pressure that had selected nearby causes. These two kinds of causes are related, because evolutionary causes generate nearby symptoms. But deviant behavior sometimes has an evolutionary value: mental disorders are deviant of normal behavior and they are "resistant" possibly because it would be sometimes important to surviving. Normal behavior has variations due to the environment and the culture, in the case of humans. This range can be wide, and it would be possible that important distortions of a normal behavior can be crystallized and became a disorder. Anger, anxiety, sadness have a evolutionary role to signalize to others internal states and help to predict behaviors. Normal behaviors and feelings that are adaptive can be deviant if its modulation be endangered (Luz & Bussab, 2009).

There are many evidences that ours ancestrals were engaged in a cooperative model that helped the development of society through emotional and cognitive patterns. Compassion had benefited evolutionary success by getting stronger the social ties; but it is a trap, because always there is someone that can use it to benefit him/herself in a egoistic way. To identify this can generate angry and leads to revenge. These dynamics are the core of policy and social interaction (Petersen; Sznycer; Cosmides; Tooby, 2012).

EP can be applied in business. Its findings deny economists interpretations about rationale motivations: understanding altruism and leadership under evolutionary viewpoint can help researchers to rethink business strategies, reduce negative behaviors on work and understand market and consumption behaviors in men and women, due to different buying behaviors strategies (Saad, 2011; Buunk & Dijkstra, 2012).

EP and other Psychology's Theories

In Brazil, EP is linked to researches of Millenium Institute since 2004, started with the research "Modern and ancestral: contributions of EP to understanding of reproductive patterns and human parental investment". In 2010 the group had 20 researchers from 9 universities and institutes, and passed by about 180 undergraduate and postgraduate students since then (Yamamoto & Moura, 2010). Brazilian and global researches about EP are growing, mainly since 2000, although have few empirical studies comparing with another traditional areas (Martins et al., 2012.)

EP had always searched to establish some independence from biology, but never had denied its roots. Psychological thinking did not pose a clear-cut boundary getting biology far away, and it is not totally independent from these references. In psychology, it is very common emphasize individual (psychological) and social aspects, and EP is important to feature the importance of biology in a broad sense, posing evolution as a powerful agent to fit behavior along the time (Ades, 2009). As we assume one or another theory in psycho-

logy, we are considering some set of objects, methods and results, and this generate many viewpoints about human behavior (Bock, 2009). EP is a perspective that is able to fit to many, or all, psychology theories, providing a broad insight about our behavior (Yamamoto, 2009). EP has no direct application to psychotherapy, educational psychology or industrial-organizations psychology, but its strength is to provide a wide range of reflections considering species development. This wide sight can help to how think and work current behavior.

Cognitive psychology is one of the theories that get more and fast benefits from EP contributions. Brain and its functioning are results of natural selection (Cosmides & Tooby, 2013). Cognitive processes are selected by generations and allowed humans to survive in a changing environment, and it is important to point out that culture is a part of human environment. Not only cognitive psychology is benefited by EP; even psychoanalysis can have influence of it. Psychoanalysis says that human behavior is moved by unconscious factors (Slavin & Kriegman, 1992; Winograd, 2007). A great part of mind structure is invisible, and our core motivations are usually out of consciousness. Considering brain structure, it is comprehensible that many mental processes are done by unconscious structures (e. g. brain nuclei), while cortex is dedicated to superior functions (e. g., decision making and consciousness). In psychotherapy, resistance can be understood as a divergence between patient and therapist interests; this is necessary to preserve low anxiety and stress rates.

Conclusion

EP is an important area that can wide our sight about human behavior. It was aimed to present the main aspects of this theory and to show how it can help psychologists, psychiatrists and other professionals to understand human phenomena and behaviors. We are not only our genes, but we would be nothing without them (Waizbort, 2008). In the same way, we would be nothing outside evolution. Recognizing that is the first step to relate psychology, evolution and natural selection. It is an exciting challenge to insert EP in undergraduate classes and, at the same time, allow and breed a productive interchange between traditional theories and EP.

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Psicologia Evolucionista: Interfaces entre a Seleção Natural e o Comportamento Humano

Resumo

A teoria da evolução através da seleção natural postula que adaptações involuntárias em espécies favoreciam a sobrevivência e a reprodução, assim os seres vivos que possuíam as características que os tornavam mais bem adaptados a seu nicho eram capazes de transmitir seus genes, e assim perpetuar a espécie. Na perspectiva da teoria da evolução, o cérebro é um órgão que evoluiu ao longo de milhões de anos para resolver problemas relacionados à sobrevivência e reprodução, da mesma forma que outras partes do corpo também sofreram pressões da seleção natural. Compreender como esses processos ocorreram e como a seleção natural refinou nossas capacidades comportamentais e suas consequências é objeto de estudo da Psicologia Evolucionista. O presente artigo visa, através de uma revisão narrativa, descrever a psicologia evolucionista e sua relevância para o entendimento do comportamento humano. Para tal finalidade, o presente artigo foi elaborado a partir de tópicos que possam auxiliar no entendimento deste campo de estudo e sua aplicabilidade na psicologia. Possivelmente o desafio que permanece para a psicologia Latino-Americana é não apenas integrar a Psicologia Evolucionista de forma efetiva no ensino acadêmico, mas garantir que haja diálogos entre áreas do conhecimento que divergem entre si e que possibilitam um entendimento mais completo sobre o ser humano.

Palavras-chave: Psicologia evolucionista, comportamento, cognição.

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