Evolutionary Psychology: How Our Ancestors Shape Us

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Evolutionary psychology (EP) examines psychological traits -- such as memory, perception, or language -- from a modern evolutionary perspective. It seeks to identify which human psychological traits are evolved adaptations, that is, the functional products of natural selection or sexual selection. Adaptationist thinking about physiological mechanisms, such as the heart, lungs, and immune system, is common in evolutionary biology. Evolutionary psychology applies the same thinking to psychology, arguing that the mind has a modular structure similar to that of the body with different modules having adapted to serve different functions. Evolutionary psychologists argue that much of human behavior is the output of psychological adaptations that evolved to solve recurrent problems in human ancestral environments.
Psychological adaptations, according to EP, might include the abilities to infer others' emotions, to discern kin from non-kin, to identify and prefer healthier mates, to cooperate with others, and so on. Consistent with the theory of natural selection, evolutionary psychology sees organisms as often in conflict with others of their species, including mates and relatives. For example, mother mammals and their young offspring sometimes struggle over weaning, which benefits the mother more than the child. Evolutionary psychology emphasizes the importance of kin selection and reciprocity in allowing for prosocial traits such as altruism to evolve. Like chimps and bonobos, humans have subtle and flexible social instincts, allowing them to form extended families, lifelong friendships, and political alliances. In studies testing theoretical predictions, evolutionary psychologists have made modest findings on topics such as infanticide, intelligence, marriage patterns, promiscuity, perception of beauty, bride price and parental investment.

Evolutionary psychologists hold that behaviors or traits that occur universally in all cultures are good candidates for evolutionary adaptations. Evolved psychological adaptations (such as the ability to learn a language) interact with cultural inputs to produce specific behaviors (e.g., the specific language learned). Basic gender differences, such as greater eagerness for sex among men and greater coyness among women, are explained as adaptations that reflect the different reproductive strategies of males and females. Evolutionary psychologists contrast their approach to what they term the "standard social science model," according to which the mind is a general-purpose cognition device shaped almost entirely by culture.

Evolutionary psychology has its historical roots in Charles Darwin's theory of natural selection. Darwin's theory inspired William James's functionalist approach to psychology. Along with W.D. Hamilton's (1964) seminal papers on inclusive fitness, E. O. Wilson's Sociobiology (1975) helped to establish evolutionary thinking in psychology and the other social sciences. While some critics argue that evolutionary psychology hypotheses are difficult or impossible to test, evolutionary psychologists assert that is not impossible and, indeed, that many empirical studies have either generally corroborated or disconfirmed evidence regarding hypotheses about specific psychological adaptations. The influence of adaptationist approaches in psychology has been steadily increasing.

Overview

Evolutionary psychology (EP) is an approach that views human nature as a universal set of evolved psychological adaptations to recurring problems in the ancestral environment. Proponents of EP suggest that it seeks to heal a fundamental division at the very heart of science -- that between the soft human social sciences and the hard natural sciences, and that the fact that human beings are living organisms demands that psychology be understood as a branch of biology. Anthropologist John Tooby and psychologist Leda Cosmides note:
"Evolutionary psychology is the long-forestalled scientific attempt to assemble out of the disjointed, fragmentary, and mutually contradictory human disciplines a single, logically integrated research framework for the psychological, social, and behavioral sciences--a framework that not only incorporates the evolutionary sciences on a full and equal basis, but that systematically works out all of the revisions in existing belief and research practice that such a synthesis requires."

Just as human physiology and evolutionary physiology have worked to identify physical adaptations of the body that represent "human physiological nature," the purpose of evolutionary psychology is to identify evolved emotional and cognitive adaptations that represent "human psychological nature." EP is, to quote Steven Pinker, "not a single theory but a large set of hypotheses" and a term which "has also come to refer to a particular way of applying evolutionary theory to the mind, with an emphasis on adaptation, gene-level selection, and modularity." Evolutionary psychology adopts an understanding of the mind that is based on the computational theory of mind. It describes mental processes as computational operations, so that for example a fear response is described as arising from a neurological computation that inputs the perceptional data, e.g. a visual image of a spider and outputs the appropriate reaction, e.g. fear of possibly dangerous animals.

EP proposes that the human brain comprises many functional mechanisms, called psychological adaptations or evolved cognitive mechanisms or cognitive modules, designed by the process of natural selection. Examples include language-acquisition modules, incest-avoidance mechanisms, cheater-detection mechanisms, intelligence and sex-specific mating preferences, foraging mechanisms, alliance-tracking mechanisms, agent-detection mechanisms, and others.

EP has roots in cognitive psychology and evolutionary biology. It also draws on behavioral ecology, artificial intelligence, genetics, ethology, anthropology, archaeology, biology, and zoology. EP is closely linked to sociobiology, but there are key differences between them including the emphasis on domain-specific rather than domain-general mechanisms, the relevance of measures of current fitness, the importance of mismatch theory, and psychology rather than behaviour. Most of what is now labeled as sociobiological research is now confined to the field of behavioral ecology.

EP has been applied to the study of many fields, including economics, aggression, law, psychiatry, politics, literature, and sex.

Nikolaas Tinbergen's four categories of questions can help to clarify the distinctions between several different, but complementary, types of explanations. Evolutionary psychology focuses primarily on the the "why? questions, while traditional psychology focuses on the "how? questions.

Related Disciplines

The content of EP has derived from, on the one hand, the biological sciences (especially evolutionary theory as it relates to ancient human environments, the study of paleoanthropology and animal behavior) and, on the other, the human sciences especially psychology. Evolutionary biology as an academic discipline emerged with the modern evolutionary synthesis in the 1930s and 1940s, although it was not until the 1970s and 1980s that university departments included the term evolutionary biology in their titles. Several behavioural subjects relate to this core discipline: in the 1930s the study of animal behaviour (ethology) emerged with the work of Dutch biologist Nikolaas Tinbergen and Austrian biologists Konrad Lorenz and Karl von Frisch.

In the 1970s, two major branches developed from ethology. Firstly, the study of animal social behavior (including humans) generated sociobiology, defined by its pre-eminent proponent Edward O. Wilson in 1975 as "the systematic study of the biological basis of all social behavior" and in 1978 as "the extension of population biology and evolutionary theory to social organization". Secondly, there was behavioral ecology which placed less emphasis on social behavior by focusing on the ecological and evolutionary basis of both animal and human behavior.

Nobel Laureates Nikolaas Tinbergen (left) and Konrad Lorenz (right) who were, with Karl von Frisch, acknowledged for work on animal behavior

From psychology there are the primary streams of developmental, social and cognitive psychology. Establishing some measure of the relative influence of genetics and environment on behavior has been at the core of behavioral genetics and its variants, notably studies at the molecular level that examine the relationship between genes, neurotransmitters and behavior. Dual inheritance theory (DIT), developed in the late 1970s and early 1980s, has a slightly different perspective by trying to explain how human behavior is a product of two different and interacting evolutionary processes: genetic evolution and cultural evolution. DIT is a "middle-ground" between much of social science, which views culture as the primary cause of human behavioral variation, and human sociobiology and evolutionary psychology which view culture as an insignificant by-product of genetic selection.

Principles

Evolutionary psychology is founded on several core premises:

The brain is an information processing device, and it produces behavior in response to external and internal inputs.

The brain's adaptive mechanisms were shaped by natural and sexual selection.
Different neural mechanisms are specialized for solving adaptive problems in humanity's evolutionary past.
The brain has evolved specialized neural mechanisms that were designed for solving problems that recurred over deep evolutionary time, giving modern humans Stone age minds.
Most contents and processes of the brain are unconscious; and most mental problems that seem easy to solve are actually extremely difficult problems that are solved unconsciously by complicated neural mechanisms.
Human psychology consists of many specialized mechanisms, each sensitive to different classes of information or inputs. These mechanisms combine to produce manifest behavior.
Evolutionary psychologists suggest that EP is not simply a sub-discipline of psychology but that evolutionary theory can provide a foundational, meta-theoretical framework that integrates the entire field of psychology, in the same way it has for biology.