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# *Cognitive Archaeology, Evolutionary Psychology and Cultural Transmission, with Particular Reference to Religious Ideas*

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## ABSTRACT

**Archaeologists have drawn on evolutionary theory for more than three decades resulting in a diversity of approaches that lay claim to being a type of Darwinian archaeology. These are briefly reviewed, and some suggested to be of limited value to the discipline. The paper argues that a valid evolutionary approach requires an explicitly cognitive perspective, and suggests that there will be considerable benefit from an integration between cognitive archaeology and evolutionary psychology. The result would be a non-functionalist Darwinian archaeology with potential to throw new light on cultural developments during the Palaeolithic and more recent times. To illustrate this, the paper discusses the cultural transmission of religious ideas.**

## INTRODUCTION

Charles Darwin's theory of evolution by natural selection has achieved remarkable success in explaining patterning and variation in the natural world. It provides the theoretical basis and unifying theme for academics working in all areas of the life sciences, ranging from molecular biology to community ecology. Few challenge the central tenants of Darwin's theory with debate concerning the relative role of historical contingency in evolutionary process and the value of adaptationism (e.g., Gould & Lewontin 1979, Gould 1989, Eldredge 1995, Dennett 1995, Orr 1996).

Without Darwinian theory, the diversity of the natural world would appear bewildering. As bewildering, perhaps, as the diversity of the cultural world of humans. If we document the range of human cultures in the modern world, and supplement that range with those inferred for the past, we find remarkable variation in human behaviour, notably in the material culture that people make and use. To what extent can Darwinian theory aid in the explanation of this diversity? Just as the diversity of life forms today are understood by evolution from some primordial single celled organism, is it possible to explain the evolution of modern material – such things as space shuttles and CD players – from the Oldowan tools of 2.5 million years ago by the application of the same theory? Archaeologists have struggled with such questions for at least two decades and tried to make use of evolutionary theory in a variety of ways. In this paper I argue that the only respectable evolutionary approach, and the only one that will make a contribution to explaining past behaviour, is one that adopts an explicitly cognitive approach.

## DARWINIAN ARCHAEOLOGIES

A recent edited book on the use of evolutionary theory in archaeology was appropriately titled *Darwinian Archaeologies,* (Maschner 1996) rather than Darwinian Archaeology, as even among those who feel committed to a Darwinian approach, there is no consensus as to how evolutionary principles can be applied to human behaviour and changes in material culture. Such pluralism may be a fashionable feature of post-modernism – there is no single truth – but it is a crippling attitude to accept when trying to make progress in our understanding of the past or present. Some of the approaches currently being pedalled as Darwinian are fundamentally flawed and must be rejected.

The most obvious of these is a group adaptationist approach. It was common during the 1970s to read about hunter-gatherer groups being adapted to their natural environments. By this was meant that their way of life appeared appropriate for their environments—it was a way of life that appeared to use energy and information efficiently. This was indeed a good type of short hand description. But the term adaptation has no relevance to group behaviour: while the use of such group adaptationist terminology may have provided a veneer of science it provided no explanatory power. An individualistic approach is a prerequisite for any evolutionary approach in archaeology, or indeed any other domain of the human sciences (Mithen 1989, 1993).

A second manner in which supposedly Darwinian theory was adopted by archaeologists was for the development of cultural selectionist models (e.g., Dunnell 1980, Rindos 1984, O'Brien & Holland 1990). Although such approaches are variable, their basic premise is that the material culture that an individual adopts is as much a part of his/her phenotype as his/her physical appearance and behaviour. Consequently such material culture traits should be as subject to the process of natural selection as any other trait: those which increase the reproductive success of an individual will survive and spread within a population. Those which do not will disappear from the pool of material culture variants. As with the group adaptationist arguments, such ideas have an intuitive appeal and initially appear effective: we are indeed all followers of fashion and adopt material culture, either consciously or unconsciously, that appears most effective at solving the problems we face in the world. The problem with such ideas is that the material culture of an individual is not an expression of his/her genotype in a particular environment, as are true phenotypic traits. There is no reason why the descendants of a reproductively successful individual will necessarily have the same material culture of their ancestor, as in biological evolution. As with group adaptationism, cultural selectionist models are fatally flawed.

Models of cultural transmission (e.g., Cavalli-Sforza & Feldman 1981, Boyd & Richerson 1985) differ from those of cultural selectionism by avoiding a functionalist agenda and attempting to explain how maladaptive traits may survive within human populations. The basis of these models is that cultural transmission is analogous to genetic transmission. The most sophisticated versions are dual inheritance models, which recognise that to explain variation in human behaviour we need to consider both genetic and cultural transmission within a single model. But the failure of such models to engage with archaeological data and to address archaeological problems, let alone contribute to their solution, is worrying to say the least. After at least two decades of development, such models should have moved beyond the purely theoretical phase and be providing some respectable case studies. The fact that they have not suggests that there may be fundamental flaws in cultural transmission models—as indeed there are. One of these is that such models lack reference to people as intentional agents—an essential element of explanation in the human sciences. Another flaw will be exposed below.

One variant of cultural transmission models focuses not on material artefacts but on the underlying ideas, which are referred to as memes—an explicit analogy with genes. Associated with this is the notion that some ideas form 'cultural viruses' that are located in human minds and might spread through a population (e.g., Dawkins 1976, Cullen 1993, Dennett 1995). The notion of the 'meme' is notoriously ill-defined. Lake (1997) has discussed and analysed the concept in detail, exploring the analogy between memes and genes, and asking whether the idea of memes has any value for models of cultural transmission and archaeological explanation. He takes a sympathetic approach, believing that there may be mileage in the concept when applied to symboling behaviour. My own judgement is harsher: the concept of a 'meme' as a unit of replication and selection is simply fallacious.

## HUMAN COGNITION AND HUMAN BEHAVIOUR

The ideas of memes and cultural viruses, along with that of cultural transmission in general, focus attention on human minds rather than human behaviour. As such, these models are aligned with a further variant of Darwinian archaeology and one I want to explore within this paper: an explicitly cognitive approach.

The premise of this approach is that the behaviour of individuals, of groups, the character of their material culture, and ultimately the long term patterns of culture change we see in the archaeological record, arise from the short term decisions of individuals (Mithen 1990). Some of these decisions, perhaps only a small subset, are made consciously and with intent. As such, this approach explicitly rejects ideas that there are long term, and as yet undefined, processes of culture change, as argued by Murrey and Walker (1988). Long term patterns in the archaeological record are no more than the accumulated results of many individual decisions and post-depositional processes concerned with site formation. Consequently to provide adequate explanations for variation in their data sets and inferred patterns of past behaviour—whether they are concerned with the artefacts of the earliest *Homo* or modern material culture—archaeologists have no choice but to focus on processes of decision making and learn-

ing by individuals. Some of these processes are concerned with social learning, others with learning from an individual's own experience. It is the cognitive processes for these tasks which have been moulded by evolutionary abilities (including natural selection), not behaviour itself, let alone material culture.

Humans are no different in this respect than other animals. When biologists study the foraging behaviour of animals ranging from blue tits to gorillas, they assume that this behaviour arises from decision making processes which were shaped by natural selection. Those individuals who could make decisions which reduced foraging time (and hence exposure to predators) or increased the rate of energy gain over expenditure, were reproductively more successful. And consequently the decision making processes they used spread within the population. There is no reason to adopt anything other than this conventional evolutionary approach to humans, either those living today or long dead in prehistory.

## EVOLUTIONARY PSYCHOLOGY AND COGNITIVE ARCHAEOLOGY

As the realisation that archaeologists need a more explicitly cognitive approach to past behaviour emerged during the last decade, it was matched by the development of a more explicitly evolutionary approach in psychology. Indeed a distinct sub-discipline has emerged calling itself 'evolutionary psychology' (Cosmides & Tooby 1987, Barkow et al. 1992). Its basic premise is that the human mind-brain is a product of evolution in precisely the same way as any other organ of the human body. As such, to understand how it works today, we must understand its evolutionary history.

Unfortunately, psychologists adopted a very simplistic attitude to that evolutionary history, proposing the notion of the EEA, the 'Environment of Evolutionary Adaptedness' (Symonds 1979, Tooby & Cosmides 1992). This was argued to be the world of Pleistocene hunter-gatherers. Consequently all human minds are described in their work as the mind of a Pleistocene hunter-gatherer, whether that mind is possessed today by a city dweller, peasant farmer, industrialist or modern hunter-gatherer.

It is easy to criticise this idea. It is clear from even the most rudimentary study of comparative psychology that there can no such thing as a single EEA. It is readily evident that parts of our mental apparatus are shared with all primates, others with the great apes, others with early *Homo* while others are unique to our species alone. In other words these evolved in response to a succession of different environments and problems during the last 100 million years: there is no single, unitary EEA (Foley 1996). Moreover, even the most rudimentary knowledge of Pleistocene environments and societies indicates that these were characterised by immense diversity: the identification of a discrete set of adaptive problems beyond the trivial level of 'gaining food' and 'selecting mates' seems improbable.

Nevertheless there is much to be welcomed in the development of evolutionary psychology. It does, after all, stress the importance of palaeoanthropology to understanding the modern world—and soon evolutionary psychologists will realise that instead of simply making vague claims about life in the stone age, they will need to draw on the work of archaeologists. The basic idea that our minds are somehow adapted to a hunter-gatherer lifestyle does appear to have considerable value in understanding our behaviour today. Why, for instance, do so many people today crave foods high in fat and sugar which cause such serious health problems and consequently appears highly maladaptive behaviour? Well, possibly it is simply because these foods were in short supply in our ancestral environments and our desire for and pleasure in them was at that time a highly adaptive mental traits. But today, when such foods are in abundance, such mental traits are now seriously maladaptive as our physiology remains adapted to a low fat diet.

A wide range of issues concerned with human health today can indeed be illuminated by adopting such an evolutionary perspective (Eaton et al. 1988, Nesse & Williams 1995). Evolutionary psychologists are making many advances in our understanding of human behaviour today in the realms of inter-personal violence and cooperation, social interaction and mate choice by adopting this type of approach (e.g., Daly & Wilson 1988, Barkow et al. 1992, Buss 1994). But evolutionary psychologists, concerned with explaining human behaviour in the modern world, have much to learn from archaeologists who can provide the understanding about our hunter-gatherer past and the selective pressures on the human mind.

Conversely, archaeologists concerned with explaining past behaviour have much to learn from evolutionary psychologists as they can provide the understanding of decision making and learning that are required in a cognitive archaeology. One of their fundamental tenets is of particular importance to an evolutionary archaeology: that rather than there being a single learning process, there are likely to be multiple modules in the human mind, each attuned to learning and making decisions about a specific domain of behaviour.

## MENTAL MODULARITY AND DECISION MAKING ALGORITHMS

To explain the notion of mental modularity, Leda Cosmides and John Tooby (1987) have adopted the meta-

phor of the mind as a 'Swiss army knife' of specialised mental adaptations. Each of these, they argue, is a mental device specifically for solving a problem faced by our ancestors in their EEA. They would include devices for selecting food stuffs, recognising predators, and choosing mates. Cosmides and Tooby (1994) provide powerful arguments for why the mind would have such a design, rather than having one or a small number of general purpose problem solving mechanisms. In essence, this is because each of these problems have a different structure and to be solved efficiently a unique type of decision making process is required: what one needs to know when making a choice about foodstuffs, and how one should process that information, are different from the knowledge required for choosing mates. An individual with a single decision making process applied to these problems would be out competed by one who has specialised mental algorithms for these different types of problems.

These mental algorithms facilitate the learning of complex tasks because they are content laden. In other words, a certain degree of knowledge about the world appears to be hard wired into our minds at birth. The classic example concerns language acquisition. It is simply impossible that in their relatively short exposure to spoken words, young children could learn all the rules of grammar that they have mastered by the age of three or four (Pinker 1994). Somehow, these rules are partly already encoded into their minds. Similarly, knowledge about the physical and natural worlds appears to be encoded as an 'intuitive physics' and 'intuitive biology', while children seem to have a vast intuitive understanding about other minds, as explored in current research on 'theory of mind' (Hirschfeld & Gelman 1994, Mithen 1996a, chapter 3). Because such mental algorithms are content laden, they make learning about their relevant domains relatively quick and efficient.

One of the cognitive domains for which we should expect hunter-gatherers to have specialised, content rich, mental models is that relating to the natural world, and more specifically for making foraging decisions. As I have discussed at length, there are good grounds for believing that early humans possessed a distinct domain of 'natural history intelligence'—a bundle of integrated modules used for learning and making decisions about the natural world (Mithen 1993, 1996a, 1996b). And even within modern human minds, in which natural history intelligence is integrated with that of other previously isolated intelligences, those content rich decision making rules for foraging continue to exist.

A consequence of this is that we should expect individuals to make foraging decisions which ultimately lead to an increase in their reproductive success. This may be achieved by reducing the time spent foraging, or improving the rate of energetic return, or avoiding the risk of shortfall in food supply or by some other proximate goal—our task is to identify what types of goals were adopted and the constraints under which they were achieved. As I have demonstrated elsewhere, with a case study exploring Mesolithic foraging in southern Scandinavia (Mithen 1990), it is possible for archaeologists to build models based on the foraging decisions of individuals and test these against the archaeological record. This involves modelling information exchange between individuals, the formation of the archaeological record as well as decision making processes of individuals themselves.

We can do such work because there are strong reasons for believing that human minds have evolved mechanisms for solving foraging problems. But of course the modern mind today, and for much of prehistory, does not possess a unique problem solving device for each problem it faces. Hunter-gatherers in the EEA did not need to make choices about buying cars or computers. Consequently learning and making decisions about these problems for which there are no specialised mental modules is notably less efficient, and involves much more conscious awareness of the decision making process. Compare, for instance, how children learn the rules of language and those of mathematics. The first are acquired effortlessly and with very limited awareness. But when children need to learn multiplication tables they struggle, needing to be formally taught and to invest great effort, even though this set of rules is remarkably simpler than those they use in every spoken utterance they make. Pleistocene hunter-gatherers are unlikely to have needed to know their seven times table, and the mind today lacks specialised mental adaptations for acquiring such knowledge.

The significance of this for a Darwinian archaeology is that it has serious consequences for models of social learning and cultural transmission. Indeed it exposes a fundamental flaw in such models. Within models such as those of Boyd and Richerson (1985), no reference is made to the actual content of what is being learnt. There is an assumption that content has no relevance to the nature of cultural transmission. Those models which have addressed the relative significance of individual or social learning in different conditions (e.g., Boyd & Richerson 1996) have failed to consider how the value of these vary as to what is actually being learnt. Yet the message from evolutionary psychology (and indeed that from our everyday experience) is clearly that some things are much easier to learn than others. The nature of cultural transmission for knowledge about social relationships – something which our minds seem to be well tuned to learning about—will be very different to that regarding the internet,

a recent topic of knowledge about which communication and thought are far less efficient because we do not have evolved mental algorithms for this domain of activity.

## ARTEFACTS AND THE CULTURAL TRANSMISSION OF RELIGIOUS IDEAS

While this might be a flaw in the abstract models of cultural transmission and one reason why they have made very limited impact on explaining variation in the archaeological record, the differential ease with which different types of information can be transmitted does in fact reveal a new approach to understanding many aspects of cultural variability. To illustrate this, I will briefly consider the cultural transmission of religious ideas.

Explaining the existence of religious ideas from a Darwinian perspective on human behaviour is clearly a challenging task (Dennett 1997). It is a characteristic feature of religious behaviour that people act in ways that appear clearly maladaptive for their own reproductive success. People have destroyed their own material possessions, sacrificed their own offspring, devoted themselves to celibacy in the cause of worshipping deities. Explaining why and how ideas about religious entities could arise in humans minds is one problem; explaining how such ideas can be so persistent is perhaps even more challenging. It seems remarkable that during the last two decades there has been such a rise of fundamentalism throughout the world, such that more than 50% of Americans apparently believe that humans were divinely created, when during that period the fossil, archaeological and genetic evidence for human evolution has become so detailed.

My own views about the origin of religious ideas have been described elsewhere (Mithen 1996a). In brief terms, I have argued that these are essentially a spandrel of a change in mental architecture (cf. Gould & Lewontin 1979) that arose during the last 100,000 years of human evolution. A spandrel is a 'necessary architectural by-product'. Gould and Lewontin argued that many aspects of animal biology and behaviour are spandrels—byproducts of other features that in themselves lack direct functional value, drawing an analogy between these and spandrels found in architectural design (see discussion of this by Dennett [1995] and Houston [1997]). To understand how religious ideas evolved as a spandrel, we must first consider the mental architecture of early humans, those whose minds appear to have lacked any religious concepts.

The early human mind—that of archaic *H. sapiens*, Neanderthals, *H. erectus*—was structured, I have argued, on the basis of four 'intelligences', or bundles of mental modules. Three of these, those concerning the social world, making and using artefacts, and interaction with the natural world, were essentially isolated from each other. This isolation explains the rather odd character of the early Palaeolithic record in which we see evidence for very complex and sophisticated behaviour within these domains, but very simple behaviour at the 'domain interfaces' (Mithen 1996a, 1996b). For instance, while Neanderthals clearly possessed great technical skill in producing artefacts such as levallois points, and to have survived in Pleistocene Europe must have had an intimate knowledge of the natural world, the design of their hunting weapons appears remarkably simple. The recent discovery of 400,000 year old hunting spears at Schöningen, Germany (Thieme 1997), further indicates the absence of technological innovation during the Lower and Middle Palaeolithic as these appear as well designed as anything produced by the Neanderthals. This lack of innovation and the absence of multi-component hunting weapons, notably projectiles, arises, I have argued, from an inability to integrate their knowledge of tool making with that of the natural world.

The substantial development in cultural behaviour that we see in the archaeological record which begins at c. 100,000 years ago, and becomes dramatic after 50,000 years ago derives from a new ability by *Homo* to integrate their intelligences, a capacity I have termed cognitive fluidity. This appears to be restricted to modern humans, although some traces of cognitive fluidity may be present within the minds of the last Neanderthals (Mithen 1996a: 209-210). This change in the nature of intelligence is, I suggest, related to changes in the nature of language and consciousness (see also the idea of off-line thinking in Bickerton [1996]). Such cognitive fluidity had enormous adaptive benefits. By being able to integrate technical and natural history knowledge, tools could be designed to markedly improve the efficiency of hunting, plant gathering and food processing; by being able to integrate technical and social intelligence, artefacts could be designed to mediate social relationships providing new means to manipulate other individuals to ones' advantage.

Yet other consequences of such cognitive fluidity have no clear adaptive benefits and can be thought of as spandrels, inevitable by-products of such adaptations. For instance by integrating social and natural history intelligence beliefs could arise that entities exist which are half human and half animal, as clearly evident in the first representational art. And by integrating technical and social intelligence, inert objects could be attributed with ideas, feelings and intentions, 'living' entities could exist which did not need to feed, which were not born and could not die. This mixing up of natural categories is the essence of a supernatural being (Guthrie 1993, Boyer 1994a, 1994b, 1996; Mithen 1996c).

The human mind does not, therefore, have an evolved module/domain for supernatural beings or indeed any types of religious knowledge. This inhibits the cultural transmission of religious ideas. When an individual is told about a social relationship between two other humans, that information is embedded into content rich modules about human social relationships allowing many inferences to be drawn from a limited amount of information (Boyer 1994a). If we are simply told that those individuals are a boy and a girl and that they are 'in love' we can accurately guess how they are likely to be interacting with each other, what they will be doing, their feelings, how they will react in a host of circumstances. But if we were told about someone who was 'in love' with a supernatural being, no such inferences could be drawn. Perhaps we are told that supernatural being is invisible but exists in all places, that he once took human form and walked on water, that he died and then came alive again. Well, such details are of little help. What can it mean to love such a being? How is a person supposed to communicate with or behave towards such a being?

So the cultural transmission of religious ideas is difficult when compared to ideas about an evolved domain of human behaviour, such as social interaction or (for hunter-gatherers) animal behaviour. Boyer (1994a) has discussed this and noted that those religious ideas which survive the rigours of cultural transmission are those which have a link to a domain of intuitive knowledge. As he has recognised, while concepts of supernatural beings have, by definition, elements which are 'super natural', such as abilities to be omnipotent, invisible or ever-lasting, they also frequently have human like features, such as suffering jealously and desires. The gods of ancients Greece provide a typical example – supernatural beings who quarrel and deceive each other in a very human-like manner. By having these human like qualities, concepts of supernatural beings can be more easily transmitted and understood, than if all features were supernatural and unable to be grasped by any domain of intuitive knowledge.

As archaeologists we can never reconstruct the specific ideas that past people held about their religious beings, although we may be able to invoke what appear to be universal features of religious beings to suggest what ideas may have been present (Mithen 1997). But the difficulty of transmitting religious ideas also has enormous implications for the archaeological record which cannot be fully understood without understanding the human mind as a product of evolution. There are two cultural means which are widely used to facilitate the transmission of religious ideas and which have major impacts on the archaeological record. First, religious ideas are often transmitted in a context of ritual–the rote repetition of movement and utterances in sequences that must be conformed to precisely. Such ritual is essential: religious ideas cannot be transmitted in an informal manner if people are to share religious concepts because there is no evolved domain of religious ideas within the human mind. Without ritual, religious ideas might exist within individual minds but a religious institution, based upon shared religious concepts, would be impossible.

A second means by which the cultural transmission of religious ideas is achieved is even more fundamental for our understanding of human behaviour: the use of material culture. The last century of Palaeolithic archaeology has supported Durkheim's (1915: 307) assertion that "the principle forms of art seem to have been born out of religious ideas" (here I reject the idea that there are 'art objects' prior to those of the Upper Palaeolithic, finding the arguments of Bednarik [1995] for 'concept mediated marks in the Lower Palaeolithic' unconvincing [Mithen 1996d]). Throughout human history religious behaviour has involved visual symbols. Why should there be such a close connection between the two? Well, as Leach (1976) argued, we transform religious ideas into material form so that we can perform operations on them which are beyond the capacity of the mind. The evolutionary understanding of the emergence of religious ideas that I have summarised above explains why this is necessary: religious symbols, and more particularly the images of religious beings, serve to anchor religious ideas within the mind. Ideas about social relationships, the natural world, and stone artefacts did not need anchoring in hunter-gatherer minds as each of these related directly to an evolved domain of mental architecture which made them easy to learn, understand and transmit. Religious ideas had no such domain and the archaeological record of modern humans is replete with religious symbols.

## SUMMARY

I have chosen to focus on religious ideas and behaviour in this paper because this domain of human activity is the one which most clearly lacks an adaptationist explanation but is one which can only be understood from an evolutionary perspective. The ability for humans to create ideas about supernatural beings is a product of the emergence of cognitive fluidity between 100,000 and 40,000 years ago (Mithen 1996a). This cognitive fluidity, the ability to integrate ideas and ways of thinking from what had been isolated domains of thought, evolved due to the selective advantage it gave those individuals who could do things such as design better hunting weapons, or use material culture to medi-

ate social relationships. But by having a cognitively fluid mind, a whole host of new ways of thought lacking in any functional significance were also made possible – such as believing in beings which were half human/half beast. Transmission of such ideas required cultural support, such as visual symbols and ritual to anchor them in the mind as they have no evolved domain of their own. Consequently, unless we understand the human mind as a product of evolution we will be unable to understand religious ideas and their transmission. And of course religious ideas are just one type of thought made possible by cognitive fluidity. Another is pursuit of pure science–investing time in discovering laws of mathematics or the origins of the universe or of modern humans–activities of no adaptive benefit but which can be understood as a spandrel of our evolved mental architecture.

Other types of ideas can be transmitted without cultural support as they directly relate to a domain of intuitive knowledge. If we are dealing with hunter-gatherers, ideas and information about social relationships, the natural world and technology are of this nature and their minds have content rich, mental modules for making decisions within these domains. We would expect such decisions to make adaptive sense and ultimately to improve the reproductive success of the individuals involved. This is fortunate for archaeologists as data relating to past subsistence behaviour is often the most readily available in the archaeological record and can provide a means to test models for decision making in foraging strategies.

All people, either in the past or present, those who lived by hunting and gathering, by agriculture or by industry, live in a social world and have an evolved domain of social intelligence. And consequently we should also expect decisions about social relationships, such as the choice of friends and lovers, to also make evolutionary sense. This seems to be born out by the cross-cultural studies of Buss (1994) on mate choice, and on homicide victims by Daly and Wilson (1988). Of course, evolutionary sense is not necessarily adaptive sense: our decision making apparatus evolved for life in small scale, highly mobile hunter-gatherer societies. We use the same apparatus when living in our urban societies today and consequently may make decisions of little adaptive sense but which can only be explained by an evolutionary understanding of the human mind.

In summary, evolutionary theory is of vital importance to archaeologists, and indeed to any one studying human behaviour. But notions of group adaptation, cultural selection, memes and cultural viruses should be rejected. Models of cultural transmission must take into account the fact that some types of information are easier to learn and transmit than others. The most profitable manner in which evolutionary theory can be used in archaeology is for an explicity individualistic and cognitive stance to be adopted. The human mind is a product of evolution and as a consequence for those domains of behaviour which were of significance during the evolution of the mind, we should expect people to make decisions which lead to behaviour that increases their reproductive success. This provides a means for building models of human behaviour which can be used to explain the variability and patterning in the archaeological record. Other domains of behaviour and thought are spandrels of our evolved mental architecture and will defy adaptationist explanations. Nevertheless their existence can only be understood from an evolutionary perspective and cultural transmission theory may be able to explain the persistence of ideas with no functional utility.

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