What Can Evolution Tell us About the Healthy Mind?

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John Dupré

University of Exeter

Introduction

Change in science is commonly thought of as being endogenously driven. The internal logic of a body of scientific theory suggests lines of experimental or theoretical investigation, and unanticipated results of such investigations prompt more or less major modifications to the theory. But there are also exogenous sources of change from quite distinct and sometimes distant successful theories, which offer new ways of looking at a domain or findings that must be reconciled with a distinct domain. New ways of doing chemistry grew out of the acceptance of quantum mechanics, for example, and geological views about the rates of geological change had to be reconciled with new technologies for radio-active dating.

Generally this kind of cross-fertilisation between scientific research programmes should be seen as beneficial. But in some cases it can be less benign. It is a natural tendency for a successful research programme to attempt to apply itself as widely as possible, and sometimes this can lead to attempts to colonise areas of enquiry for which it is poorly equipped. I have described this process, in its worst manifestations, as scientific imperialism (Dupré 1994). The power and generality of the central idea of natural selection has made it a particularly attractive base for such imperialism; *loci classici* are the notorious aspirations to colonise the humanities and social sciences in E. O. Wilson's *Sociobiology* (1975), or Daniel Dennett's conception of natural selection as a universal acid (Dennett 1995), capable of dissolving a vast array of problems.

It is hardly surprising that attempts have been made to expand the scope of evolutionary theory to the domain of human behaviour, a project initiated by Darwin himself in *The Descent of Man*. Given that we evolved, and that therefore our behaviour evolved, such attempts are surely sensible. Nevertheless, the processes through which our behaviour evolved may be very different from those responsible for most of biological evolution; and biological evolution itself may involve a wider range of processes than are typically given much weight. So there are good reasons why these expansionist projects may prove unsuccessful. One project of this kind that has been particularly prominent for the last thirty years is the Evolutionary Psychology associated especially with Leda

Cosmides and John Tooby (see, e.g., Barkow, Cosmides and Tooby 1992). It is also, according to several philosophers, including myself (Dupré 2001), a deeply ill-conceived project.
Some fields of investigation seem particularly liable to invite contributions from outside, whether beneficial or malignly imperialistic. It is unsurprising that psychiatry should be such a field, both because it lacks a dominant paradigm equipped to repel invaders, and because the complexity of the phenomena it addresses will very likely benefit from being considered from multiple perspectives. As papers in the present volume illustrate, fields including genetics, neurophysiology and evolution have volunteered to reform psychiatric thinking. All of these may well have significant contributions to make, though almost certainly less extensive contributions than their more enthusiastic advocates suppose. This chapter will explore the claims of Evolutionary Psychiatry, derived directly from the school of Evolutionary Psychology mentioned above, to hold the key to a proper understanding of the diseases of the mind. The paper will outline the deficiencies of some of the arguments offered in favour of this reforming movement. More generally, it is hoped, it will provide a cautionary tale to deter excessive enthusiasm in assessing such offers of radical reform from distant intellectual arenas.

Evolution and the Human Mind

I introduce the substantive discussion of this paper with some platitudes. First, we evolved: our distant ancestors were much simpler organisms, and at some point in the very distant past there are ancestors that we share with all other terrestrial organisms. I do not make any assumptions about the process of evolution, for example on the role of natural selection or the extent to which natural selection guarantees optimal outcomes. It does follow from the fact that we evolved, however, that our capacities to develop healthy or unhealthy minds are products of our evolutionary history.

What does not follow from any of the above is that evolutionary theory will be useful in understanding either what constitutes a healthy mind or why, and under what circumstances, our minds sometimes become unhealthy. There are at least two reasons for this. First, our concepts of health and disease are partly normative concepts. This is most obviously the case for psychological health. At some historical periods homosexuality, for instance, was taken to be a disease; moral reflection and political action have subsequently overturned this categorisation. This is not to deny that there is an organic basis for many mental disorders or traits (homosexuality might in principle turn out to have a systematic neurological cause), nor that some organic conditions can produce conditions that would be drastically debilitating in any imaginable society. It is rather a reminder that in attempting to understand a psychiatric disorder we should always be prepared to ask why this condition is judged pathological. In some cases, no doubt, the answer will be obvious.

The normativity of at least some kinds of psychopathology is hardly controversial. Continuing the previous illustration, it was not that long ago homosexuality was considered both a disease and a crime. It was then hazardous to be homosexual—leading to disastrous outcomes such as incarceration—and even today it exposes people to dangers from social discrimination and the violence of homophobic gangs. This observation points to the second problem I want to stress for evolutionary approaches to the pathological: pathology is a relation between an organism and an environment not, in general, an intrinsic feature of an organism. Although, as noted above, there are conditions that would very probably be considered pathological in just about any imaginable society, these constitute a limiting case rather than the paradigm. There is a sense in which homosexuality really is a pathology in a homophobic society: it is a dangerous and unhealthy behavioural disposition, though the danger derives not from any inherent features of the trait, but from the behaviour it may precipitate in others.

We might also consider the suggestion deriving from Foucault that homosexuals, as a class of people with a particular distinguishing characteristic, are a social construct. Where once homosexual acts were just a behaviour that many or most people engaged in on occasion, they were gradually interpreted as the symptoms identifying a special kind of person, or a pathology afflicting an unfortunate or sinful minority. While not forgetting that there are people with massive cognitive deficits that impair their functioning in any imaginable society, psychiatry is often concerned with more subtle mismatches between individual behaviour and social norms. Much psychopathology can be, to a greater or lesser extent, partly constructed by these norms. This is nicely illustrated by Ian Hacking's discussion (this volume) of the conditions under which (some) autistic people can lead worthwhile lives. My point here is not to promote general scepticism about psychopathology but only to recall the quite familiar difficulty of saying what it is, what its various manifestations are, and what are the conditions, internal and external to the patient, that make these manifestations pathological. This is important for understanding the difficulties with evolutionary approaches to the subject that will be the main topic of this paper.

Is evolution the key to understanding human behaviour?

While evolutionary theory has had extraordinary successes in explaining biological phenomena, it is quite another matter to use it to predict, to tell us what organisms must be like ahead of our empirical discovery that they are or are not like that. Advocates of an evolutionary approach to psychiatry do not merely point to a well-understood phenomenon, say schizophrenia, and explain how it came about. Given the limitations of our understanding of the mind it is inevitable that a general theory of its origin and function will reshape the categories in which we think about the

mental. Evolutionary theorists indeed do propose that reflection on the evolutionary origins of our psychopathologies will help us to understand what these are, and even whether they are pathological. What they propose is, therefore, often more like prediction than explanation.

There are several grounds for scepticism about this general project. Evolution is an extremely complex process, the upshot of processes of many different kinds, and the nature and importance of these is by no means fully understood (Dupré 2012, Ch. 9; Gould and Lewontin 1979). Moreover, if there is one feature that most clearly distinguishes human behaviour, it is its plasticity. Of course, this plasticity evolved. But what is part of the normal scope of this evolved plasticity, and what lies beyond it in the realm of the abnormal or pathological, becomes a difficult, perhaps even incoherent, question. At any rate, behavioural plasticity makes it easy to understand how the realm of the normal may be an evolving function of the social environment as much or more than an intrinsic feature of the individual. With these concerns in mind, I turn to the claims made by advocates of evolutionary psychiatry for the relevance of their approach. Perhaps the best known such advocate is Randolph Nesse.

Nesse on the proper functioning of the emotions.

The evolutionary approach to psychiatric issues is well illustrated by Nesse's treatment of emotional disorders (Nesse and Jackson 2006). Nesse and Jackson's starting point is that we need evolutionary insight to understand why the emotions exist at all and hence what their proper functions are. Only from this perspective can we provide a proper taxonomy of emotions, realising for example that sadness, depression or anxiety may have different evolutionarily derived functions. Identification of these functions, in turn, can show us that some distressing emotions are normal given their occurrence in circumstances for which they are appropriate. This realisation will enable the avoidance of false positives that can lead to inappropriate attempts to treat normal, functional emotional states. More generally, the evolutionary perspective is required if we are to analyse the motivational structure of an individual's life.

I offer no opinion on whether Nesse and Jackson's evolutionary reflections may have provided valuable insights into emotional disorders. Nevertheless, the path by which they have reached them is problematic. First, as already noted, inferring how something evolved presupposes knowing what it is that evolved. It is not now possible, and very probably never will be possible, to infer what features an organism must have from reflection on its evolutionary history. So whether sadness, depression and anxiety are importantly different states is a question for empirical investigation of contemporary humans, not for theoretical evolutionary speculation.

A second difficulty is the omnipresence of exaptation, the adaptation of traits evolved to serve one function to entirely different uses. The fact that lungs evolved from structures that served to keep our fishy ancestors afloat doesn't imply that our present lungs are really flotation devices. This is a general problem with evolutionary accounts of function, which has led philosophers to the 'recent history' account of function, the idea that function is what currently maintains or has recently maintained a trait in a population (Godfrey-Smith 1994). The plasticity of human behaviour makes it plausible that exaptation could happen on a very short time scale, so that identifying what evolutionary psychologists refer to as the 'environment of evolutionary adaptation' (see further discussion below) becomes an extremely difficult task.

Given these problems, it is no surprise that the possibility of inferring the functional organisation of individuals from evolutionary reflection is typically grounded in simplistic and increasingly outdated ideas about evolution. Here are two indicative quotes, again from Nesse (2008):

"biologists have known for decades that selection is much stronger at the level of the individual, so benefits to groups are rarely substantial."

"There is no single normal genome, there are just genes, some of which have been more successful than others in making bodies that survive to reproduce."

Both of these statements are highly contentious. While group selection became very unfashionable in the 1970s and 80s, especially under the influence of Williams (1966) and the very successful popularisation of Williams's views by Dawkins (1976), more recently the issue has become far more open (Sober and Wilson 1998). Notoriously, group selection has recently been strongly endorsed by E. O. Wilson (2012), the founder of sociobiology (Wilson 1975), the intellectual ancestor of Evolutionary Psychology. Needless to say, perhaps, the question of group selection is of central relevance to human behaviour, much of which is undoubtedly directed at developing and maintaining cohesion and cooperation within groups, whether or not that is the evolutionary explanation of its existence.

The status of genes is also a matter of intense debate among philosophers of biology (Stotz and Griffiths 2013). An uncontentious point is that the behaviour of genes, whatever exactly these are, is always dependent on many aspects of their cellular context, including other features of the genome. Arguably the genome is a much less theoretically problematic entity than the gene (Barnes and Dupré 2008). Certainly there is no normal genome if that is taken to mean some precise sequence of nucleotides; but there is a great deal more to a genome than a sequence of nucleotides. And in fact equally, there surely are abnormal, or at least pathological, genomes, for example trisomies such as

that which results in Down syndrome. There are invariably pathological genes, for example the extended trinucelotide repeat that causes Huntington's disease, though this might equally well be seen as a genomic pathology. Most potentially harmful genes are only abnormal, however, in the sense of having harmful effects, in specific genomic contexts. As is a familiar finding from classical genetics, many recessive deleterious genes, genes that are harmful in the homozygous state, may be beneficial as heterozygotes.

My point here is not to develop an argument in favour of one position or other on these controversial and difficult questions, but to point out that evolutionary theory is in a dynamic and rapidly changing state, and that to take it as a firm body of established principles from which conclusions can be drawn in other equally difficult and contentious domains, is highly problematic (Dupré 2012, Ch., 9).

Evolutionary Psychology and Evolutionary Psychiatry

Many attempts to apply evolutionary thinking to psychiatry follow closely the programme of evolutionary psychology often referred to as the Santa Barbara school, associated especially with Leda Cosmides and John Tooby (Barkow, Cosmides and Tooby 1992; Buss 1999). Because there is an uncontroversial sense in which there must in principle be some legitimate study of evolutionary psychology—since humans evolved, their psychology must have evolved—it has become common to refer to the specific approach of the Santa Barbara School as Evolutionary Psychology (capitalized), a convention I shall follow here. Unfortunately Evolutionary Psychology suffers from serious deficiencies, including the general problems sketched in the last section (Dupré 2001; Buller 2005). In this section I shall briefly describe Evolutionary Psychology, and the Evolutionary Psychiatry that derives from it, and point towards some of their failings. This will lead, in the next section, to some suggestions about a more adequate way of thinking about human nature and, thus, its possible pathologies.

Representative applications of Evolutionary Psychology to Psychiatry include a general treatment by Anthony Stevens and John Price (2000) and a more specific treatment of depression by Keedwell (2008). In briefest outline, these works take psychopathology to consist of a misfit between a universal evolved human nature and the actual (social) conditions of an individual. The contribution from Evolutionary Psychology is that human nature is to be discerned by reflection on a particular phase of evolutionary history, the Pleistocene, approximately the two million years preceding the Holocene, roughly the last 11,000 years. During this period, according to Evolutionary Psychologists,

humans evolved a large number of specialised mental modules designed to deal with the problems posed by the natural and social environment of that time period.

Here is how Stevens and Price describe our general predicament:

From a biological point of view, the ultimate purpose of our existence is the perpetuation of our genes. The transmission of our genes to the next generation is the **ultimate cause** of our behaviour. The archetypal propensities with which we are endowed are adapted to enable us to survive long enough in the environment in which we evolved ("the environment of evolutionary adaptedness") to give our genes a fair chance of transmission to our offspring" (Stevens and Price, p. 11; emphasis in original).

And here is why this leads to psychological disorder:

"cultural development now occurs too quickly for genes to adapt, resulting in a split between our genes and our lifestyles; this mismatch ... can bring about illness" ... "the brain is a physical structure ... and one that has been under genetic control" (Keedwell, pp. 6-7)

I, and others, have offered extensive criticism of the general picture assumed in these quotes, and I won't try to rehearse these in any detail here (Dupré 2001; Buller 2005). One central point is that, as is standard in Evolutionary Psychology, development is not highlighted—emphasis is on dispositions that develop similarly in the Stone Age and a modern city, i.e. are genetically determined independent of any external developmental contingencies. Stevens and Price elaborate this in terms of Jungian *archetypes* and though these are no doubt controversial, I don't think their peculiarities are essential to the argument beyond proposing developmental trajectories that are evolutionarily selected and genetically determined.

Of course both Evolutionary Psychologists and their psychiatric followers universally deny that their doctrines embody genetic determinism. And of course this is quite correct if determinism is taken to deny any interaction between goals, drives, needs, etc. and the environment. But the basic goals are given: 'psychopathology results when the environment fails … to meet one (or more) archetypal need(s) in the developing individual' (Stevens and Price, 2000, p. 34). At the very least these archetypal needs are seen as developmentally deeply entrenched and hard to deflect.

Against Atavism

The views I have been describing see human behavioural dispositions as *atavistic*. Though of course we may often manage to adjust our behaviour to the exigencies of modern life, the dispositions from which we begin are designed for the very different conditions of the Stone Age. I have criticised this

idea in some detail elsewhere (Dupré 2012, Ch. 14), and I shall not rehearse the arguments in detail here. The key point is that the thesis of atavism is based on assumptions about the rate of evolution. Evolution is understood as involving random changes in genomes and selection of any that prove to be beneficial, and this is taken to be far too slow a process to result in significant changes in the short time period since the Pleistocene. But this is a quite inadequate account of human evolution. Changes in human behaviour can be brought about, and passed on to descendants, by a variety of processes, notably cultural and epigenetic, that can operate on much shorter timescales. In the following sections I shall give some indications of how this can work, and how it wholly undermines the programme of Evolutionary Psychology and its offspring in Psychiatry.

Genetic vs. Cultural Causes of Human Behaviour

Notoriously, there is a good deal of mudslinging in debates over human nature, with opposing camps hurling accusations of genetic and cultural determinism. We can begin to move beyond these stark oppositions by noting a fundamental point about scientific explanation. In contrast with the grand theories espoused by an earlier generation, contemporary philosophers of science see explanation, at least in the social and biological sciences, as deriving from various kinds of models (Bailer-Jones 2009; Morgan and Morrison 2000). All models provide only partial representations of the real systems that are their targets. Certain features are highlighted and others ignored. This enables the understanding of important tendencies or capacities of real systems, but in the open real world contexts in which living systems reside, scientific models cannot provide universally reliable predictions.

Given this basic point we might conclude that both genetic 'determinist' and cultural 'determinist' models were perfectly legitimate scientific tools. Up to a point this is correct. However, first, advocates of models of both kinds are sometimes inclined to what I have called scientific imperialism, the view that their favourite tools are far more widely applicable than they really are (Dupré 1994). (If you have a hammer, everything looks like a nail.) Second, and more important, in human development biological and cultural factors are almost invariably so deeply intertwined that a one-sided model is almost inevitably misleading. But finally, as I shall argue shortly, there are good reasons for paying more attention to cultural models.

One area where the atavistic perspective described in the preceding section might seem especially attractive is that of phobias. The dangers posed today by snakes and spiders are trivial compared to, say, cars or electric outlets. Yet the former are much more frequent subjects of phobia. It is hard to resist the conclusion that some atavistic predispositions are at work here. On the other hand there

are also distinctively modern phobias, such as going to school or to the dentist, or of contracting AIDS. According to Stevens and Price (2000, pp. 103-4.) '[these] are contemporary versions of going off the home range, getting hurt, or of getting infected'. Perhaps. But this is then looking a disturbingly Procrustean or even Panglossian programme. (If you have a hammer…)

Surely a better way to understand this case is to see an interaction of biological, evolved tendencies with environmental factors that can lead to a wide variety of more or less pathological outcomes. Learning what to be afraid of is, presumably, an important part of development, and one that undoubtedly depends on both biological capacities and environmental inputs (learning of various kinds). Sometimes this fear is disproportionate, and sometimes it is directed at largely inappropriate objects, perhaps for reasons of phylogenetic inertia. There are no dangerous spiders where I live, but perhaps they were a serious threat to many generations of my ancestors.

A more complex example will show why generally we should be more interested in cultural determinants of behaviour. Stevens and Price divide the fundamental goals of human life shaped by our Stone Age history into those concerned with rank and with attachment. Rank, or status, provides access to resources of all kinds, but especially mates. Attachment, cooperative relations with other humans, provides allies and again mates. They remark that "The commitment of social scientists to ... cultural relativity and behavioural plasticity ... has meant that the universal importance attributed to rank and status in human societies has been largely overlooked" (2000, p. 25). Knowing a few social scientists, I found this comment extraordinary. I'm inclined to say, rather, that the commitment of evolutionary psychologists to natural selection and reproductive success has meant that the universal importance attributed to rank and status by social scientists has been largely overlooked. Status is a (or the) fundamental organising concept for much of social science.

There is an important point here beyond the mud-slinging. While it may be true and important that a generalised drive to achieve high status can be found in the great majority of humans, the implications that this has in any particular human society are enormously more complex and interesting than the identification of such an allegedly general drive. And the implications in a particular complex modern society are quite different from those in a particular hunter-gatherer society. It is perhaps because of this that social scientists have been interested in the diversity of social contexts more than the possible universality of very basic human goals. No one is likely to deny that sex is a very widespread human goal, but it does not follow, nor is it true, that the implications of this are the same in Los Angeles, Teheran, and Beijing.

At any rate, the division of labour provides a foundation for all human societies, is a central feature that distinguishes one society from another, and provides a range of crucial differentiations within any society by giving rise to multiple, often cross-cutting status groups. Occupational status groups determined by the division of labour are cross-cut by countless other status groupings: race, gender, class, caste; nerds, geeks, skinheads, Guardian readers. As, e.g., Bourdieu (1984) has elegantly demonstrated, status is also acquired and confirmed by a multitude of matters of taste and style. The fact that people seek status, at least within a more or less narrow group to which they belong is a necessary background to the interest in considering these various sources of status. But if one in interested in how people actually behave there is no substitute for mapping the complex and intersecting paths to multiple different kinds of status in particular societies. In the present context it is surely these that must be understood if we are to discern the frustrations that the attempt to follow these winding paths can engender, and which can, in extreme cases, lead to mental illness. Social scientists are surely right to resist the reduction of this complexity to the quest for reproductive success.

Developmental Systems Theory

A much more useful approach to evolution, especially human evolution, than the neo-Darwinism implicit in the Evolutionary Psychiatry I have been criticising is provided by Developmental Systems Theory (DST) (Gray and Griffiths 1994; Oyama, Griffiths and Gray 2001). DST sees evolution not as a sequence of statically defined things (adult organisms or genomes) but as a series of cycles of development, which also involve the assembly of the resources necessary for the next cycle. These resources certainly include genes, but also features of the 'environment' from multiple features of cellular chemistry and structure beyond the mere sequence of nucleotides in the genome, to nests, dams or hospitals. In the human case a central aspect of the developmental niche is technology.

The emphasis on technology fits nicely with an important topic in recent evolutionary theory, niche construction (Odling-Smee, Laland and Feldman 2003). Emphasising a feature of evolutionary thinking that was classically elaborated in Darwin's work on earthworms (Darwin 1881), the concept of niche construction captures the way that organisms do not merely evolve to adapt to a pre-existing environment, but also shape the environment to fit with their evolved needs. A glance at contemporary human environments makes the relevance of this point obvious. Indeed, few humans could survive at all outside the elaborate contexts that they have constructed for themselves. And this is not merely a matter of constructing environments suited to the thriving of humans as they have come to be. Within the perspective of DST it is clear that technology, by changing the conditions under which humans can develop, can itself provide real changes in human evolution. I

would argue that technologies from clean water and drainage to rapid transport, computers, or mobile phones provide just such potential agents of evolutionary change.

One other widely discussed feature of human evolution is the importance of cultural transmission. Most of human behaviour is learned from parents, peers, teachers, or other role models. Innovations in behaviour, often connected to new technologies, can spread rapidly through human populations, sometimes within the time frame of a single generation. It is sometimes objected that such changes should not count as evolutionary because of their potential impermanence. But I can see no force to this point. There is no theoretical reason why rapid transport, say, should not remain a feature of human existence for another million years nor, for that matter, why we should not be wiped out by familiar biological forces next week. Generally, the attempt to find something conceptually unique about genetic transmission seems increasingly unpromising, an observation that is in fact central to the widespread acceptance of DST by philosophers of biology.

The rejection of the privileged status of genetic transmission, finally, completely undermines the standard Evolutionary Psychological argument for privileging the conditions of the Pleistocene in understanding human evolution. The human environment has changed massively and dramatically in the last 11,000 years, the Holocene, as has the variety of human behaviour. At some level of abstraction there are no doubt neural structures that have remained pretty much the same over this period, many of which date from far earlier periods than the Pleistocene. Similarly much basic metabolic chemistry has remained largely unchanged for much of the history of life, but no one supposes that this is the right level of abstraction to understand general morphology or physiology. It is worth mentioning that as well as genetic and cultural transmission, there has recently been an explosion of interest in epigenetic transmission, heritable changes to the genome that do not involve changes to nucleotide sequence (Jablonka and Lamb 1995, 2005). The diversity of kinds of change and modes of transmission that can be involved in human evolution makes the Evolutionary Psychologists' obsession with genetic evolution in the Pleistocene entirely without defensible rationale.

Human Nature as a Process

Evolutionary Psychology offers us a theory of a universal human nature. Even if this particular approach is misguided, there remains a widespread intuition that there must be some such human nature, and that discovering what this is must be the key to understanding the deviations from it that constitute psychopathology. The intuition is expressed by William James:

"Why do we smile, when pleased, and not scowl? Why are we unable to talk to a crowd as we talk to a single friend? Why does a particular maiden turn our wits so upside-down? The common man can only say, Of course we smile, of course our heart palpitates at the sight of the crowd, of course we love the maiden, that beautiful soul clad in that perfect form, so palpably and flagrantly made for all eternity to be loved!" William James (1890). *Principles of Psychology.*

The 'of course' in this quote, I take it, points to the idea that this is just what people are like, something that is just obvious to all of us, even the common man. These are commonplace remarks about human nature. Such an appeal to human nature seems plausible because certain abstractions across human behaviour seem both intuitively and evolutionarily inescapable: expression of emotions (an element of sociality); interest in (usually) the opposite sex; etc. But once again, the problem is with the level of abstraction. To know how real people will actually behave, we need to know more specific facts about a particular cultural context or a particular individual. *When* we smile, or *which* maidens turn our wits upside down, etc., can vary greatly and change rapidly. The most distinctive thing about human 'nature' is its flexibility. And the specific, local level at which behaviour is underdetermined is crucial for understanding human evolution. The level at which behaviour is underdetermined by biologically inherited factors provides the material for cultural evolution, and cultural evolution can produce profound changes in the developmental niche. Through such processes changes in behaviour can be firmly entrenched in human lineages.

According to Cosmides and Tooby, '"Our modern skulls house a stone age mind", (Cosmides and Tooby 1997). But this is just wrong. For one thing, according to many contemporary philosophers from followers of Wittgenstein to various kinds of externalists and adherents of extended mind theses, our skulls don't house minds of any kind. The most that can be said with any confidence is that our skulls house a partly stone age brain. I say 'partly', first, because much of the brain has a history that goes back far beyond the Stone Age. This evolutionarily ancient structure may be said to provide the physiological basis for the modern mind, and maybe even for Stone Age (or much earlier) dispositions, provided these are described in a sufficiently broad and abstract way. But the modern mind is codetermined by the context, especially social, in which it develops. And this context, and the minds that have developed within it, have changed at a far greater rate than genetic evolution alone could allow.

Human nature is generally understood as a common property of all humans. But there are also the particular natures of individual humans. I suggest that one way of thinking more clearly about both these topics is to understand them as processes. It is uncontroversial, of course, that whatever universal human nature there may be at any time is always evolving, and hence is a developing

process not a static thing. My argument here has been that many theorists, including some Evolutionary Psychiatrists, have entirely misconstrued the rate of change of this process. To whatever extent there is, nonetheless, a universal human nature at a time, what it contributes to individual humans is just one of a number of developmental resources. Individual human nature is then a process of development in which these resources interact with a wide range of environmental conditions and contingencies to produce the particular nature—habits, dispositions, etc.—of the individual human. This nature is itself subject to continuous change and development over the life course. Except in cases of extreme dysfunction, trying to understand this process in terms of something as static as gene sequence is bound to fail. The clearest empirical observation about evolved human nature, to repeat, is its perhaps unique flexibility.

I must leave it to psychiatrists themselves to decide whether this perspective is helpful in understanding mental illness. It is uncontentious that mental illness is a developmental outcome, so it seems likely that a clearer view of the nature of human development is the best resource for a proper conceptual grasp of the causes and character of psychopathology. At the very least, it should be clear that reflection on Stone Age life is an unpromising path for gaining insights into psychiatry. Much more generally, we should be extremely wary of inferring from the fact that a theoretical perspective can in principle be applied to a domain of enquiry that it will be useful to do so. It is undoubtedly true that our minds evolved. But whether the models of evolutionary process that have proved useful in understanding many aspects of the history of life will be illuminating in understanding this particular and perhaps unique episode in the history of life is another matter. And indeed much experience to date suggests that such a strategy will provide more confusion than illumination.

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References

Bailer-Jones, Daniela (2009). *Scientific Models in Philosophy of Science*. Pittsburgh: University of Pittsburgh Press.

Barkow, Jerome, Leda Cosmides, and John Tooby (eds.) (1992). *The Adapted Mind*. New York: Oxford University Press.

Barnes, Barry and John Dupré (2008). *Genomes and What to Make of Them*. Chicago: University of Chicago Press.

Buller, David (2005). *Adapting Minds: Evolutionary Psychology and the Persistent Quest for Human Nature*. Cambridge, MA: MIT Press.

Bourdieu, Pierre (1984). *Distinction: A Social Critique of the Judgement of Taste.* Translated by R. Nice. Cambridge, MA: Harvard University Press.

Buss, David (1999). *Evolutionary Psychology: The New Science of the Mind*. New York: Doubleday.

Cosmides, Leda and John Tooby (1997). *Evolutionary Psychology: A Primer*. http://www.cep.ucsb.edu/primer.html.

Darwin, C. (1881). *The Formation of Vegetable Mould, through the Action of Worms, with Observations on their Habits*. New York: D. Appleton.

Dawkins, Richard (1976). *The Selfish Gene*. Oxford: Oxford University Press.

Dennett, Daniel (1995). *Darwin's Dangerous Idea: Evolution and the Meanings of Life.* New York: Simon and Schuster.

Dupré, John (2012). *Processes of Life: Essays in the Philosophy of Biology*. Oxford: Oxford University Press.

Dupré, John (2001). *Human Nature and the Limits of Science*. Oxford: Oxford University Press.

Dupré, John (1994). "On Scientific Imperialism." *Philosophy of Science Association Proceedings*, vol. 2, pp.374-381.

Godfrey-Smith, Peter (1994). "A Modern History Theory of Functions." *Noûs* 28: 344-362

Gould, Stephen Jay, and Richard C. Lewontin (1979). "The Spandrels of San Marco and the Panglossian Program: A Critique of the Adaptationist Program." *Proceedings of the Royal Society of London* 250: 281–288.

Griffiths, P. E. and R. D. Gray (1994). "Developmental systems and evolutionary explanation." *Journal of Philosophy* 91: 277–304.

Griffiths, Paul and Karola Stotz (2013). *Genetics and Philosophy: An Introduction.* New York: Cambridge University Press.

Jablonka, Eva and Marion J. Lamb (1995). *Epigenetic Inheritance and Evolution: The Lamarckian Dimension*. New York: Oxford University Press.

—— —— (2005). *Evolution in Four Dimensions: Genetic, Epigenetic, Behavioral, and Symbolic Variation in the History of Lif*e. Cambridge, MA: MIT Press.

Keedwell, Paul (2008). *How Sadness Survived: The Evolutionary Basis of Depression*. Oxford: Radcliffe Publishing.

Morgan, Mary and Margaret Morrison (1999). *Models as Mediators: Perspectives on Natural and Social Science*. Cambridge: Cambridge University Press.

Nesse, and Eric D. Jackson (2006). “Evolution: Psychiatric Nosology’s Missing Biological Foundation.” *Clinical Neuropsychiatry* 3: 121-131.

Nesse, Randolph M. (2008). “Evolution: Medicine’s Most Basic Science.” *Lancet.* 372: S21–S27.

Odling-Smee, F. John, Kevin N. Laland, and Marcus W. Feldman (2003). *Niche Construction: The Neglected Process in Evolution.* Princeton: Princeton University Press.

Oyama, Susan, Paul E. Griffiths, and Russell D. Gray (eds.) (2001). *Cycles of Contingency: Developmental Systems and Evolution*. Cambridge, MA: MIT Press.

Sober, Elliott and David S. Wilson (1998). *Unto Others: The Evolution and Psychology of Unselfish Behavior*. Cambridge, MA: Harvard University Press.

Stevens, Anthony and John Price (2000). *Evolutionary Psychiatry: A New Beginning* (2nd. Edition). Hove, East Sussex: Routledge.

George C. Williams (1966). *Adaptation and Natural Selection.* Princeton, NJ: Princeton University Press.

Wilson, Edward O. (1975). *Sociobiology: The New Synthesis*. Cambridge, MA: Harvard University Press.

Wilson, Edward O. (2012). *The Social Conquest of Earth*. New York: Norton.