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Four Fallacies of Pop Evolutionary Psychology

By David J. Buller

Charles Darwin wasted no time applying his theory of evolution to human psychology, following *On the Origin of Species* (1859) with *The Descent of Man* (1871) and *The Expression of the Emotions in Man and Animals* (1872). Ever since, the issue hasn't been whether evolutionary theory can illuminate the study of psychology, but how it will do so. Still, a concerted effort to explain how evolution has affected human behavior began only in the 1970s with the emergence of sociobiology. The core idea of sociobiology was simple: behavior has evolved under natural and sexual selection (in response to competition for survival and reproduction, respectively) just as organic form has. Sociobiology thereby extended the study of adaptation to include human behavior.

In his 1985 critique of sociobiology, *Vaulting Ambition*, the philosopher Philip Kitcher noted that, whereas some sociobiology backed modest claims with careful empirical research, the theoretical reach of the dominant program greatly exceeded its evidential grasp. Kitcher called this program "pop sociobiology" because it employed evolutionary principles "to advance grand claims about human nature and human social institutions" and was "deliberately designed to command popular attention."

Times have changed. Although some self-identified sociobiologists are still around, the current fashion is evolutionary psychology. Evolutionary psychology maintains that adaptation is to be found among the psychological mechanisms that control behavior rather than among behaviors themselves. But, as the old saw goes, the more things change, the more they stay the same. Although some work in evolutionary psychology backs modest claims with careful empirical research, a dominant strain, pop evolutionary psychology, or Pop EP, offers grand and encompassing claims about human nature for popular consumption.

The most notable representatives of Pop EP are the psychologists David M. Buss (a professor at the University of Texas, Austin, and author of *The Evolution of Desire* and *The Dangerous Passion*) and Steven Pinker (a professor at Harvard University, whose books include *How the Mind Works* and *The Blank Slate*). Their popular accounts are built on the pioneering theoretical work of what is sometimes referred to as the Santa Barbara school of evolutionary psychology, led by the anthropologists Donald Symons and John Tooby and the psychologist Leda Cosmides, all of the University of California, Santa Barbara.

According to Pop EP, "the human brain consists of a large collection of functionally specialized computational devices that evolved to solve the adaptive problems regularly encountered by our hunter-gatherer ancestors" (from the web site of the Center for Evolutionary Psychology at UCSB). Just as evolution by natural and sexual selection has endowed all humans with morphological adaptations such as hearts and kidneys, says Pop EP, so it has endowed all humans with a set of psychological adaptations, or "mental organs." These include psychological mechanisms, or "functionally specialized computational devices," for language, face recognition, spatial perception, tool use, mate attraction and retention, parental care, and a wide variety of social relations, among other things. Collectively, these psychological adaptations constitute a "universal human nature." Individual and cultural differences are, by this account, the result of our common nature responding to variable local circumstances, much as a computer program's outputs vary as a function of its inputs. The notable exceptions to this rule involve sex differences, which evolved because males and females sometimes faced distinct adaptive problems.

Moreover, since complex adaptation is a very slow process, human nature is designed for the hunter-gatherer lifestyle led by our ancestors in the Pleistocene (the period from 1.8 million to 10,000 years ago). As Cosmides and Tooby colorfully say, "our modern skulls house a Stone Age mind." Pop EP proposes to discover our universal human nature by analyzing the adaptive problems our ancestors faced, hypothesizing the psychological mechanisms that evolved to solve them, and then testing those hypotheses using standard-fare psychological evidence, such as paper-and-pencil questionnaires. Pop EP claims that a number of psychological adaptations have been discovered in this way, including evolved sex differences in mate preferences (males prefer nubility, females prefer nobility) and jealousy (men are more distressed by a mate's sexual infidelity, women by emotional infidelity).

I believe that Pop EP is misguided. The ideas suffer not so much from one fundamental flaw as from many small mistakes. Nonetheless, recent critiques of evolutionary psychology point to some general lessons regarding the shortcomings of Pop EP.

Fallacy 1: Analysis of Pleistocene Adaptive Problems Yields Clues to the Mind's Design

Tooby and Cosmides have argued that, because we can be quite certain that our Pleistocene ancestors had to, among other things, "select mates of high reproductive value" and "induce

potential mates to choose them," we can also be sure that psychological adaptations evolved for solving these problems. But efforts to identify the adaptive problems that drove human psychological evolution confront a dilemma.

On the one horn, while it's true that our ancestors had to "induce potential mates to choose them," for example, such a description is too abstract to provide any clear indication of the nature of human psychological adaptations. All species face the problem of attracting mates. Male bowerbirds build ornately decorated bowers, male hangingflies offer captured prey, and male sedge warblers sing a wide repertoire of songs. Figuring out which strategies ancestral humans had to use requires a much more precise description of the adaptive problem for early humans.

More precise descriptions of the adaptive problems our ancestors faced, however, get impaled by the other horn of the dilemma: these descriptions are purely speculative, because we have little evidence of the conditions under which early human evolution occurred. The paleontological record provides a few clues about some aspects of early human life, but it is largely silent regarding the social interactions that would have been of principal importance in human psychological evolution. Nor do extant hunter-gatherer populations provide many hints about the social lives of our ancestors. Indeed, the lifestyles of these groups vary considerably, even among those who live in the regions of Africa populated by early humans.

Moreover, as the biologist Richard Lewontin of Harvard University has argued, the adaptive problems faced by a species are not independent of its characteristics and lifestyle. Tree bark contributes to the adaptive problems faced by woodpeckers, but stones lying at the foot of a tree do not. In contrast, for thrushes, who use stones to break snail shells, the stones are part of the adaptive problems they face, whereas tree bark is not. Similarly, our ancestors' motivational and cognitive processes would have been selectively responsive to certain features of the physical and social environments, and this selective responsiveness would have determined which environmental factors affected human evolution. So, in order to identify the adaptive problems that shaped the human mind, we need to know something about ancestral human psychology. But we don't.

Finally, even if we could precisely identify the adaptive problems faced by our ancestors throughout human evolutionary history, we still couldn't infer much about the nature of human psychological adaptations. Selection builds solutions to adaptive problems by retaining

modifications to preexisting traits. Subsequent adaptation is always a function of how preexisting traits were modifiable. To know how a solution to an adaptive problem evolved, then, it's necessary to know something about the preexisting trait that was recruited and modified to solve the problem. Without knowledge of our ancestors' psychological traits—which we don't have—we can't know how selection tinkered with them to create the minds we now have.

Fallacy 2: We Know, or Can Discover, Why Distinctively Human Traits Evolved

Biologists are often able to reconstruct the selection pressures that drove a species' evolution by using the comparative method to study a clade, or group of species descended from a common ancestor. Because all the species in the group are descended from a common form, differences between them may be due to variations in the environmental demands they faced. When a trait is shared by two or more species in a clade, but not by the others, it is sometimes possible to identify environmental demands common to those species, but absent among the species without the trait. Correlating trait differences with specific environmental variations, in this way, can indicate the environmental demands to which a trait is adapted.

But the comparative method offers little help for Pop EP's aspiration to reveal the adaptive history of the psychological traits—including language and forms of higher cognition—that putatively constitute human nature. Pinker, for example, has argued eloquently that language is an adaptation for verbal communication of infinite combinatorial complexity. He is probably right that language is an adaptation. But discovering why it evolved, what it is an adaptation for, requires identifying the adaptive functions that language served among early language users. To employ the comparative method to answer such questions, we need to compare some human psychological trait with its homologous form in species with whom we share a common ancestor. Here looms the problem. Among extant species, our closest relatives are the chimpanzee and the bonobo, with whom we share a common ancestor that lived approximately six million years ago. But even these, our closest relatives, don't possess forms of the complex psychological traits, such as language, whose evolution Pop EP aspires to explain. So we can't identify the environmental demands we share with our closest relatives to see what our common psychological traits are adapted to. Rather, we need to identify the environmental demands that drove our evolutionary separation from our closest living relatives during the past six million years.

What could enlighten us about these evolutionary events would be information about the ecology and lifestyle of more closely related species with whom we share some higher cognitive abilities. Then, perhaps, we could identify environmental demands shared with them but absent among the chimpanzee and bonobo (and other primates). The species that fit this bill are the other hominins, the australopithecines and the other species in the genus *Homo*. Unfortunately, all other hominins are extinct. And dead hominins tell (virtually) no tales about their evolutionary histories [see "Once We Were Not Alone," by Ian Tattersall; *Scientific American*, January 2000]. So there is a dearth of evidence necessary for using the comparative method to illuminate the evolutionary history of distinctively human traits. (That is why there are several theories about the evolution of language, but no suggestions about how evidence can be used to choose among them.)

The comparative method does, however, sometimes provide useful information about distinctively human adaptations. But, as the philosopher Jonathan Kaplan of Oregon State University has pointed out, when it does so, it is not for traits that are universal among humans, but for traits that appear in only some human populations. For example, we know that the gene that produces sickle-cell anemia (when a person has two copies of the gene) is an adaptation for resistance to malaria (when a person has just one copy of the gene). Our evidence derived from comparing human populations that have the gene with human populations that don't, and identifying the environmental demands correlated with its presence. Because the comparative method has illuminated such physiological adaptations, it's reasonable to suppose it could illuminate some psychological adaptations as well. But this is cold comfort to Pop EP, which claims that all human psychological adaptations are, in fact, universal among human populations. It is precisely such universal and distinctively human traits for which the comparative method offers little use. Therefore, it is unlikely that accounts of the evolution of our alleged universal human nature will ever rise above the level of speculation.

Fallacy 3: "Our Modern Skulls House a Stone-Age Mind"

Pop EP's claim that human nature was designed during the Pleistocene, when our ancestors lived as hunter-gatherers, gets it wrong on both ends of the epoch.

Some human psychological mechanisms undoubtedly did emerge during the Pleistocene**.** But others are holdovers of a more ancient evolutionary past, aspects of our psychology that are

shared with some of our primate relatives. The evolutionary neuroscientist Jaak Panksepp of Bowling Green State University has identified seven emotional systems in humans that originated deeper in our evolutionary past than the Pleistocene. The emotional systems that he terms Care, Panic, and Play date back to early primate evolutionary history, while the systems of Fear, Rage, Seeking, and Lust have even earlier, pre-mammalian origins.

Recognition of our deeper evolutionary history can greatly affect how we understand human psychology. Consider human mating. Buss has argued that human mating strategies were designed during the Pleistocene to solve adaptive problems that were unique in shaping human evolution. Accordingly, observing that humans pursue both short-term and long-term mating (sometimes indulging in brief infidelities in the context of an ongoing mateship), he interprets these behaviors as aspects of an integrated set of psychological adaptations that unconsciously calculate the reproductive benefits of each strategy. When the potential reproductive benefits of a short-term mating opportunity are greater than the potential costs, these adaptations lead to infidelity.

If we recognize that aspects of our psychology are holdovers of pre-human evolutionary history, we get a very different picture. Indeed, since our closest relatives, the chimpanzee and bonobo, are highly promiscuous species, our lineage likely embarked upon the uniquely human leg of its evolutionary journey with a mechanism of lust designed to promote promiscuous mating. Psychological characteristics that subsequently emerged during human evolutionary history were built atop that foundation. And we know that some emotional systems subsequently evolved to promote the pair-bonding that is ubiquitous among human cultures but absent in our closest primate relatives. We have no reason, however, to think that mechanisms of lust and pair-bonding evolved together as parts of an integrated mating strategy. Indeed, they likely evolved as separate systems, at diverse points in our lineage's evolutionary history, in response to different adaptive demands, to serve distinct purposes.

If this alternative interpretation of human mating psychology is correct, we are not "of one mind" about our sexual relationships. Rather, we possess competing psychological urges. We are pushed toward promiscuity by evolutionarily ancient mechanisms of lust and toward long-term pair-bonds by more recently evolved emotional systems. Rather than being driven by an integrated Pleistocene psychology that unconsciously calculates which urge to pursue when, we are torn by independently evolved emotional mechanisms.

The idea that "our modern skulls house a Stone Age mind" gets things wrong on the contemporary end of our evolutionary history as well. The idea that we are stuck with a Pleistocene-adapted psychology greatly underestimates the rate at which natural and sexual selection can drive evolutionary change. Recent studies have demonstrated that selection can radically alter the life-history traits of a population in as few as 18 generations (for humans, roughly 450 years). Of course, such rapid evolution can occur only with significant change in the selection pressures acting on a population. But environmental change since the Pleistocene has unquestionably altered the selection pressures on human psychology. The agricultural and industrial revolutions precipitated fundamental changes in the social structures of human populations, which in turn altered the challenges humans face when acquiring resources, mating, forming alliances, or negotiating status hierarchies. Other human activities—ranging from constructing shelter to preserving food, from contraception to organized education—have also consistently altered the selection pressures. Because we have clear examples of post-Pleistocene physiological adaptation to changing environmental demands (such as malaria resistance), we have no reason to doubt similar psychological evolution.

Moreover, human psychological characteristics are the product of a developmental process involving interaction between genes and the environment. Even if little genetic evolution has taken place since the Pleistocene, which is doubtful, human environments have changed in profound ways, as the examples above indicate. Any Pleistocene-selected genes we possess will interact with these new environments to produce psychological traits that may differ in important ways from those of our Pleistocene ancestors. So there is no good reason to think that all of our evolved psychological characteristics remain adapted to the lifestyle of Pleistocene hunter-gatherers.

Fallacy 4: The Psychological Data Provide Clear Evidence for Pop EP

Pop EP argues that its speculations about our Pleistocene past have led to the discovery of many of the psychological adaptations that control our behavior. Because the approach has worked, it must be on to at least part of the truth about human evolutionary history. Of course, the soundness of this argument turns on the strength of the evidence for Pop EP's alleged discoveries. That evidence usually consists of standard psychological pencil-and-paper data (such as responses to forced-choice questionnaires), but sometimes also includes a limited array

of behavioral data. However, as I argue at length in *Adapting Minds*, the evidence is typically inconclusive, at best. Pop EP's favored evolutionary hypotheses are, as the philosopher Robert Richardson of the University of Cincinnati recently quipped, "speculation disguised as results." The appearance that the evidence is compelling is created less by the data themselves than by the failure to consider, and adequately test, viable alternative explanations. Consider a single illustration of this point.

Buss argues that jealousy evolved as an emotional alarm that signals a partner's potential infidelities and causes behavior designed to minimize losses of reproductive investment. Among our ancestors, the argument continues, infidelities entailed different reproductive costs for the two sexes. For men, a female's *sexual* infidelity signified that he might be investing parental resources in another male's offspring. For women, it was a male's *emotional* involvement with another woman that could lead to the loss of his resources. And, indeed, Buss claims to have discovered the requisite sex difference in the evolved "design features" of the jealous mind: the male mind is more sensitive to cues of sexual infidelity, while the female mind is more sensitive to cues of emotional infidelity.

The principal data cited in support of this theory are responses to forced-choice questionnaires. One questionnaire item, for example, asks subjects which they find more upsetting, "imagining your partner forming a deep emotional attachment" to a rival or "imagining your partner enjoying passionate sexual intercourse" with a rival. The results consistently show that more men than women report the thought of a partner's sexual infidelity to be more distressing than the thought of a partner's emotional infidelity.

But such data are hardly conclusive evidence of sex-differentiated psychological adaptations. Instead, both sexes could have the same evolved capacity to distinguish threatening from nonthreatening infidelities and to experience jealousy to a degree that is proportional to the perceived threat to a relationship in which one has invested mating effort. This shared capacity could generate Buss's questionnaire results because of acquired beliefs about a sex difference in the types of behavior that pose a threat to a relationship. In fact, several studies have found that it is widely believed, by both sexes, that men are more likely than women to have sex in the absence of any emotional involvement. Given this belief, men will find a woman's sexual infidelity more threatening than women will find a man's sexual infidelity, because female sexual infidelity is more likely to be accompanied by emotional involvement.

This alternative hypothesis also readily accounts for data that aren't easily accommodated by the theory that there is a sex difference in the evolved design features of the mind. First, homosexual men are even less likely than heterosexual women to find sexual infidelity more upsetting than emotional infidelity. And homosexual males, as a group, are also less likely than heterosexual males or females to believe that sexual infidelity poses a threat to the primary relationship. If the sexes share the same capacity for jealousy, with the degree of sexual jealousy determined by the degree of the perceived threat to a relationship, homosexual males' tendency not to find sexual infidelity threatening would cause them to depart from the male norm.

Second, the degree to which males find the prospect of a female partner's sexual infidelity upsetting varies significantly among cultures. For example, only about a quarter of German males report sexual infidelity to be more upsetting than emotional infidelity. Interestingly, Buss and his colleagues have themselves noted that the German culture has "more relaxed attitudes about sexuality, including extramarital sex, than does the American culture." So, German males should be less likely than American males to believe that a female partner's sexual infidelity threatens a relationship, hence less likely to be distressed by sexual infidelity than American males. Again, this cultural difference is precisely what we should expect if degree of sexual jealousy is a function of the degree to which sexual infidelity is perceived as a threat to a relationship.

It's unclear why Pop EP resists the idea that the sexes share the same emotional mechanism of jealousy and that attitudinal differences are a function of differences in the beliefs processed by the mechanism. According to Pop EP, many cultural differences stem from a common human nature responding to variable local conditions. Yet cultural differences are often more profound than the sex differences that Pop EP has transformed into sensational theory. If cultural variation can result from a common nature responding to dissimilar inputs, surely sex differences in attitudes and behavior can too.

Coda

Among Darwin's lasting legacies is our knowledge that the human mind evolved by some adaptive process. After all, the human brain is even more costly to run than an internal combustion engine these days, consuming 18 percent of the body's energy intake, while

comprising merely 2 percent of its weight. We wouldn't have such an organ if it hadn't performed some important adaptive functions in our evolutionary past.

The challenge for evolutionary psychology is to move from this general fact to some evidentially well supported specifics about the adaptive processes that shaped the mind. But, as we have seen, the evidence needed to substantiate accounts of adaptation in our lineage during the past couple of million years is scarce. And this isn't the sort of evidence that is likely to materialize; such evidence is lost to us, probably forever. It may be a cold, hard fact that there are many things about the evolution of the human mind that we will never know, and about which we can only idly speculate.

Of course, some speculations are worse than others. Those of Pop EP are deeply flawed. We are unlikely ever to learn much about our evolutionary past by slicing our Pleistocene history into discrete adaptive problems, supposing the mind to be partitioned into discrete solutions to those problems, and then supporting those suppositions with pencil-and-paper data. The field of evolutionary psychology will have to do better. Even its very best, however, may never provide us knowledge of why all our complex human psychological characteristics evolved.

More to Explore

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