

# The limitations of evolutionary psychology

## A philosophical analysis

Evolutionary psychology is a large-scale scientific project to explain our mental capabilities in evolutionary terms. Lack of sufficient material evidence, multitude of rival hypotheses, and speculative nature of many explanations are only a small fraction of theoretical problems influencing this new discipline. The purpose of this paper is to provide a critical analysis of assumptions and claims that are considered foundations of evolutionary psychology. The paper presents crucial methodological consequences connected with the process of explaining phobias in evolutionary terms. Subsequently, it discusses some genetic limitations imposed on the inborn character of our mental traits and incompatibilities between evolutionary psychology and the phenomenon of cortex plasticity. Lastly, it is demonstrated that evolutionary psychology abuses some crucial terms like EEA, an adaptation or a by-product, and does not take into account the possibility that some mental traits can be caused by neutral mutations.

**Key words:** evolutionary psychology, natural selection, cortex plasticity

The question about the scope of inborn knowledge is a central problem of many meticulous philosophical disputes but until relatively contemporary times was not a subject of large-scale scientific investigations. This state of affairs has been changed with the coming of evolutionary psychology, which due to the application of methods taken from both evolutionary biology and cognitive psychology, is claimed to offer some new insights into the very core issues concerning human cognition generally and inborn knowledge particularly. Because of its complexity, interdisciplinary approach, and the way it tries to solve some crucial philosophical problems it constitutes a philosophical problem-in-itself which cannot be crossed off the list of issues requiring careful analysis. The main purpose of this paper is to provide such a critical analysis of ontological and methodological framework of evolutionary psychology together with the classification of its major scientific and philosophical premises in order to, at least partially, answer the question about its status as a well-established science.

From the logical point of view one particular method, which is widely used by evolutionary psychologist, should be precisely examined – the method of reverse engineering. This method has its origin in evolutionary biology where it is referred to whenever there is a need to establish a link between a feature with no apparent adaptational advantage for one of the modern species and adaptational pressure which forged this feature in the times when the ancestors of the analyzed organism lived. [Cf. Richardson 2007, 41-45] For example, pelvic girdle is useless for modern whales which can lead to the assumption that its presence probably indicates that whale's ancestors were land mammals, contrary to their marine descendants, and must have changed habitat because of food scarceness, high competition rate

or some other reason. The same reasoning applies e.g. to presence of stings in several ant species because of its connection with the well-supported hypothesis claiming that ants evolved from wasps. [Gillott 2005, 27-33] These examples are relatively simple but things get more and more complicated when a set of interconnected features is under investigation.

Most applications of reverse engineering are constructed pursuant to the model where a feature with no apparent adaptational advantage is a good reason to put forward a hypothesis about the occurrence of the change in adaptational pressure or where a new feature may indicate that some new pressure-related factors have developed or diminished. Because biologists reason from the current state about some past events they can never ascertain that they included all essential premises into reasoning. Whale's pelvic girdle and ant's sting are not very sophisticated features to-be-explained because of the poverty of competing hypotheses but e.g. human mental capabilities abound in impediments of all kinds including the lack of sufficient material evidence and massive amounts of rival hypotheses.

Even rather simple evolutionary explanations of certain types of behavior involve so many auxiliary hypotheses that serious doubts begin to emerge. It seems that e.g. arachnophobia among many ethnic groups has a very convincing evolutionary explanation, which stipulates that those among our ancestors who were not afraid of spiders were more prone to death from their poisonous bites than those who fled at the very first sight of these infamous arachnids. But this stipulation is somewhat incompatible with the science of entomology. There are about 34'000 identified and classified species of spiders from which only about dozen can be harmful for humans. Five species of spiders can be and quite often are even deadly for humans, but two of them are native to Australia (The Redback Spider and The Tree-Dwelling Funnel-Web Spider), two to North America (Brown Recluse Spider and The Black Widow Spider) and one to South America (Brazilian Wandering Spider), which definitely complicates things a bit. [McGavin 2000, 228-238] Actually, neither Australia nor North or South America cannot be taken into account as a birthplace of mankind. The oldest human fossils found in Australia are estimated to be about 40'000 years old whereas fossils in North America are even younger with only 18'000 years.

To follow this line of reasoning it should be noted that neither Aborigines nor native American Indians are particularly terrified by spiders, which are actually often part of their daily diet, whereas many inhabitants of Europe are arachnophobic, despite the fact that there are no deadly species of spider in Europe. Even if we assume that the total number of existing spiders is two or even three times greater than the number of currently identified ones, which is quite probable by the way, it does not change the fact that hypothetical undiscovered deadly

spiders have rather small impact on human life. It can also be assumed that many species of deadly African spiders have become extinct during last four million years, but this *ad hoc* hypothesis lacks solid material and non-material evidence.

There is yet another possibility, namely that deadly spiders were more vulnerable to extinction than their harmless companions but this is also problematic. Vulnerability to habitat changes is very often related to the endemic character of certain species, because of the fact that the larger area organism occupies the less vulnerable it is to the habitat changes, but this also means that the universality of fear of spiders has not been explained. The best way to deal with this difficulties is to assume that deadly species of spider were endemic to the region where first humans or even human-like apes evolved but this hypothesis, although very tempting, is rather speculative and unsupported by currently available direct and indirect evidence. Moreover, it is possible to put forward an evolutionary hypothesis which claims that boldness in contact with spiders is vital for survival. Large species of spiders are rich in proteins, vitamins and minerals, are relatively easy to catch and cook, because they needn't be gutted. Small children from native tribes of Amazonia hunt tarantulas using only sticks and they do not care about minor skin irritations caused by their hairs or even painful but relatively harmless bites. Sometimes this is only a tasty snack but more often a main dish which prevents starvation. This hypothesis is supported by the fact that large spiders are considered excellent food wherever they live. Both hypotheses can be supported by a suitable evolutionary explanation, which probably means that without further conclusive research we cannot simply choose one of them. Maybe it is another case of eurocentrism where our own culturally-based fears are claimed to be universal. Evolutionary framework abounds in very simple and tempting ways to formulate a universal hypothesis, but it should not be perceived as an encouragement. For the sake of clarity, a hypothesis supporting innateness of a certain trait should bear the burden of proof.

At first glance the fear of spiders is peripheral but a deeper investigation can reveal that it is actually a top of the iceberg from biochemical point of view. The number of human genes is estimated to be between 20'000 and 25'000 which is surprisingly low comparing with simple invertebrates like roundworm or fruit fly with about half that much genetic information. [Cf. McCabe 2008, 1-9] The complex structure of human eye alone is coded by about 2'500 genes, not to mention the case of visual cortex, but hard-wired emotions seem to be a redundancy. This is only a beginning because, according to evolutionary psychology, not only emotions but also reasoning, social behavior, parenting, courting and esthetical preferences are hard-wired. But all these hard-wired traits make human brain a functionally

rigid organ with well-defined tasks, which is incompatible with the phenomenon of cortex plasticity. Numerous inborn mental capabilities also use a lot of physical space in the coding part of the DNA, which is difficult to combine with our current knowledge of the size of the genome. [Cf. Pierce 2002, 22-28]

Moreover, Ockham's razor is useless in that field, which is generally a first symptom of an excess of *ad hoc* hypotheses. The aim of scientific method is to explain phenomena using as few hypostases as possible whereas evolutionary psychology multiplies different hardwired purpose-specific mind-modules what sometimes leads to extremes like supposition that even the choice of foot we immerse in water first is pre-programmed. It is very difficult to explain why these minute features with no apparent adaptational use are wasting precious time and resources during DNA replication, and even more difficult to support the hypothesis that they are constraints. Claiming that a trait is a constraint urges to be supported by a list of traits which caused this type of constraint. It is similar to reasoning, popular in XVIII century, that ether is an anesthetic because it has an aesthetical power in itself, which explains literally nothing and put forward only a pleonastic definition. The sentence 'We behave in way X because we have X-executing mind-module' is a quite obscure explanation, which makes sense only if we can point at a factor which forced our ancestor to do X and it is a mere speculation otherwise. [Cf. Scher 2003, 1-31]

The next rather major obstacle is combining evolutionary psychology with hypothesis of cortex plasticity, which is a founding one in modern neurology. Cortex plasticity allows us to learn new skills, modify existing ones or even rewiring our mind after brain-damaging accidents. How it is possible that despite having such an amazing ability we rely so heavily on our pre-programmed modules? The studies of identical twins, widely used in evolutionary psychology, can be a great illustration of this issue. Evolutionary psychology claims that identical twins behave in a similar way because they share this same set of fine-tuned mental traits, but it does not seem as only possible explanation. First of all, identical twins share 100% of DNA, which contributes to the same physique and is of great importance in many real-life situations. It is a trivial but also underestimated fact. A Person's height, overall health state, proportions and even complexion can partially determine the choice of career or even a life partner. Identical twins share these determinations. They also share a common geographical and social environment in more aspects than any other siblings. Because they look alike, people, not excluding parents, tend to treat them alike, which is only a part of self-sustaining process of behavioral mimicry leading to the development of idioglossia – a kind of private language comprehensible only for them. Because they stay together all the time

they share identical peer-groups, daily habits and even particular tastes for food, which in turn may lead to similar health problems. [Cf. Joseph 2004, 187-190] The differences are so minute that it is nearly impossible to judge whether they were influenced by genes or an environment without very rigorous experiments consisting in separating them as early as possible, maybe even at birth, and raising, without any opportunity to stay in touch, in different cultures and dissimilar geographical environment, making them speak languages from different groups and not mentioning a word about their identical twin. Despite being unethical such an experiment is a hard-to-achieve ideal and nearly impossible to perform in a representative group of identical twins. Even if achievable we cannot omit the fact that mother womb is also a common environment with this same sounds like familiar voices and tastes depending on mother diet. From the fifth month of his life fetus can detect sense data from the environment, despite being immersed in amniotic fluid and separated from external world by layers of muscle and skin cells. If learning really starts in womb it can be another argument against claims of evolutionary psychology. At least it seems to be a hypothesis worth considering in order to avoid one-sidedness of views in nature-nurture debate.

Another broadly discussed and quite controversial methodological issue is connected with the distinction between an adaptation and a by-product. There are numerous problems which evolutionary psychology simply refuse to solve by labeling them by-products. Music is said to be a by-product of our melodic language [Cf. Revesz 2001, 219-222], religion a by-product of our answers-seeking rationality, art, poetry and performing arts a by-product of mating-behaviors, which allows us to present our intelligence and ultimately our good genes to potential mate. It may sound plausible at the beginning but it also evokes some methodological worries because, to put it crudely but simply, by-product is an empty category which explains nothing more than our ignorance and inability to put forward a proper explanation. It does not mean that there is a need to explain everything in terms of adaptation, which may lead to some forms of panadaptationism, but rather look from different perspective. Even if music, art, philosophy and religion are by-products it does not mean that they are only by-products. Nearly every adaptation creates some constrains, which in turn can become breeding ground for new adaptations influencing our survival. Without these pre-existing by-products further adaptations would not have foundations to build upon. We cannot exclude that our rationality is so complicated because of this sophisticated network of constrained by-products and new adaptations. [Cf. Gigerenzer 2002, 178-191] Providing causal explanation gives no reasons to narrowing the discussion to causes alone. Moreover,

refusing to explain kinds of behaviors which are specific to human being is like denying the social and cultural psychology the right to exist in our intellectual horizon.

The problem lies even deeper. Evolutionary psychology is generally uncomfortable with mutations and tries to minimize their role in evolution. Actually, mutations surely had a strong influence on our minds and because of them certain traits are probably not adaptive but neutral. Mutation may be neutral for survival but it can at the same time influence non-adaptive by-products. Mutation, especially neutral one, is a difficult concept to include into the framework of evolutionary psychology because it advocates the position that a number of different traits are not adaptations or their by-product but simply neutral changes in terms of survival. [Cf. Kimura 2005, 240-243] Because of the focus on environmental pressure, which influenced our religious thinking or our musical preferences, evolutionary psychology overlooks the possibility that these mental traits can be adaptively neutral. If they are neutral mutations they cannot be explained in terms of natural selection. To sum up, it can be said that evolutionary psychology incorporates only chosen aspects of evolution into its framework (natural and sexual selection) while completely avoiding reference to the concepts of mutation and genetic drift.

It is generally hard to accept for evolutionary psychology that some cultural phenomena live their own life and are independent of factors that called them to existence. If every kind of action is explained in terms of natural or sexual selection then it will be extremely difficult to give any good reason for committing suicide or homosexuality. [Cf. McFee 2000, 113-117] Theory that explains suicide as a kind of self-sacrifice, whose purpose is to assure better living of family members in very harsh conditions, is unsatisfactory in most cases. Parents committing suicide in order to provide their own flesh for their children dying of famine are good example here. But how a suicide of successful and wealthy young men can be explained? In normal conditions somebody who has not passed their genes should not be prone to suicide. Another great enigma for evolutionary psychology is homosexuality, autosexuality and asexuality. How it is possible that some sexual behaviors are not leading to reproduction? These types of behaviors are completely fruitless from the evolutionary point of view and yet quite common. Maybe there is no evolutionary explanation for them at all?

Another problematic hypothesis is so called EEA hypothesis which causes some major methodological obstacles. EEA or The Environment of Evolutionary Adaptedness is hypothetical area where our ancestors originated and type of environment to which they were originally adapted. It serves as a common point of reference for investigations concerning both our physical and mental adaptations, but unfortunately it has not been exactly localized.

Because of our lack of knowledge about the exact place of human origin, the question whether certain mental traits are adaptations or by-products is inconclusive and in many places simply vague. Not knowing the exact fauna and flora of our EEA, we are forced to making quite risky stipulations about our innate fears. For instance, because of lack of knowledge about the exact geographical environment of our ancestor we are compelled to speculate in a very coarse way about the landscape where our spatial imagination evolved. Because of that the very notion of EEA is not well-defined in nearly any aspect which could contribute to understanding whether certain trait is or is not an adaptation to EEA. The margin of possible error is too broad to make well-founded prediction about most of our mental traits. It is also not a certain thing that we will manage to elucidate the problem in the future.

Thirty-five years ago sociobiology struggled with similar set of accusations but does that mean that evolutionary psychology is its direct descendant which is as faulty as its ancestor? Both sociobiology and evolutionary psychology are result of unavoidable human endeavor to understand his own mind scientifically. Even if evolutionary psychology is to be discredited it certainly does not mean that it is a last trial in this field of investigations. Moreover, it can be undoubtedly said that evolutionary psychology lacks many disadvantages of her ancestor. First of all, it accepts mental causality which definitely broadens the conception of mind. It no longer assumes that our mental states are only a result of external stimuli but rather autonomic computation-making units with hard-wired feedbacks. According to this conception our desires may be results of our thoughts and not only sensual impressions like in sociobiological conceptions. Whereas sociobiology offered only crude biological explanations evolutionary psychology analyses a sophisticated network of cognitive modules which are a result of natural selection but can be also understood by its function. [Cf. Buss 2008, 2-36] A good example is a concept of rationality. Evolutionary psychology does not discredit rationality as a mere illusion but rather use a concept of limited rationality, which must cope with the problem given using as little resources as possible, and may lead to impression that some behaviors are irrational. Where we have Darwinian algorithm and enough resources to execute it we are able to solve the problem optimally, but in most situations we must depend on crude heuristics and limited resources which sometimes give miserable results.

Satisfactory theory of mind, its functions and origin is probably one of the most complicated of human's endeavors. These first attempts to explain our mental states are very simplified and extremely reductionist, but at the same time they are a necessary stage of scientific development. Critical philosophical appraisals of current scientific theories may be

helpful in this process because they expose theoretical inconsistencies and logical fallacies interwoven into promising scientific hypotheses.

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