

Taking evolutionary psychology seriously

Robin Dunbar argues that debates over the role of evolution in psychology have been largely misplaced

Although evolution played a significant role in psychology and the social sciences during the late 19th century, the opening decades of the 20th century witnessed a profound parting of the ways. Over the ensuing decades, species differences gradually came to be superseded by species similarities, with interest in species other than humans largely dictated by the extent that other species provide a useful model for the psychology of humans.

With this shift of taxonomic focus went a shift of interest from questions of origins and evolutionary history to questions of mechanism. 'How does it work?' became the driving focus of interest, gradually displacing the more evolutionarily influenced questions of 'Why do we have it?' and 'How/When did we come to do it this way?'

The rise of evolutionary psychology in the past decade represents something of a reversal of this trend. Evolutionary questions are once more being given prominence. The result has been a surprisingly adverse reaction on the part of more conventional psychologists and a somewhat fractious debate. It has been a dispute that has been largely misplaced. This is mainly because most conventional cognitive and developmental psychologists have misunderstood the role of an evolutionary perspective, seeing it as a competing paradigm that would render their existing theories redundant or wrong.

One reason for this misunderstanding has been a seemingly inevitable tendency for psychologists to interpret an evolutionary approach in terms of the nature/nurture debate. Since the environmentalists gained the upper hand in developmental psychology during the 1980s, a 'naturist' view (which is firmly equated with the genetic determination of cognition and

behaviour) has been viewed with deep suspicion by most psychologists. An evolutionary approach emphasising the adaptiveness of the human mind has seemed rather like a return to the Dark

psychologists assert that someone behaves in a particular way 'in order to maximise their fitness', this has often been interpreted as a statement about what actually motivates people. 'Evolutionary explanations can't be true because I married because I was in love..., or because I had my eye on a rich spouse..., etc.' In fact, this is to confuse apples with oranges. Evolutionary explanations are about the ultimate (i.e. evolutionary) goals that guide behaviour, not their immediate motivations. Such explanations lie at a higher explanatory level: evolutionary goal states require motivations to make them possible. This is because selection cannot work directly on fitness (the relative number of copies of a gene that one leaves in future generations), but requires motivational mechanisms (as well as the usual panoply of physiology and anatomy, and of course some development) as an intervening process on which it acts directly. We are motivated by the usual things in order to maximise fitness.

The problem is that both these common responses conflate different levels (or types) of explanation. In doing so, they (perhaps deliberately) obscure the real role that an evolutionary approach ought to play in any discipline. While it is always possible that components of the mind are genetically determined in some strong sense (and there is now considerable evidence to support this in many – but of course not all – cases), an evolutionary perspective does not require this to be so. Certainly, there must be genes involved, but these genes need not be genes that determine behaviour, or even the mind in fine detail. Two aspects of evolutionary psychology make this clear.

First, the evolutionary approach is, properly speaking, a strategic one: evolution predisposes us to maximise fitness, and the evolutionary approach seeks to discover the rules we use in doing this. It is thus about decision-making, with the emphasis on the word 'decision' in the case of vertebrates with brains of any significant size. The amoeba and the aphid may make their decisions genetically by evolving fixed responses, but for most large-brained, slowly reproducing vertebrates that would be a recipe for extinction: the environment changes far too rapidly for such species to adapt genetically. Rather, these species opt for a more strategic evaluation of the costs and benefits of alternative courses of action. What is genetically imbued is the machinery needed to make that decision (aka a brain) and a handful of goal states at which to aim. The rest is done by conventional cognition. However, from an evolutionary point of view, there is no

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Ages that most had assumed were now firmly closed off behind us – the imputation of genetic differences between races, genders or even social classes.

A second source of confusion has been the fact that psychologists are used to explaining human behaviour in terms of motivations. So when evolutionary

difference between these cases: functionally, both end up maximising fitness, but they do it via different proximate mechanisms – genes and learning, respectively.

And this underpins the second issue, the fact that cultural evolution is as natural a component of the Darwinian world as something like eye colour that is more obviously under direct genetic control. Culture is not something that is somehow opposed to, or contrasted with, biology – culture is biology. The nature/nurture debate ground to a standstill in biology as long ago as the 1960s because biologists began to realise that the question was actually meaningless: everything is the product of the interaction of both nature and nurture. It doesn't even make sense to ask whether a trait is due to one or the other. Recognising this allows us to appreciate that cultural explanations are as much a part of the Darwinian process as genetic ones.

This is a natural consequence of the fact that the Darwinian formula does not specify whether or not genes are involved – which is perhaps not too surprising, given that they weren't discovered until decades after Darwin's death. Darwin and Mendel (who provided the mechanism of inheritance that underpinned Darwin's theory of evolution) merely spoke of heritability. They did not specify what form that should take, although perhaps inevitably it came to be identified with genes once these were discovered. However, Darwin's theory deals with Mendelian genes, and Mendelian genes are not DNA but rather traits whose mode of inheritance is unspecified. In principle, anything that allows fidelity of copying across generations is enough to generate the processes of natural selection. Learning is, of course, such a process, since it results in something (rules of behaviour, lists to be remembered) being differentially passed on through time. Cultural inheritance (or social learning) is simply one more evolutionary process.

Similar issues arise in respect of motivational explanations. Since many alternative motivational states could support a given ultimate fitness goal, it is an empirical question as to whether any particular one is relevant in any given case. I fall in love, and that's why I choose to marry someone; but even if I marry for any number of less noble reasons, the end consequence is still that I maximise my fitness (or more correctly, the fitness of my genes). We can still ask the evolutionary question: How well did my decision influence my genetic fitness? And because it is genetic fitness we are concerned with, I do not necessarily even need to

reproduce myself to maximise: I can maximise my fitness just by enhancing the reproduction of my relatives (what is known in evolutionary biology as Hamilton's rule, or the theory of kin selection). The problem is created, perhaps, by the fact that we humans can look far into the future, and so we often do appreciate – at least intuitively, but sometimes explicitly – that proxies for fitness such as having grandchildren or ensuring lineage survival are important to us. We thus tend to live in a folk psychological world of mixed motives: we often explain our behaviour by a confusing appeal to both proximate motivations and ultimate fitness consequences at the same time, and don't always make a clear distinction between the two.

I suspect that one of the sources of confusion here is that psychologists tend to focus on the individual and typically ask why an individual behaves in the way he or she does. In contrast, although the evolutionary perspective also speaks about individuals, it takes these to stand for categories. In reality, the evolutionary approach focuses on strategies that individuals use (Mendelian genes), rather than the individuals as such. The individuals, in one sense, are simply the vehicles that express the strategies. The same individual could, on different occasions, come to stand for very different strategies.

Of course, in reality, we usually run up against the limitations of real-life eventually: individuals are not infinitely flexible. Those proximate mechanisms beloved of psychologists eventually come into play and limit the range of options that any one individual can opt for. Such constraints are widespread in biology, and their role in the grand scheme of things is well understood. Indeed, at root, the evolutionary approach is precisely all about how individuals cope with constraints in order to maximise fitness. However valuable they might be for territorial conflicts, butterflies do not carry machine guns – not because they don't have the brain to invent them, but because of constraints imposed by flight. It's a problem for them, and they have to work around it.

We encounter these kinds of constraints all the time in psychology. Our social world is not infinite, but rather constrained by cognition, by social processes (whom we ought to talk to) and by time. Perhaps the best-known outcome

of this is 'Dunbar's number' – the apparently universal typical size of social circles at around 150 individuals. Dunbar's number is the outcome of the social brain hypothesis, the now broadly accepted explanation for the fact that primates evolved much larger brains than other species. The hypothesis, for which there is now very considerable supporting evidence, states that the social group size characteristic of a species is a simple function of the relative size of its neocortex. That relationship yields a predicted group size for humans, based on

our neocortex size, of about 150, and it turns out that this is an extremely common group size in modern humans in all cultures. It is the community size in hunter-gatherers, as well as the average village size in traditional agricultural societies (the *Doomsday Book* yields exactly this value for virtually every county in England, for example). It is also the typical size of our personal social networks (the number of individuals we know personally).

Of course, there is some variance around this value, some of it due to gender (women tend to have significantly larger social networks than men), some of it due to individual differences in social cognitive skills, a small fraction perhaps even due to differences in personality (though the effect is much smaller than one might expect in this case). The key here, however, is social cognitive abilities, the most familiar component of which is theory of mind. People who are better at juggling the mind states of more individuals at once (and women are better than men at this) have bigger social networks. And we now know that these social cognitive skills are reflected in differences in how the brain works – which, of course, can be due to genetically inherited differences, differences in early nutrition or differences in rearing experiences (especially social rearing experiences), or the interaction of all three.

So far, so interesting. But we should also ask the evolutionarily informed question of why we need these groups. Social groups exist principally to buffer us against the vagaries of the world. Among primates in general, social groups are communal solutions to the everyday problems of survival that threaten successful reproduction. Solving these problems communally is more effective, and the better they do it the higher their fitness will be. A recent study of wild baboons has shown that more intensely social females have higher lifetime reproductive outputs (i.e. larger numbers

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opinion

of surviving offspring). Kinship plays an important role here, because baboon females' best friends are their mothers, sisters and daughters. Humans are not immune to these considerations, it seems. A large-scale study of childhood morbidity carried out in Newcastle during the 1950s revealed that children embedded in larger extended kinship networks had much lower morbidity and mortality rates – and these findings have been replicated more recently in Dominica.

Primate social groups are, in effect, implicit social contracts, just as ours are. But social contracts of this kind are difficult to manage, because they require us constantly to trade off our short-term personal interests (selfishness, by any

other name) against the long-term benefits of social cooperation. Like all social animals, we are constantly torn between these two extremes, and which way we swing may depend on how economically interdependent we are. We make that decision individually – and in the face of intense peer pressure, as well as a great deal of parental pressure as we grow up – but the collective outcome of many individuals leaning one way rather than another can, over the course of just a few generations, swing the whole tenor of society from collective to individualistic and back again. Once in place, the social structures that emerge can impose their own constraints on an individual's freedom of choice, thus making it difficult to switch easily from one end state to the other. Communalism and individualism may thus be two stable states on either side of a fine dividing line: slip over in either direction, and everyone may be dragged rapidly off into the opposite corner (the phenomenon known as a basin of attraction in game theory).

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The point of this example is that it shows how understanding a fairly simple phenomenon – how many friends we have – can, within an evolutionary framework, allow us to integrate a wide range of different disciplines. Here, we fitted together a jigsaw of components based on differences in social behaviour, their cognitive, neurological and developmental underpinnings, and their social consequences both for the individual and for the emergent structural aspects of society as well as something to do with the functions of group life. We have slipped effortlessly from neuropsychology to sociology, and back, and called in on ecology on the way.

My claim is that our understanding of the phenomena we study is the richer and the more complete for this breadth of explanation. But more than that, our real appreciation of what is involved is only possible by integrating all these disciplines into a single seamless framework. And the only framework we have that can do this job is evolutionary theory.

reading

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