Heylighen, F. (2014). Evolutionary Psychology. In (A. C. Michalos, Ed.) Encyclopedia of Quality of Life and Well-Being Research, p. 2058-2062. Dordrecht: Springer.

Retrieved from http://pespmc1.vub.ac.be/Papers/EvolutionaryPsychology-QOL.pdf

# Evolutionary Psychology

*Francis Heylighen*
*ECCO, Vrije Universiteit Brussel*

## Definition

Evolutionary psychology (EP) is an approach to the study of the mind that is founded on Darwin's theory of evolution by natural selection. It assumes that our mental abilities, emotions and preferences are adapted specifically for solving problems of survival and reproduction in humanity's ancestral environment, and derives testable predictions from this assumption.

## Description

### History

When Charles Darwin formulated his theory of natural selection as an explanation for the origin of species, he already anticipated that this concept would also help us to understand the mind as a product of biological evolution. He made some first steps towards such "evolutionary psychology" in his later works on human descent and on the expression of emotions. His approach inspired several late 19th century philosophers and psychologists, including William James and James Mark Baldwin. However, in the 20th century, psychology became dominated first by behaviourism, then by cognitive approaches, which saw the mind basically as a blank slate, to be "programmed" by experience. Evolutionary perspectives on mental phenomena were relegated to other disciplines, including ethology (the study of animal behaviour) as investigated by Konrad Lorenz, evolutionary epistemology as founded by Donald T. Campbell, and sociobiology (evolutionary theory of social interactions) as proposed by Edward O. Wilson.

Building on these developments while adding specifically psychological methodologies for testing hypotheses, evolutionary psychology came back to the fore in the 1990s, under the impulse of researchers such as David Buss, Leda Cosmides, and John Tooby (Barkow, Cosmides & Tooby, 1992; Wright, 1995; Buss, 2011). Initially, this approach was quite controversial, as it contradicted the standard social science model according to which our preferences and behaviours are essentially a product of education and socialization. However, some of the empirical results of the new approach (e.g. on the cross-cultural universality of the determinants of jealousy and of physical attractiveness) were so compelling that it was difficult to come up with alternative explanations. Moreover, evolutionary psychology profited from a general revival and spread of Darwinian ideas across virtually all the disciplines, including economics, computer science, and medicine. Nowadays, the value of EP is generally recognized, although some scepticism and much misunderstanding remain concerning its theoretical underpinnings (Buss, 2005; Confer et al., 2010).

### Assumptions and methods

The basic assumption of evolutionary theory is that all organisms are the product of blind variation and natural selection. Each generation, selection picks out the variants that are fittest, i.e. that are best

adapted for surviving and reproducing in their given environment. Therefore, most features of biological organisms can be understood as *adaptations*, specifically "designed" for life in this environment—although some are merely by-products of adaptations, or random variations that have not (yet) undergone selection. Evolutionary psychology (EP) adds that the major features of the human mind too should be viewed as adaptations to our ancestral environment. While environments have of course changed over the course of evolution (most radically in the last centuries), evolutionary psychologists contend that the most important environmental features remained largely the same over the last 2-3 millions years of human prehistory until the end of the Paleolithic, about 10 000 years ago. Therefore, we may assume that our psychological mechanisms have been optimized by natural selection for functioning in this *Environment of Evolutionary Adaptedness* (EEA) (Buss, 2005; Narvaez et al., 2011).

The human EEA features are those of life as hunter-gatherers in small, nomadic bands of 30-150 individuals, searching for a large variety of animal and vegetable foods, shelter, and other resources across a varied, savannah-like landscape, while avoiding dangers such as predators, poisonous plants and animals, parasites, precipices, and potentially hostile strangers. Important criteria for success in the social environment were the abilities to attract and bond with fertile and dependable mates, to raise children until they are able to stand on their own, to establish cooperative relations with reliable friends, to detect and exclude "cheaters" who abuse such social contracts, to exchange useful information with others (via language, "gossip" and story telling), and to achieve a sufficiently high status within the group.

Like cognitive psychology, evolutionary psychology sees the mind as an *information-processing* system that solves problems by interpreting sensory data, devising schemes to deal with the perceived situation, and selecting appropriate actions. What EP adds is that these problems are fundamentally problems of adaptation to a specific environment. Unlike cognitive psychology, EP does not see the mind as a "general-purpose" problem solver that can deal equally well with any kind of issue via mechanisms of inference and learning. While we may have developed some capacity for domain-independent rational thought, it is too weak to deal sufficiently quickly and reliably with the complex problems encountered in the EEA. For example, if you see something slithering in the grass towards you, you do not have the time to carefully observe its features, determine whether or not they indicate a poisonous snake, and if they do, decide that it is safer to step away from it: you better run immediately! Another complex problem for which there is no dependable rational procedure is deciding whether you can trust the person you just met: best is to simply rely on your "instinct" to interpret all the subtle non-verbal cues…

EP assumes that over the millions of years of its evolution our brain has accumulated a massive number of specialized neural circuits for tackling these kinds of adaptive problems. These circuits are often conceived in EP as "*modules*", i.e. separate, encapsulated pieces of information processing machinery, each responsible for performing one specific function. For example, it has been proposed that our brain contains specific modules for fearing spiders, for learning grammar, and for detecting cheaters. Within cognitive science, the existence of modules in the brain is contentious. However, it is not necessary to assume that the specialized circuits postulated by EP are separate (Confer et al., 2010). It seems more likely that their functions would overlap, so that different pieces of circuitry may contribute to solving a given adaptive problem, while the same circuit may contribute to different problems.

For example, we have specialized brain mechanisms for estimating the physical attractiveness of a potential sex partner (Buss, 2005). EP researchers have shown via extensive cross-cultural surveys that there exist universal criteria for sex appeal. For women, these are basically indicators of health and fertility: symmetric features, smooth skin, long legs, full breasts, a 0.7 waist-to-hip ratio, and a minimum of deformities, in the sense of deviations from the "standard" human shape. Choosing a female sex partner with these characteristics makes perfect sense if the problem to be solved is maximizing the chances for healthy offspring. On the other hand, we have different innate criteria for evaluating the

"cuteness" of babies and toddlers, an adaptation that stimulates us to take care of children that are too young to fend for themselves. These include short legs, large eyes and a small, upturned nose. But "cuteness" and "sex appeal" also overlap in criteria such as smooth skin, symmetry, and absence of deformities, and therefore are likely to make use to some degree of the same brain circuits. As a result, there may be interference between both mechanisms, so that men also tend to be attracted to "cute" women with large eyes and a small nose, even though these indicate no fertility benefit.

EP accounts are often accused of being "*just-so stories*", i.e. explanations based on some reconstruction of our evolutionary past that may seem plausible, but that cannot in any way be verified (Confer et al., 2010). While this criticism may have been applicable to certain other evolutionary approaches, such as sociobiology, EP explicitly aims to derive falsifiable predictions from its hypotheses. To test these predictions, EP relies on all the traditional methodologies of psychology, such as laboratory experiments and surveys, but also on methods and data from other domains, such as archaeology, anthropology, biology and neuroscience. An example of such a testable prediction is the assumption—common in fairy tales but before EP absent in psychological theory—that parents care less about their stepchildren than about their biological children. This makes perfect sense from an evolutionary perspective, since stepchildren do not pass on their stepparents' genes. The reality of this effect was proven by means of extensive, cross-cultural crime statistics, which show that children are orders of magnitude more likely to be killed or abused by stepparents than by their biological parents.

A last common misunderstanding about EP is that it implies some form of *genetic determinism*, i.e. the view that our behaviour is fixed by our genes (Confer et al., 2010). However, an essential requirement for fitness is the ability to adapt to a variety of situations. Therefore, the innate mechanisms postulated by EP are plastic and will only come to the fore in the appropriate context or environment. For example, we are all capable of dominant and of submissive behaviours, but we will normally only act dominant when we are in a position of power, and submissive in a position of weakness. The same teacher may tyrannize his pupils, while grovelling for the school head. The underlying information-processing mechanisms may be conceptualized as what cognitive scientists call *condition-action rules*. These specify what type of action is appropriate under which condition. An example of such a rule could be "*if* you see a snake (condition), *then* flee (action)". While such a rule may be innately present in the brain, in an environment without snakes (say, the Arctic) it will never be triggered, and therefore fear of snakes may never develop.

Moreover, in most cases such psychological adaptations will not *determine* the action to be performed, but merely *suggest* a default action: running away is not necessarily the best action to take in the presence of a snake, but if there is no time to reflect about a better alternative, it provides a good default reflex. In that sense, most adaptations can perhaps be better conceptualized as *biases* or in-built *preferences* for certain types of behaviour, which, however, can be overruled by learning or rational reflection. But it must be emphasized that such overruling demands much more effort than merely following your "instinct", and therefore the "instinctual" behaviour will tend be more common than any of its learned variants.

**Applications to wellbeing**

The view of psychological adaptations as innate, subconscious preferences for certain conditions and behaviours has direct implications for human wellbeing: people can be expected to feel well when these preferences are satisfied, and feel stressed otherwise. According to EP, these preferences reflect the conditions that were optimal for survival and reproduction in the EEA. For example, we will tend to feel good in an open, sunny landscape with grass, trees and animals, in the vicinity of clear water, such as a lake, while performing activities that resemble hunting or gathering, in the company of friends or mates, or while nurturing children. On the other hand, we will tend to feel stressed in the presence of spiders,

snakes, thunderstorms, threatening animals or people, loud noises, fast-moving objects, and great heights, as these all indicate dangers in the EEA.

The problem is that our present environment is very different from the EEA. Therefore, behaviours that were adaptive in the EEA may no longer fit in well with our modern lifestyle. This leads to a fundamental mismatch between the behaviours and conditions that our genes "expect" and those that society proposes (Grinde, 2002; Hill & Buss, 2008). Several authors have argued that this discrepancy is at the origin of our many "diseases of civilisation", which include obesity, cardiovascular disease, diabetes, allergies, depression, dementia and ADHD. These disorders, which severely reduce our quality of life, are virtually unknown among hunter-gatherers.

EP theorists have examined in particular the evolutionary origins of stress and emotions together with their implications for happiness (Nesse, 2004; Hill & Buss, 2008; Grinde, 2002). One conclusion is that some of the "natural" conditions for happiness, such as intimate connections within a small, egalitarian band, are intrinsically difficult to achieve in our modern society. On a more optimistic note, several aspects of our ancestral, hunter-gatherer lifestyle, such as frequent exercise, engaging activity, sound sleep patterns, and regular exposure to sunlight and to nature, can be reintroduced or mimicked without too much effort. A program based on such guidelines (Ilardi, 2009) has been shown to combat depression more effectively than drugs or psychotherapy, and is likely to increase wellbeing overall.

Another application is in improving childcare. Here, EP researchers recommend maximum physical contact between caregiver and infant (extended breast-feeding, carrying on the body, and co-sleeping) and immediate and sensitive response to any sign of distress (e.g. crying or fussing). On the other hand, older children should be allowed to play and explore freely as soon as they feel autonomous enough. Such nurturing but permissive parenting style, at least in hunter-gatherers, appears to provide the foundation for the development of a healthy, self-confident personality, and for what is called "secure attachment" in interpersonal relationships (Schön & Silvén, 2007; Narvaez et al., 2012).

EP further provides an explanation for the often-observed asymmetry between positive and negative emotions, and their corresponding cognitive biases. We tend to feel good by default (the "positivity offset"), because that motivates us to explore, take on challenges, and thus build the mental and physical resources that ensure long-term survival (Fredrickson, 2004). On the other hand, we tend to overreact to possible threats (the "negativity bias"), because that protects us against potentially lethal harm. Therefore, people behave like "paranoid optimists" (Haselton & Nettle, 2006): in general overconfident about their own abilities (e.g. in getting a project done on time or answering questions correctly), but quick to get frightened by low probability dangers (e.g. a plane crash or a terrorist attack).

In conclusion, evolutionary psychology has proven its value in generating testable new hypotheses about human cognition, emotion, and innate preferences, by assuming that our mind is adapted to our ancestral way of life, the environment of evolutionary adaptedness. While several non-trivial hypotheses have already been confirmed, more tests are needed, and many more fruitful predictions are likely to be derived from our increasing understanding of the human EEA. Such theories and observations are likely in particular to extend and unify our understanding of the conditions for human wellbeing.

## References


Barkow, J. H., Cosmides, L., Tooby, J. (1992). The adapted mind: Evolutionary psychology and the generation of culture. Oxford University Press New York.

Buss, D. (Ed.). (2005). The handbook of evolutionary psychology. Wiley.

Buss, D. (2011). Evolutionary Psychology: The New Science of the Mind (4th ed.). Prentice Hall.

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.

Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. Philosophical Transactions of the Royal Society B: Biological Sciences, 359(1449), 1367.

Grinde, B. (2002). Happiness in the perspective of evolutionary psychology. Journal of Happiness Studies, 3(4), 331–354.

Haselton, M. G., & Nettle, D. (2006). The paranoid optimist: An integrative model of cognitive biases. Personality and Social Psychology Review, 10, 47–66.

Hill, S.E.., & Buss, D.M. (2008). Evolution and subjective well-being. In Eid, M. & Larsen, R. (Eds). The science of subjective well-being. New York: Guilford Press.

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

Narvaez, D., Panksepp, J., Schore, A., & Gleason, T. (Eds.). (2012). Human Nature, Early Experience and the Environment of Evolutionary Adaptedness. Oxford University Press.

Nesse, R. M. (2004). Natural selection and the elusiveness of happiness. Philosophical Transactions of the Royal Society B: Biological Sciences, 359(1449), 1333.

Schön, R. A., & Silvén, M. (2007). Natural Parenting—Back to Basics in Infant Care. Evolutionary Psychology, 5(1), 102–183.

Wright, R. (1996). The moral animal: Why we are the way we are: The new science of evolutionary psychology. Abacus.