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ON HUMAN NATURE

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The widely accepted interactionist picture of human development makes it clear that, given the historical and geographical differences in the cultures in which human develop, we should expect a great historical and geographical diversity of human natures. This makes it advisable not to talk about a singular human nature at all, and consider only diverse human natural histories. This view is reinforced by the contemporary move from preformationist to epigenetic understandings of the role of the genome in development. Among the defects of evolutionary psychologists' claims to delineate a universal human nature is the implicit commitment to an obsolete preformationist view of development. Their misguided project has political dangers as well as epistemological shortcomings.

Introduction

What, if anything, is human nature? One philosophical tradition, regrettably revived recently, supposes that this phrase should refer to some real essence of the human species: an internal property of all and only humans that explains why they are as they are and why they do as they do. But we should all know now that even if there are some kinds of things that have essences, biological kinds are not among them[1]. Biological kinds do not generally have even necessary and sufficient conditions. And since humans are a biological kind, they do not, therefore, have a common essence. At the opposite extreme there are certainly generalisations to be made about the currently extant members of the human species. For behavioural generalisations, which will be my main concern today, these will almost all be statistical. No doubt the proportion of people indulging in certain kinds of behaviour will be high. To take some random examples from a well-known though rather strange compilation of biological universals by Donald E. Brown[2], I have no doubt that most people have beliefs about death, classify flora and weather conditions, make choices, use metaphors and personal names, distinguish good and bad, and demarcate poetic lines by pauses. (There are several hundred more of these on Brown's list.)

One will want to say different things about the items on this list. Any creatures that eat vegetation had better classify flora, or they will very rapidly attract the unwanted attention of natural selection. Having classified their flora, they had better subsequently

[1] See, for instance, Hull (1965); Dupré (1993, pt. 1).
[2] Brown (1991), updated by Pinker (2002).

make choices among them as to which to eat. Weather is another matter. Having lived in California for a number of years, I can report that between about May and October no one in California classifies weather. In the UK it is a year round practice. The point does not need further labouring: weather is a variable that affects behaviour in obvious ways for some people all of the time and for most people some of the time. It would be astonishing if some note were not taken of it, if only because intelligent action will often be affected by it. (We need only think of the generations of action theorists agonising over whether to carry their umbrellas.) The universality of pauses in poetic declamation is a matter I shall leave to literary critics, with only the proviso that surely this is not a central aspect of human nature.

And here is the trouble with all of this. Even if human nature is not a human essence, it is surely intended to be something fundamental, something more significant than merely what some or most people happen to do. These forms of behaviour are not, therefore, in any sufficiently interesting sense part of human nature, but features of the environment that a creature of our behavioural complexity could not possibly ignore.

Of course taking a few random examples from Brown's list of human universals does not show that there are not more fundamental items lurking therein. What I do want to suggest, though, is that the compilation of such a list surely shows that there is something that might be called a *natural history* of *Homo sapiens*, but perhaps there is nevertheless nothing in such a project that answers to traditional conceptions of *human nature*. The creature behaves in various more or less characteristic ways, and often it is pretty obvious why it does so. But it is also a highly variable animal and, very importantly, different local populations develop quite distinctive suites of behaviours. The extent of this variation is an empirical matter, but it is certainly considerable. This seems to me correctly to summarise the situation, and I also intend it to constitute a denial that there is, in any sufficiently interesting sense, a human nature that goes beyond this natural history.

The natural history of *Homo Sapiens*, of course, is the enormously complex subject to which sociologists, historians, anthropologists, and even poets and philosophers make their various interlocking contributions. The problem is not that some of this is not interesting, it is that it is not specially or uniquely interesting. The history of classical Greece is very interesting as are the head-hunting practices of the Ilongot and the behaviour of contemporary British tourists in Ibiza. It is just that none of them is fundamental and explains all the others. Biologists, in turn, may tell us a great deal about the physiological substratum of the capacities that allow us to behave in the complex and various ways that we do, but they will not, I think, disclose the underlying essence of human nature.

Many people will recognise my title as that of a best-selling book by Edward O. Wilson (1978). Wilson has perhaps been the most influential recent thinker to conceive of the problem of human nature as a problem in biology. Of course in a broad enough sense of biology this must be right: we are biological organisms, and our nature, and even our natural history, is part of biology. But to be interesting the relevant sense of biology must be narrower than this. No doubt a lot of philosophers assume that human nature resides in a very specific biological object, the human brain. But frustratingly, the functioning of the human brain is not at all well understood, and surely less well understood than human nature itself. So even if these philosophers are right, their

insight is of little immediate help with the problem at hand[3].

Wilson, I suppose also thought of human nature as residing in the brain, but the excitement that many have felt at his project is that it offered to disclose fundamental features of the brain without the trouble of actually removing anyone's skull and examining its contents. Rather, Wilson proposed that this important information could be gathered through reflection on the origins of the brain which is to say, of course, through reflections on human evolutionary history. This proposal has been seized on eagerly by a variety of thinkers, most prominently by the sect that has succeeded in co-opting the term 'evolutionary psychology'. According to this school, human nature can be defined as a set of information-processing modules evolved in the Pleistocene, approximately the last million years, by our humanoid ancestors[4].

I shall say something in this paper about evolutionary psychology and what I take to be its deficiencies. But let me say right away that I don't believe that human nature is primarily a biological problem at all, or at least not in any narrow sense that would make the thesis interesting. Human nature, if it is anything at all, is the upshot of the interaction between a developing human individual and a particular society. I do not mean by this merely that human behaviour depends simultaneously on what humans are like and the situation, typically social, in which they act. That, I take it, is obvious. I mean rather that what humans are like is itself a matter of the constant interaction in human development between internal, narrowly biological, factors, and external, generally social factors. So that human nature is itself a function of the social context in which particular humans develop. No doubt society itself cannot be understood independently of the natures of the humans who, at any time, constitute it. The relationship between individual and society is, to use an unfashionable term, dialectical.

Nature, nurture, and the human genome

Almost everyone agrees that there is something profoundly wrong with the dichotomy between nature and nurture, and yet it seems stubbornly unwilling to go away. The frustrating nature of the problem is strikingly evident in recent debates over evolutionary psychology. Opponents of evolutionary psychology accuse its proponents of being genetic determinists, while the latter accuse their critics of seeing the human mind as a blank slate, on which culture can write anything whatever[5]. Both sides vehemently deny these accusations, and everyone claims to be a sophisticated interactionist. According to interactionism the human mind develops as an interaction between biological and cultural, or other contextual, influences. Who could deny anything so reasonable and obvious? And yet having made this unexceptionable commitment the evolutionary psychologists go off on their quest for biologically determined causes of behaviour and the more traditional social scientists continue the

[3] As a matter of fact, I don't think they are right. See Dupré (2001, 31–8).

[4] A standard source for this currently dominant version of evolutionary psychology is Barkow, Cosmides, and Tooby (1992).

[5] Examples of the first type of accusation are Rose (1997) and Dupré (2001); a book-length version of the latter is Pinker (2002).

search for cultural factors in ways that seem to their opponents to assume the image of the blank slate.

It will be helpful to start by considering a bit further what is involved in the interactionist model on which every one officially agrees. A human life begins as a zygote, or fertilised egg. This includes a cell contributed by the mother and, more or less, some DNA contributed by the father. Note first, that contrary to a picture still occasionally propagated by fundamentalist Dawkinsians[6], there is no point in the life cycle at which there is only the DNA. A cell is a highly complex and structured entity, and whether and how the DNA is transcribed and translated depends on complex features of the enclosing cell. So from the moment of conception, human development involves an interaction between the genome, the nuclear DNA, and its cellular environment.

The embryo then continues to develop in the maternal uterus and does so as the result of a continuous interaction between the developing entity—including of course its genome now distributed through its many cells—and the uterine environment. After birth, the external influences become much more diverse. Various people and other stimuli will affect mental, and to some degree physical, development, as will also more complex social structures such as hospitals and schools. Development, in short, will depend on a huge variety of factors both internally biological and externally environmental. Why should we be tempted to ascribe an entirely pre-eminent role in this process to one class of such factors, those located in the genome? Or, for that matter, to those 'located' in the ambient culture?

One major reason why theorists have been led to accord priority to the genetic leads immediately to a fundamental issue in the history and the philosophy of biology. A central problem in biology is to understand how biological form is reproduced. Or put another way, how does it come about that development of a human zygote reliably produces humans, and similarly for camellias and aardvarks. A common answer to this is that the relevant structure, or form, in some way exists prior to its disclosure through development. This is, broadly, the doctrine of preformationism. In the extreme form of this doctrine we had the vision of the embryo as a miniature adult, and even as containing within itself miniature embryos nested together like Russian dolls. But while probably nobody believes anything like this today, a much more plausible version of preformationism is still highly influential. The preformationism I have in mind holds not that the mature organism exists in miniature, but rather that it exists in a different mode, as information. Familiar contemporary expressions of this view, which almost invariably identify the genome as the site of the relevant information, describe the genome as embodying a blueprint or plan of the adult organism. The adult form does not literally pre-exist its realisation in development, but it pre-exists implicitly in the blueprint or as information. And the existence of the blueprint explains the realisation in development of the adult form. Moreover, this picture holds out the promise of explaining how the capacity to reproduce is transmitted from one generation to the next: the blueprint itself is passed from parent to child. And, finally, with the understanding of the mechanism of DNA replication we have a detailed story about the reproduction of the information or blueprint. So the problem of the consistent development of form—

[6] The authoritative text is Dawkins (1976).

the problem of how something as complicated as a human replicates itself—has been replaced by the surely much simpler problem of the replication of an information-bearing molecule. And this is something to which DNA replication provides a compelling answer.

One of the most striking manifestations of this picture is in the well-known picture of evolution promoted by Richard Dawkins (1976). If the genome is a blueprint we can extract from the history of life simply the sequence of blueprints and their copying errors. Development can be entirely black-boxed, and we need worry only about which blueprints show a tendency to spread through a population.

Unfortunately, as the observant will already have noticed, the problem of consistent development has not really been solved. For we most certainly still have the problem of explaining how the supposed blueprint is interpreted in the processes of development. Of course, this does define a conception of the task of the science of ontogeny: how is the genome interpreted? But then it seems—and this points to a fundamental criticism of the picture just sketched—that if we really had a proper understanding of development we might not need the blueprint. The assumption of a blueprint is perhaps no more than a reflection of the limited imagination with which we approach the problem of development. And indeed as remarkably powerful techniques in molecular biology begin to give us glimpses into the processes of development, it becomes increasingly clear that the whole preformationist picture is entirely misguided.

Some quite simple and long familiar biological observations suggest that the blueprint metaphor is unhelpful. Elements of a blueprint can be correlated with elements of the finished project the blueprint represents. But despite the continued prevalence of the language of genes for this and that organismic trait, there are no, or almost no, such correlations. As has been recognised for decades, particular bits of DNA can be involved in the development of a variety of organismic traits, and traits depend on many bits of DNA[7]. A little learning about molecular biology has led people to suppose that at least there were genes for the production of protein chains, and perhaps these could be seen as the elements of the organism represented by bits of the DNA. But remarkably, the many/many relation between genes and extragenetic features of organisms has been found to apply even to the first step in development, the production of protein chains. Amino acid sequences are built up from various non-contiguous bits of the genome and bits of coded amino acid sequence may be used in various different proteins. Far from being a blueprint it might be better to think of the genome as a reference library for the production of different structural items. This usefully points to the fact that the 'expertise' required to use the library is not itself located in the genome. On the other hand it may misleadingly suggest that the genome is entirely passive whereas in reality it is in dynamic interaction with other constituents of the cell that the genome contributes to cellular function.

I won't try to offer one more metaphor to describe the integrated and internally interactive cell of which the genome is an essential part. What is important to grasp is the underlying picture of which these various many/many relations and two-way

[7] The relevance of the many/many relations between genes and phenotypic traits for reductionist aspirations in biology was explored in detail in Hull's (1974) classic introduction to the philosophy of biology.

interactions are symptomatic. Here we find the historical antithesis to preformationism, epigenesis[8]. The preformationist picture sees the solution to the problem of development as residing in some object which, in an almost magical way, contains the final form of the organism. The semantic inspiration of this vision is evident in the invariable description of this object in terms of codes, information, plans, or blueprints. Epigenesis dispenses completely with this comfortingly semanticised locus of form, and aspires to explain development wholly in terms of process. From the epigenetic perspective there is no sense in which the adult form pre-exists its realisation in development.

One way of seeing how profoundly different this perspective is from that of preformationism is through the very different implications the two views have for our understanding of the genome. For the preformationist the genome is, to exaggerate only slightly, the whole story. And this image of the genome is everywhere in our culture. Imaginary scientists scrutinising our genomes for intelligence, sexual preference, or tastes in neckwear, and providing the latest style in babies to their affluent clients are one obvious manifestation of this image. No more nor less fictional are the long-dead creatures magically preserved in informational traces imagined in Jurassic Park or the occasional fantasies of Dodophiles. Less obviously, I think that such preformationist fantasies can be discerned in the imaginations of evolutionary psychologists.

From an epigenetic perspective, on the other hand, it is again only a slight exaggeration to say that there is nothing very special about the genome. The genome is of course necessary for the developmental process, but so is much else besides. Epigenesis offers a picture in which all the interacting elements are equally indispensable for the process in which they are all involved. The reproduction of organismic form is brought about by the disposition of the organism to assemble all the diverse resources that are necessary for the implementation of the developmental process. The temptation to see the genome as information and the rest of these developmental resources as merely channels is a consequence only of the misplaced semantic metaphors in terms of which genetics is still so often presented.

As will have become clear, I think that preformationism is a mistaken picture and epigenesis is the correct one. I won't try to defend this conviction here because it is a biological conclusion rather than a philosophical one. The collapse of preformationism was, perhaps, inevitable once the extent of the failure of gene/trait correlations became evident in the early decades of the last century. As already stressed, this points to the inadequacy of such metaphors as the ubiquitous blueprint. I think, at any rate, that as with simple nature/nurture interactionism, the correctness of the broader epigenetic image is not really a matter of controversy within biology. In both cases what is controversial is what follows from accepting the respective positions.

Before getting finally to what all of this has to do with human nature, I shall make one brief historical comment on the debate between epigenesis and preformationism. Though in some ways a gross oversimplification, it is illuminating to see much of the history of twentieth century genetics as depending on a preformationist perspective. Prior to the development of tools for manipulating the genome at a chemical level, genes could only be identified through phenotypic effects. Thus it was inevitable that for

[8] The contrast between these two conceptions of genetics is excellently described by Lenny Moss (2003).

example the classic work on fruit flies by Morgan, Mueller and others was presented as investigating genes for red eyes, bristle numbers, and so on. The oversimplification becomes damaging if we infer that the scientists doing this work had naïve views about the complexity of the connections between genotype and phenotype (which generally they did not). Nevertheless, it is significant that they were unavoidably stuck with a preformationist classification of genes.

It is hardly surprising that as information about genes developed, including information about what was naturally interpreted as spatial relations between genes, there should be interest in their physical realisation. In a series of stages that are not especially relevant to the present discussion, it became clear that genes were located on chromosomes and, as we all now know, that chromosomes were composed of deoxyribonucleic acid, or DNA. Over the last fifty years we have become increasingly adept at analysing and manipulating DNA. This has led to an increasing tension between the preformationist history of genetics and the increasingly epigenetic understanding of the genome that our molecular investigations have disclosed.

A problem that makes this issue exceptionally difficult is the circulation of a term such as gene between a great variety of different users with different expertise and different goals. A book I have already cited because of its considerable public impact on the understanding of genes is Richard Dawkins classic, *The Selfish Gene* (1976). Glancing through this work at random, one will quickly encounter such things as cheat genes and sucker genes, genes for giving an alarm call, and female genes for choosing handicapped males. Despite even more extraordinary discussion of genes making policies or predictions, Dawkins does not really believe the apparent implication of these phrases, that there is a molecule somewhere that has the function of facilitating the production of alarm calls or the behaviour of a sucker. Elsewhere he is quite explicit that the phrase 'gene for x' means only that an organism with this gene has a higher than average probability of having the feature x. Thus the cheat gene might also be a gene for being tall, having a liver that can detoxify cabbages, and countless other things. In a different environment either externally or genetically, it might be an honesty gene, a gene for being short, and again countless other different things. Dawkins is certainly aware of these consequences of his official view. One important question is then whether the use he makes of these gene concepts is really compatible with this very thin understanding of their significance. But perhaps more important is whether the readers of Dawkins's and other similar work really have any grasp of the surprising and counterintuitive official interpretation.

I think it is quite clear that most readers are entirely misled and that, at any rate, a quite naïve interpretation of these genes for this and that is rife throughout contemporary culture. When scientists announce a gene for homosexuality, discussion is provoked of the consequences of the discovery that homosexuality is biologically caused, determined at birth or conception, and so on. But with the official interpretation of the term 'gene' these discussions are wholly irrelevant. The fact, if such it is, that some people start life with a slightly higher chance than others of becoming homosexual hardly amounts to saying that sexual preference (or sexual orientation as many convinced of this determinist thesis prefer to call it) is determined at birth. Only a genetic module, part of the genetic blueprint, with the specific function of determining sexual orientation, could have such a consequence. And no one with any familiarity with genetics believes

there is such a thing.

A tempting response to this kind of problem is to discourage any talk about genes whatever. In the sense in which genes are widely understood, there are surely no such things, and in fact there are serious difficulties in providing any definitive decomposition of the genome into functional parts even from a thoroughly epigenetic perspective. The difficulty with the proposal that there are no genes at all is that one is left with the problem of explaining the apparently quite respectable and fruitful uses of the term gene in such contexts as medical genetics. I have suggested elsewhere that most of such uses are best seen as referring to classes of mutations leading to particular developmental defects (Dupré, forthcoming), an idea that also applies to such familiar genes as the 'gene' for blue eyes. The only important point here is that while there may be useful references to genes for things going wrong, or atypically, there is no generally defensible reference to genes for particular aspects of normal development. And this is most clearly true for alleged genes for the normal psychological functions that are the concern of students of human nature.

Evolutionary psychology vs. real humans

Let me now return after this long, but I think unavoidable preamble, to human nature, and explain why a proper understanding of these biological issues can lead to the view that there is no such thing as human nature. Among the most notorious recent consumers and retailers of 'gene for' language have been the evolutionary psychologists. As I have said, I take this usage to imply a commitment to a version, albeit a reasonably subtle one, of preformationism. I want now to look at the way that evolutionary psychology finds itself in this regrettable predicament.

One of the central intellectual manoeuvres in evolutionary psychology has been a standard argument for looking for human nature in the conditions of life in the Pleistocene, approximately the last million years of prehistory. The argument goes like this. Behaviour, we all know, is caused by brains. Brains are physiological structures constructed under the direction of genes. So a certain kind of brain produces a certain kind of behaviour (or—it doesn't matter here—disposition to behaviour), and a certain kind of brain requires a certain set of genes. Standard models in population genetics suggest that the evolution of a structure such as the human brain, or the transition from the brain of our common ancestor with the chimpanzees to the modern human brain, must take much longer than the time available in modern history.

It is worth remarking in passing that the relevant population genetics models are arguably covertly or overtly preformationist. The picture at work is of a set of genes coding for a particular trait (in this case the modern human brain) and accumulating in the genome over generations. An epigenetic perspective suggests the possibility of quite large developmental changes cascading through holistic effects on cytological systems from quite small genomic alterations. But I won't pursue this thought here, as my main point will be that it is quite wrong to suppose that substantial changes in human behaviour need to be seen as genetic in origin at all.

The alleged requirement for many thousands of generations to allow the evolution of modern behaviour from supposed behaviours of ape-like ancestors, in addition to

considerations of the historical trajectory of changes in brain size, points to the Pleistocene as the period when the evolution of the modern brain is likely to have taken place. Consequently, finally, our brains are 'designed' by natural selection to respond to conditions that existed in the Stone Age. Reflection on those conditions, and the behavioural strategies that would have been most conducive to fitness under those conditions, provides us with a method for discerning the true nature of human nature. And since this provides a common origin for human nature it also indicates a common human nature underlying all the apparent diversity of contemporary human existence.

Now I think almost everything—perhaps everything—is wrong with this argument. I certainly can't discuss all of its shortcomings. However it is remarkably influential and it is worth the effort of distinguishing some of the mistakes it makes. Let me quote a relatively clear version of the argument from the introduction to the work cited above by Jerome Barkow, Leda Cosmides and John Tooby (1992, 5):

> What we think of as all of human history...and everything we take for granted as the normal parts of life...are all the novel products of the last few thousand years. In contrast to this our ancestors spent the last two million years as Pleistocene hunter-gatherers. These relative spans are important because they establish which set of environments and conditions defined the adaptive problems the mind was shaped to cope with: Pleistocene conditions rather than modern conditions. This conclusion stems from the fact that the evolution of complex design is a slow process when contrasted with historical time.

Let me begin my reflections on this argument by noticing that the mind is here assumed to be a bit of complex *design*. A design, I take it, pre-exists its execution in a concrete instance; often it pre-exists it concretely in the form of a set of directions, or perhaps, to recall a familiar expression, a blueprint. But we have already seen that this idea is incompatible with the interactionism that every one concedes. Interactionism is the view that human beings, including their minds, develop as a result of a sequence of interactions between their biological resources and their external environment; and variation in either can affect substantial changes in the outcome. As Barkow et al. observe, the external environment in which humans develop is quite different from that in which our Stone Age ancestors developed. It is therefore to be expected that their minds will be different, regardless of whether their genes have remained essentially the same. It is, of course, even less controversial that, since behaviour is sensitive to the context in which it occurs, human behaviour would be different now from that typical in the Stone Age even if the human mind were, somehow, the same. Given, then, that on the premises admitted by evolutionary psychologists our minds are different and the context in which they produce behaviour is different, it is hard to see how the conditions of the Stone Age are of any relevance to contemporary human behaviour.

A striking feature of the evolutionary psychological picture, explicit in the above quote from Tooby and Cosmides, is the view that human dispositions to behaviour are systematically inappropriate, since evolved for an environment thankfully very different from the one we now experience. What underlies the assumption that evolution is a much slower process than are the processes of human history? I have said that there are perhaps questionable arguments about the rate of accumulation of genetic modification. But why should we see evolution as necessarily consisting of changes in gene

frequency? Sometimes the answer is merely definitional: it is not uncommon for biologists to define evolution as consisting in changes in gene frequency. Then, of course, the issue must be posed not as whether evolution of the human mind can occur at the requisite speed, but rather as to whether the development of the human mind is properly seen as a case of evolution. But what this slippery semantic point shows, I think, is that we do much better to define evolution in a way that is non-committal with regard to the underlying processes driving change. So let us think of evolution as simply change over time in the distribution of properties (including, of course, behaviour). No doubt for most of biological evolution this involves changes in the distribution of genes. But equally clearly it may involve other things. Even in non-human animals there are well-known cases in which behaviour is culturally transmitted—the songs of birds or whales, for instance, or the feeding habits of opportunistic birds where the environment includes unattended milk bottles with foil caps.

In the case of humans it is perfectly obvious that this is often the case. I can myself recall a time in human evolution when there were no personal computers; and almost everyone can remember a time when there were no mobile phones. These make possible all kinds of behaviour that were not possible in the very recent past. And nobody, I'm fairly sure, is hypothesising a gene for the tendency to use mobile phones. More generally, the day to day behaviour of a 21st century professor of philosophy, say, surely has very little in common with that of a 12th century baron or serf.

It will certainly be said that this is all superficial. No one used mobile phones until there were mobile phones to use. But when these things appeared, people started to use them as part of broadly the same patterns of behaviour that they would have been engaged in the 12th century or, for that matter, the Stone Age—pursuing sexual partners, cementing alliances, and suchlike. The general idea, again, is that 'human nature' refers to the inner causes of behaviour and there is no reason to suppose that these fundamental inner causes have changed during recent history. Of course as we vary the environment, the mixture of inner and outer causes will provide a different mix of behaviour. But the inner causes are still essentially what they were in the Stone Age.

This response enables us to flesh out the point argued above about the interactionist view of human development. Contemporary people grew up in the 20th (or 21st) century. Some people have already grown up using personal computers and now a generation is growing up using mobile phones. Surely their brains will turn out somewhat different from those of earlier generations (and not, I hope, because their brains are being fried by microwaves). One hopes these changes are not too great, as it would be nice if we can have conversations with our children that don't constantly remind us of the indeterminacy of translation. But I would not be at all surprised to find that a conversation with a 12th century serf would be a tricky undertaking.

It may seem at this point as if I have now perfectly exemplified the problem pointed out at the beginning of this paper. Having started out with the usual pious remarks about interactionism, I am now proposing a more or less classic blank slate view of the human mind. But in fact I have done nothing of the kind. What I have said is that human evolution, or evolution of the human mind, can happen much more quickly than is implied by the mixture of dubious evolutionary theory and obsolete genetics that is evolutionary psychology. Consequently I suggest that human minds are rather different from those that our ancestors enjoyed a few centuries ago, and that there is probably a

fairly diverse collection of human minds currently to be found on our planet. But I haven't said that there are infinitely variable human minds or even that it would be possible to produce any kind of human mind whatever.

As a matter of fact this seems most unlikely. Humans are profoundly social creatures. I would be surprised if it were possible to bring people up as entirely solitary with no interest in interaction with conspecifics. Nor is it likely that we could bring people up with no interest in sex: my guess is that the contemporary American teenage abstinence movement is providing some good empirical evidence of this fact. So perhaps we should say just that human nature is a set of boundary conditions, a description of the limits within which possible human natures can develop. I have no very deep objection to this idea, but I do think it is best to reject it. My not very deep objections are first epistemological and second pragmatic. When we reject the bad reasons for supposing that humans are really much less diverse than they seem, we can acknowledge that the species is indeed highly diverse in much the sort of ways that cultural anthropologists have reported for decades, though as the more or less banal human "universals" mentioned earlier indicate, this diversity is not unbounded. The epistemological problem is just that however convinced we are that there are biologically imposed limits to human possibility, we have no idea of how to establish what they are.

Evolutionary argument and experience both speak against the likelihood that we could have a society without sex, a topic central to evolutionary psychologists' theories about human nature[9]. But since this fails to distinguish us from the majority of multicellular organisms, it is hardly an interesting fact about human nature. However, whereas evolutionary psychologists have attempted to specify a narrow set of parameters that determine the sexual behaviour of men and women, experience tells us that the expression of the sexual instinct is astonishingly diverse. Different cultures embed sex in a great variety of social structures and show varying tendencies to deviate from the norms those structures provide. Notoriously the object of sexual interest varies greatly. Even if biology will indeed maintain a typical sexual interest of the human male in young females with a 0.7 waist-to-hip ration, as evolutionary psychologists have insisted (Singh 1993), what is interesting about human development is the variety of possible outcomes, and the object of desire is no exception. The point of the preceding discussion of human ontogeny is that we are free to accept this apparent diversity at face value, and to remain open-minded as to the ways in which the expression of the sexual interest may evolve in future human populations.

This leads naturally to the pragmatic objection to emphasis on the biological constraints on human possibility. Emphasis on limits is always liable to be understood normatively. And nowhere is this more obvious than, once again, in the case of sex. Typical sexual preference is, for example, often interpreted as morally mandatory sexual preference. Yet it is quite evident empirically that one normal possibility in human development is a predominant or exclusive interest in members of the same sex. Recognising the variability of human development makes it unproblematic and inevitable to conclude from the frequency of this occurrence that it is perfectly normal.

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[9] A standard source for the evolutionary psychology of sex is Buss (1994). For critical discussion, see Dupré 2001, ch.3.

The attempt to shoehorn human nature into its alleged biological limits will always tend to present the non-typical as an intellectual problem and perhaps even a moral one; whereas an understanding of the flexibility of human development will see the atypical as encouraging evidence for the recession of biological limits[10]. Given the epistemological difficulties in discerning biological limits, the pragmatic disadvantages of doing so, I think, become overwhelming. But what possibilities are actual, what actual variants of human nature can be produced and with what difficulties, remain empirical questions. While the unlimited temptation to social engineering attributed to 'blank slate' theories are not implied by this view, we should surely not be discouraged from exploring possibilities for amelioration of the human condition.

Why care about human nature?

The question with which I shall conclude is why theories of human nature often seem so important. Debates over sociobiology and evolutionary psychology, for instance, have been a good deal more heated and public than is typical for 'merely academic' disagreements. The answer to this question has been alluded to in the last paragraph of the preceding section: views about human nature matter because they are almost invariably understood to have normative force, to have consequences for how we should live our lives.

A noticeable feature of the evolutionary psychology literature is the vehemence with which its practitioners deny the normative significance of their claims. They are very much given to citing the 'naturalistic fallacy', though admittedly often misunderstood as the banal thesis that the fact that something is true doesn't imply that it is right or good. But however misinterpreted, the point of this appeal is to block the accusation that evolutionary speculation about human psychology is likely to have adverse social or political consequences. Typically they insist that their claims are very likely true and that the truth about human nature can only have beneficial effects on the development of social policy.

We may begin by dismissing the irrelevant issue of the naturalistic fallacy. As implied in the last sentence of the last paragraph, knowledge of human nature will of course be relevant to social policy. All the naturalistic fallacy ever claimed is that normative conclusions cannot be derived from exclusively factual premises. So to derive policy prescriptions from, say, an evolutionary psychological analysis of rape, we would need at least the normative premise that rape is a bad thing. Given that premise, how best to prevent it will depend on facts about its aetiology. As remarked in the previous section, then, if these 'facts' are in fact dubiously grounded claims, we will be in danger of implementing ineffective or even counterproductive policy prescriptions.

Evolutionary psychologists have, in fact, been quite willing to advertise their findings as relevant to policy issues. A recent volume of essays entitled *Human Nature and Public Policy: An Evolutionary Approach* (Somit, Peterson 1993) well illustrates this willingness. And, as critics have often suggested, the recommendations of such an approach are likely to be conservative. As the editors to the volume just mentioned

[10] For more on these issues, see Dupré (1998).

remark: 'evolutionary theory holds that, barring mutation or some profound environmental change, the behaviours of a species are likely to remain essentially constant. In terms of public policy, this means that where attempts to alter or even prohibit behaviour have been consistently unsuccessful in the past, similar attempts are not likely to be any more effective in the future' (Somit, Peterson 2003, 7). They go on to quote Edmund Burke: 'We cannot change the nature of things or of man, but must act upon them as best we can' (loc. cit.). Maybe so, but it is pretty clear, at any rate, that evolutionary psychology is anything but innocent of claimed political implications.

And there is a rather different kind of concern. Scientific claims about human nature are evidently liable to change peoples' attitudes about themselves and others. This points to an important difference between the human and non-human sciences: claims in the human sciences are liable to have effects on their subject matter that may even affect the truth of their claims. It is hard to dispute, for instance, that supposedly scientific claims that black people are less intelligent than white people will encourage racist attitudes, and racist attitudes may perpetuate the social causes of lower intellectual achievement by black people. Philip Kitcher (2001) has recently argued that research on such issues is not in the public interest and should be actively discouraged (though not prohibited).

The question what effect scientific theories have on attitudes can also be investigated empirically. One classic case is the work of Robert Frank and collaborators (1993) suggesting that learning economics reduced students' dispositions to cooperate, hence making economists' typical assumptions about human behaviour more nearly true. Currently Tom Postmes, Alex Haslam and Lesley Newson, social psychologists at the University of Exeter, are conducting research on the effects of exposure to evolutionary psychology on the production or reinforcement of sexist attitudes.Their preliminary results do indeed reveal just such an effect. Male subjects exposed to evolutionary psychological theories of sex-linked differences in behaviour were found more likely to consider women generally inferior, less suitable for high level jobs, and suchlike. It is surely likely that the promotion and reinforcement of such attitudes will tend to maintain differences in behaviour and achievement of men and women, and thereby even tend to provide evidence for the claims of asymmetry presented by evolutionary psychology[11].

The point of all this is just that supposedly scientific claims about human nature matter a great deal. They will inevitably provide arguments for some particular policies rather than others and, even more disturbingly, they may have real impact if not upon human nature itself, at least on the natural history of contemporary humans. The position defended here, that although human ontogeny involves a constant interaction between biological and cultural factors the outcome of this interaction can be highly variable, aims explicitly to minimise the influence of biological claims both on policy and on humans themselves. Given the extremely dubious basis of contemporary claims to find human nature fixed by biology, this conclusion seems no more than common sense[12].

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[11] Postmes et al. (2003) is a preliminary report on this work.

[12] This paper has been much improved following comments on an earlier draft by Christine Hauskeller. The support of the Economic and Social Research Council (ESRC) is gratefully acknowledged. This work was part of the programme of the ESRC Research Centre for Genomics in Society.

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