

Evolutionary Psychology: The Wheat and the Chaff

Frans B.M. de Waal¹

Yerkes Primate Research Center, Emory University, Atlanta, Georgia

Abstract

Evolutionary approaches are on the rise in the social sciences and have the potential to bring an all-encompassing conceptual framework to the study of human behavior. Together with neuroscience, which is digging the grave of mind-body dualism, evolutionary psychology is bound to undermine the still reigning human-animal dualism. If a Darwinian reshaping of the social sciences seems inevitable, even desirable, this should not be looked at as a hostile takeover. The underlying theme of this essay is that it is time for psychologists to join the Darwinian revolution, yet the essay also critically reviews current evolutionary psychology. It questions the loose application of adaptationist thinking and the fragmentation of the genome, behavior, and the brain. From biology we learn that not every species-typical trait is necessarily advantageous, and from neuroscience we learn that not every psychological ability or tendency necessarily needs to have its own specialized brain circuitry. But even if the concept of adaptation is hard to apply, psychologists would do well to start looking at human behavior in the light of evolution.

Keywords

evolution; adaptation; modularity; biology

Few topics are as hotly debated within psychology today as evolutionary psychology. It is not that the issues are new—some go back to William James and the heyday of social Darwinism—but evolutionary ideas about human behavior are being forwarded with new force, backed by innovative concepts derived from the study of animal behavior, at a time when the once-popular environmental and cultural explanations are increasingly recognized as inadequate.

The stated goal of evolutionary psychology is to provide an evolutionary account of human behavior. By hypothesizing about the selection pressures that have shaped behavior in the past, evolutionary psychologists expect to arrive at testable hypotheses about present behavior. Because evolutionary psychology does not focus on genetic explanations at the exclusion of other explanations, it is not genetically deterministic, even though it obviously emphasizes genetic evolution more than psychologists have been used to. Whereas its objectives are broad and laudable enough, evolutionary psychology is unfortunately better known for a few narrow theories about why women fall for rich guys, why stepfathers are not to be trusted, and how rape is only natural. Moreover, in the promotion of these ideas, theoretical convictions have often been more conspicuous than data. Nonetheless, there is no way around an evolutionary approach to human behavior. Although I take a critical approach to evolutionary psychology in this essay, my arguments should not be taken

to mean that it has no future. On the contrary, I see evolutionary psychology as an inevitable, even desirable development plagued by serious growing pains that need to be addressed for its own good.

Looking at the social sciences as a relative outsider, I see thousands of ideas that are barely interconnected (Staats, 1991). One could argue that they do not need to interconnect, yet this amounts to an admission that every area within the discipline is free to come up with its own explanations. This approach results in a serious lack of mooring to the thinking in psychology, a lack of an overarching scheme within which everything must make sense.

A younger generation of psychologists, anthropologists, and even economists and political scientists is gaining enthusiasm for a Darwinian framework, which has the potential to tie together the forest of hypotheses about human behavior now out there. My hope is that this generation will turn evolutionary psychology into a serious and rigorous science by being critical of its premises without abandoning the core idea that important aspects of human behavior have been naturally selected. In the end, evolutionary theory may serve as the umbrella idea so desperately needed in the social sciences (Wilson, 1998).

Even though psychology is at the forefront in moving closer to the life sciences, it has not yet freed itself from certain aspects of Western philosophy, which ultimately came out of the Christian tradition. Psychology is still burdened with ancient dualisms, such as those between body and mind, human and animal, and nature and culture. It will have to rid itself of these dualisms before it can fully integrate with the life sciences and their non-Christian, Aristotelian foundation. Whereas we can safely leave it to cognitive neuroscience to do away

with any lingering mind-body dualism, and to students of animal culture to bridge the nature-culture gap, psychology will also need to get over its pervasive human-animal dualism.

DARWINISM 101

But before evolutionary psychology can be successful, social scientists will need training in evolutionary theory. Many of the problems surrounding evolutionary psychology have nothing to do with whether human behavior has been subject to evolution by natural selection—which to me is a given—but rather concern how broad or narrow a view of evolution one embraces. Many followers of evolutionary psychology overlook some of the simplest truths coming out of evolutionary theory.

Dobzhansky (1973) wrote an article with the now-famous title “Nothing in Biology Makes Sense Except in the Light of Evolution.” This obviously means that leaving evolution out of basic science education constitutes a fatal deficiency. Because of continuing resistance to evolutionary theory, however, this deficiency unfortunately characterizes large parts of the U.S. public school system. After such an education, the young social scientist goes to the university, where the curriculum, with few exceptions, also neglects evolutionary theory. As a result, the way evolutionary theory is applied to human behavior is often riddled with curious errors. The most basic one is taking the existence of a trait to mean that it must be good for something, thus ignoring the warning of Williams (1966), a contemporary evolutionary biologist, that “adaptation is a special and onerous concept that should be used only when it is really necessary” (pp. 4–5).

An example straight out of the evolutionary psychology literature—and I could offer hundreds more—is found right in the opening sentence of a recent article. It states: “Both male facial hair and male pattern baldness are genetically based, suggesting that they contributed to fitness” (Muscarella & Cunningham, 1996, p. 99). Later in the same article, we learn that male pattern baldness may signal social maturity, described as a friendly kind of dominance based on wisdom. Is this supposed to explain why we have an entire industry that removes hair from men’s heads? Obviously, every man wants to look mature and wise!

The first common mistake in evolutionary explanations, then, is to think that if something is genetically influenced it must serve a purpose. Alzheimer’s disease and cystic fibrosis have a genetic basis, as do many other diseases, but no one would argue that they contribute to fitness. In addition, many characteristics are by-products of others, and all that matters from an evolutionary perspective is that the entire set of traits serves survival and reproduction. Many individual traits are imperfectly designed or positively costly. A human example is our back: Our species is not fully suited for an upright posture, hence many of us suffer back problems, such as hernias, slipped disks, and neck pain. Walking upright must have had great benefits for these costs to be tolerable, even though there exists no universally accepted theory of why we walk upright.

It is no wonder that biologists often refer to the evolutionary process as “tinkering.” Ballast often remains visible in the end-product. Ironically, then, the natural world is rampant with flawed designs that reflect the trouble evolution has had turning one form into another, such as a quadruped into a biped.

RAPE AS ADAPTATION

The lesson from the foregoing is that one cannot atomize the organism. One cannot single out a trait for an adaptive story, as is often done in evolutionary psychology. Rather, one needs to (a) consider the entire set of traits and (b) trace the organism’s phylogeny, that is, the ancestral forms that produced it.

In moving this observation to human behavior, it is impossible to ignore the evolutionary psychology book that has raised most eyebrows. In *A Natural History of Rape*, Thornhill and Palmer (2000) postulated that rape is an adaptation; that is, rape may have been favored by natural selection because it furthered male reproduction. The authors extrapolated straight from Thornhill’s insect studies, which showed that there are indeed species with male anatomical features that seem designed to force females into sexual contact. But these are flies, and in humans rape is part of a far larger picture. Rape occurs at the interface of sex and power, two rich and complex areas of human behavior that are obviously interconnected. It is hard to see how any serious treatment of rape can rip it from this larger context, explaining it as an isolated behavior, as Thornhill and Palmer tried to do.

To be called an adaptation, rape would need to have its own genetic basis separate from the genetic bases of other sexual tendencies, as well as personality characteristics, such as impulsivity or aggressivity. Rape would also need to offer special reproductive advantages, and have been favored by selection for this very reason. These are heavy requirements that raise a number of pressing questions. Do we know if rapists are genetically unique? What are the advantages of rape, if any, in terms of reproduction? Are

there costs associated with rape? In relation to the latter question, imagine a small ancestral community in which a man raped the wives and daughters of other men. I do not think this man would have had good survival chances. And why do men sometimes rape partners who are perfectly willing to engage in consensual sex? Declaring rape an adaptation raises a multitude of questions, questions that Thornhill and Palmer have failed to answer.

A major problem with the strategy of singling out rape for evolutionary explanation is that the behavior is shown by only a small minority. The same criticism applies to Daly and Wilson's (1988) well-known work on infanticide by stepparents. They explained this category of infanticide as arising from a lack of shared genes with adoptive offspring. I would argue that in seeking to understand rare behavior we should never ignore the norm. If child abuse by stepfathers is evolutionarily explained, why do so many *more* stepfathers lovingly care for their children than abuse them? And if rape is such an advantageous reproductive strategy, why are there so many *more* men who do not rape than who do? I have called this the dilemma of the rarely exercised option: A Darwinian account of an atypical behavioral choice is incomplete without at least an equally good account of the typical choice (de Waal, 2000).

THE MODULE EXPLOSION

Followers of evolutionary psychology often talk about a gene for this or a brain module for that, seeking to dissect the whole to explain each part separately. If this cannot be done with the components of a watch spread out on the

table, it most certainly cannot be done with the genome, the organism, and its behavior. As for the brain, the current trend to divide brain function into modules reminds me of early ethology, when there was no limit to the number of instincts one could propose: from self-preservation to aggression, and from sex to motherhood. In the 1950s, each species-typical tendency had its own instinct, and Konrad Lorenz's *Instinktlehre* (German for "instinct doctrine") even included a "parliament" of instincts to indicate how all components together influence decisions. These ideas applied mainly to nonhuman species, but human instincts have been proposed many times as well, most energetically by self-declared evolutionary psychologist McDougall (1908). Similarly, proponents of evolutionary psychology have compared the brain to a Swiss army knife to which evolution has one by one added modules for everything from face recognition, to tool use, preference for kin over nonkin, child care, friendship, detection of cheaters, and theory of mind² (Tooby & Cosmides, 1992).

One problem with this approach—apart from the fact that brain modules at any specific task level have yet to be demonstrated—is that this would make for an incredibly unwieldy brain, much like a computer to which a new chip would need to be added each time we install another program: one chip for word processing, one for games, one for spreadsheets, and so on. Instead, a computer is a multipurpose device that allows each application to draw on its full potential.

This is not to imply that the brain is a *tabula rasa*. It seems prepared to acquire certain skills more easily than others, and to be waiting for certain kinds of information. The studies by Tooby and Cosmides (1992) do indeed suggest

such preparation, as do many animal studies, going back to the early work on imprinting, according to which ducks and geese are preprogrammed to pick up information about their species in the first days of life. What makes this happen is unclear, however, and the various labels now in use to indicate genetic influences on behavior—from biogrammar, to biological algorithm, brain module, epigenetic rule, and learning predisposition—are really not much better at solving the mystery than the good-old instinct concept. The term module, in particular, carries the connotation of a brain part that is self-contained, encapsulated, and localized, rendering the idea unpalatable to neuroscientists (Panksepp & Panksepp, 2000). Quite possibly, our preparedness for particular sets of stimuli or problems (e.g., the facility with which we recognize faces; Gauthier & Tarr, 1997) boils down to learned stimulus relevance rather than specialized brain circuitry.

Williams (1966) was right to warn that adaptation is an onerous concept that should be applied parsimoniously. What evolutionary psychology needs to develop is a taste for multilevel thinking in which attention freely shifts between immediate (proximate) explanations of behavior, which are the traditional domain of psychology, and evolutionary (ultimate) explanations. In other words, it needs to address both the "how" questions of how things work and the "why" questions of why evolution favored a particular behavior—to put a little less evolution and a little more psychology into its explanations.

CONCLUSION

Current problems with evolutionary psychology may be serious,

but they are not insurmountable. Evolutionary psychology is bound to overcome them. I dare predict that 50 years from now every psychology department will have Darwin's bearded portrait on the wall. Evolutionary approaches have the potential to introduce a conceptual framework that will accommodate or replace the current proliferation of disconnected theories in the study of human behavior.

Even though evolutionary psychology, like the rest of psychology, oftentimes acts as if the human species is a world apart, it cannot help but undermine its own anthropocentrism given the source of the theories that it is so eagerly

adopting. They derive from scientists, such as Darwin, who first of all were naturalists. If evolutionary psychology embraces Edward Wilson it cannot help but get covered in ants, and if it embraces William Hamilton it cannot overlook the beetles and parasites that fascinated this brilliant biologist. With regard to animals closer to us, the parallels are even more striking. Chimpanzees, for example, engage in political alliances when jockeying for power, show empathy toward others in distress, establish an economy of services and favors, and reconcile with opponents after a fight by means of a kiss and embrace (Fig. 1; de Waal,

1982/1998, 1996). Because evolutionary explanations require close attention to phylogeny, and given that primatologists are used to behavioral complexity not unlike that of our own species, evolutionary psychology and primatology make natural partners.

The questions asked by evolutionary psychology may strike some readers as simplistic, yet they are here to stay. Questions about why we choose particular mates, avoid incest, and favor kin, and what modes of cooperation we engage in, for example, are not the traditional questions of psychology, yet they emerge naturally from an evolutionary perspective.



Fig. 1. Example of chimpanzees' use of eye contact and hand gestures to invite a reconciliation. This photograph shows the situation 10 min after a protracted, noisy conflict between two adult males at the Arnhem Zoo in the Netherlands. The challenged male (left) fled into the tree, but 10 min later his opponent stretched out a hand. Within seconds, the two males had a physical reunion and climbed down together to groom each other on the ground. Photograph by the author.

These basic questions are central to any evolutionary approach. Psychologists who do not like the simplicity of the answers currently coming out of evolutionary psychology should make an effort to improve them, to broaden its intellectual horizon, because all of psychology would stand to gain from a more enlightened evolutionary psychology.

Recommended Reading

- de Waal, F.B.M. (1999). The end of nature versus nurture. *Scientific American*, 281, 94–99.
- de Waal, F.B.M. (2001). *The ape and the sushi master: Cultural reflections by a primatologist*. New York: Basic Books.
- Mayr, E. (2001). *What evolution is*. New York: Basic Books.
- Zimmer, C. (2001). *Evolution: The triumph of an idea*. New York: Harper Collins.

Acknowledgments—I thank Allison Berger and Virginia Holt for providing

the transcript of my 2001 Focus on Science Plenary Address, which was presented at the annual meeting of the American Psychological Association in San Francisco and was on the topic of this essay. I am also grateful to Mauricio Papini and Scott Lilienfeld for comments on previous versions of the manuscript.

Notes

1. Address correspondence to Frans B.M. de Waal, Living Links, Yerkes Primate Research Center, Emory University, 954 N. Gatewood Rd., Atlanta, GA 30322.
2. Theory of mind means that one understands the mental states of others (a capacity that may be limited to humans and apes).

References

- Daly, M., & Wilson, M. (1988). *Homicide*. Hawthorne, NY: Aldine de Gruyter.
- de Waal, F.B.M. (1996). *Good natured: The origins of right and wrong in humans and other animals*. Cambridge, MA: Harvard University Press.
- de Waal, F.B.M. (1998). *Chimpanzee politics*. Baltimore: Johns Hopkins University Press. (Original work published 1982)
- de Waal, F.B.M. (2000, April 2). Survival of the rapist [Review of the book *A natural history of rape: Biological bases of sexual coercion*]. *New York Times Book Review*, pp. 24–25.
- Dobzhansky, T. (1973). Nothing in biology makes sense except in the light of evolution. *American Biology Teacher*, 35, 125–129.
- Gauthier, I., & Tarr, M.J. (1997). Becoming a “Greeble” expert: Exploring mechanisms for face recognition. *Vision Research*, 37, 1673–1682.
- McDougall, W. (1908). *An introduction to social psychology*. New York: Putnam.
- Muscarella, F., & Cunningham, M.R. (1996). The evolutionary significance and social perception of male pattern baldness and facial hair. *Ethology & Sociobiology*, 17, 99–117.
- Panksepp, J., & Panksepp, J.B. (2000). The seven sins of evolutionary psychology. *Evolution and Cognition*, 6, 108–131.
- Staats, A.W. (1991). Unified positivism and unification psychology: Fad or new field? *American Psychologist*, 46, 899–912.
- Thornhill, R., & Palmer, C.T. (2000). *A natural history of rape: Biological bases of sexual coercion*. Cambridge, MA: MIT Press.
- Tooby, J., & Cosmides, L. (1992). The psychological foundations of culture. In J. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 19–136). New York: Oxford University Press.
- Williams, G. (1966). *Adaptation and natural selection*. Princeton, NJ: Princeton University Press.
- Wilson, E.O. (1998). *Consilience: The unity of knowledge*. New York: Knopf.