

## THE LACK OF ACCEPTANCE OF EVOLUTIONARY APPROACHES TO HUMAN BEHAVIOUR

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**Abstract.** This study investigates the key factors influencing acceptance of the relevance of evolutionary theory to human behaviour, and the attitudes underlying them. Using data gathered from a wide-ranging questionnaire survey of students and staff in UK universities on attitudes to science, evolution and its application to human behaviour, multivariate analysis reveals that studying social sciences and sociocultural anthropology correlate with rejection of evolutionary approaches. The incompatibility of social science conceptions of humankind and human behaviour with evolutionary theory are discussed, with particular emphasis on the cultural focus of social scientists and modern attempts to incorporate cultural interactions into evolutionary approaches.

**Keywords:** evolutionism, sociobiology, evolutionary ecology, gene-culture co-evolution

*'I had the future exactly wrong. I didn't imagine the work we were doing taking over biology to the degree that it has. I instead imagined that the social sciences would be reformulated around this work. I confidently predicted that in twenty years, in other words right now, you would not be able to walk down the hall of a psychology or a sociology or an anthropology department, without hearing people arguing with each other "Yes but why would natural selection favour that?". This has not happened. The parallel fact in biology has been extremely gratifying ...'*

ROBERT TRIVERS, August 1995

### INTRODUCTION

Darwin's theory of evolution by natural selection has a long history of controversy, which has manifested itself in different ways in the 150 years since its publication. Original opposition came from religion, where the revelation of the animal nature of humans was not well received by those with more divine conceptions of mankind

and its origins. In addressing the relationship between humans and other species, evolutionary theory has challenged traditional, entrenched worldviews and provoked repeated resistance. Nevertheless, Darwin's theory flourished since its integration with Mendelian genetics in the Modern Synthesis, and subsequently developed into evolutionary studies of animal behaviour. Throughout the great advances made in understanding life and the human species with the refinement of Darwinian theory, there has been an underside of misuse of its concepts when applied to human society (DIAMOND 1991; JONES 1999; KUPER 1994; LALAND and BROWN 2002). Ideologies of eugenics and Social Darwinism have rightly been resisted, but have also been falsely invoked in response to legitimate attempts to understand the evolution of human behaviour. The attempt by E.O. Wilson to consolidate the fields of animal and human behavioural studies in *Sociobiology: The New Synthesis* (1975) provoked an immediate strong backlash in academia and beyond. This was based primarily on moral and political opposition to the historical abuses of evolutionary theory applied to humans, which were regarded as synonymous with sociobiology, rather than based on scientific criticism of the new approach. Nevertheless, the scale of the sociobiology debate was such that it had a profound influence on the acceptance of evolutionary approaches to human behaviour.

Wilson, Trivers and others believed sociobiology could make a particularly useful contribution to the social sciences by providing a model of the underlying evolutionary influences on humans, to integrate with social scientists and anthropologists culturally-based conception of behaviour, but it ended up being almost totally rejected (LALAND and BROWN 2002). The term sociobiology is not much used now, the fields which relate biological factors to human behaviour being mainly described as behavioural ecology and evolutionary psychology and cultural evolution or gene-culture co-evolution. The history and central concepts of social science disciplines, negative perceptions of sociobiology, a religious reluctance to view humans as animals, lack of biological education and the socio-cultural background of individuals have been suggested as general reasons behind this resistance to an evolutionary perspective (ELLIS 1996; LIEBERMAN 1989). Social sciences' focus on cultural determinants of behaviour have generally been seen as incompatible with any proposition of biological influences (DUNBAR and BARRETT 2007; CRONK and GERKEY 2007; CALCAGNO 2003; ELLIS 1996), leading many social scientists to continue to disregard evolutionary perspectives.

This study aims to investigate the key factors influencing the acceptance of evolutionary theory applied to human behaviour. Using a wide-ranging questionnaire survey of students and staff in UK universities, data were gathered on attitudes to science, evolution and its application to human behaviour, religious belief and education, and demographic, political, cultural and psychological background characteristics. These variables are investigated using multivariate analysis: The central aim is to evaluate whether there is evidence that studying certain academic disciplines, specifically the social sciences and sociocultural anthropology, correlates with rejection of the relevance of evolution to human behaviour.

## THE HISTORY OF EVOLUTION APPLIED TO HUMAN BEHAVIOUR

### Eugenics and Social Darwinism

The idea of evolution through natural selection acting on behaviour, in addition to physical traits, extends back to DARWIN (1872); among other things he identified universal emotional expressions independent of cultural differences. Francis Galton was interested in his cousin Darwin's ideas of heritable behavioural characteristics, but entered dangerous territory with his belief in using selective breeding to improve the human species. He introduced the term 'eugenics', but the controversy around this idea in the early 20<sup>th</sup> century has subsequently clouded attempts to investigate any biological influence on human behaviour (CLARK and GRUNSTEIN 2000; RIDLEY 1993; LIEBERMAN 1989; DEGLER 1991; BARKOW 2006). Galton's writings on eugenics were adopted by a movement, popular at the time, that ultimately resulted in discrimination, forced sterilisation, and the racist atrocities of the Nazis (LALAND and BROWN 2002; WADE 2002). The ideas of Darwinian natural selection were also distorted by Social Darwinists, who applied evolutionary theory to society and used it to justify right-wing capitalist ideology and racist immigration policy (ROSE and ROSE 2000; LALAND and BROWN 2002).

Contrary to popular belief, Lamarckian evolutionist Herbert Spencer coined the phrase 'survival of the fittest'; erroneously regarding evolution as linear and progressive, in opposition to Darwin's own views (BADCOCK 2000). His perspective was widely embraced in the US in the late 1800s as justification for the prevailing capitalist business structure (RUSE 2001; LALAND and BROWN 2002). At the time nature was considered to be more important than nurture in human behaviour, and Social Darwinism was embraced in North America and Europe to justify the increasing inequality in power and wealth, compared with the rest of the world, as a 'natural' result of racial superiority (ROSE and ROSE 2000). Culturally biased IQ test were also regarded as proof of innate differences between the races, contributing to US immigration restrictions for certain races and nationalities in the 1924 Immigration Act (LALAND and BROWN 2002; KUPER 1994; DEGLER 1991). Following Spencer, German zoologist Ernst Haeckel characterised evolutionary theory as having political implications; beginning a biological tradition with direct links to later Nazi theorists (RUSE 2001; PIETIKÄINEN 2004; WADE 2002). Thus Darwinism has long been perverted and abused for political purposes (JONES 1999; DIAMOND 1991; KUPER 1994).

The Social Darwinist idea of evolution as progress chimed well with some of the classic ideas emerging in the new discipline of anthropology, such as those of Morgan and Tyler. MORGAN (1877) described societal evolution as unilinear, progressing from savagery to barbarism to civilization. Describing this as evolutionism caused a semantic confusion that still persists even today between evolutionism referring to theories of social progression rather than Darwinian evolution, which makes no such assertions. But such ideas were used to justify the perception of

white Europeans as the most evolved humans, and legitimise racist oppression of other cultures (TURNER et al. 1997; BLANCHARD 2006; WADE 2002). Some even believed that other races were different species which, as in the biblical view of nature, were there to be used by humans, naturally justifying slavery (KUPER 1994). These ideas lent academic credibility to the perception of Western society as innately superior, despite refutation by Darwinian biologists in the late 1800s. Darwin and the Ethnological Society opposed the racist ideology of the Anthropological Society during the American Civil War, when race was the major political issue (KUPER 1994). He highlighted the similarities between races in mental abilities and expression of emotions, and that populations could not be classified into different types as the greatest variation was *within* them (LALAND and BROWN 2002; KUPER 1994). This view has been borne out in the modern evolutionary synthesis with genetics, which has revealed that genetic variation within populations is greater than that between them. However, the racial implications of Darwin's theory were misunderstood from the start and used to defend prejudiced social and ethical ideas (KUPER 1994; LALAND and BROWN 2002).

By the 1930s, the emphasis on natural differences gave way to environmental and then cultural determinism. This developed from the ideas of sociology's founder, Emile Durkheim, and the dominant behaviourist psychology, characterising the mind as a 'blank slate' which could be conditioned to respond to any outside stimuli (WRIGHT 1999; MIDGLEY 1980a; RIDLEY 1993; CARROLL 2007). In anthropology Franz Boas emphasised the study of cultural differences, countering the innate, universal generalisations of the evolutionist movement (LALAND and BROWN 2002; PELS 2004; KUPER 1994; BLANCHARD 2006). He first introduced the concept of 'culture' in terms of differences between societies, underlying differences between people, in 1911 (DEGLER 1991). This moved the burden of proof from culture onto nature, with behaviour regarded as shaped by culture unless proven otherwise (SEGERSTRÅLE 2000; RIDLEY 1993; DEGLER 1991).

Boas' students, including Alfred Kroeber, Edward Sapir and Leslie Spier, went on to found many of the major anthropology departments, resulting in a long-term focus on ethnographic approaches (LIEBERMAN 1989). This movement to largely descriptive anthropology was, in part, an attempt to distance anthropology from the racist views of the prevailing Social Darwinist doctrine of its inception (PELS 2004; DEGLER 1991; LALAND and BROWN 2002). Founding figures in social anthropology in the UK, such as Radcliffe-Brown, also concentrated on describing socio-cultural phenomena and their inter-relationships (PELS 2004; BROWN 1991).

LALAND and BROWN (2002) note the irony that the social sciences began to reject evolutionary theory just as it was becoming a cogent whole, with the Modern Synthesis of Mendelian genetics and Darwinian theory providing the mechanism for inheritance (LIEBERMAN 1989). This reclamation of evolutionary theory by biology subsequently led to the ethology of animal behaviour, relating behaviour to social and ecological environments, which provided the basis for its extension to humans (BATESON 2008; MYSTERUD 2004; MAXWELL 1991). Konrad Lorenz, one

of the founders of ethology, introduced the idea that evolved tendencies influence the development and behaviours of organisms, though do not directly determine them (LALAND and BROWN 2002). This was widely accepted when applied to non-human animals, but its potential importance for the social sciences had been overlooked due to the controversy surrounding its application to humans (RUSE 2000). The over-zealous application of evolutionary theory to human behaviour in popular ethology books of the 1960s, for example *The Naked Ape* (MORRIS 1967), incorporated much unsubstantiated and sensationalist conjecture (LALAND and BROWN 2002; KUPER 1994). While generating huge popular interest in the idea, it may have ultimately damaged its perception as a serious scientific enterprise (MAXWELL 1991). Such books described 'innate' tendencies in human behaviour; commonly interpreted as deterministic and, with the naturalistic fallacy, as asserting that what is natural is right (SEGERSTRÅLE 2000).

### Sociobiology wars

The first attempt to integrate animal and human studies using neo-Darwinian evolutionary approaches to understanding social behaviour came with E.O. Wilson's *Sociobiology: The New Synthesis* (1975). Wilson reasoned that mankind should not be exempt from study of its own evolved nature, and attempted to analyse human behaviour from the same perspective as other animals' (KUPER 1994; LALAND and BROWN 2002; SEGERSTRÅLE 2000; RIDLEY 1993). While recognising the potential of the approach, he saw previous attempts, like MORRIS' (1967), as "inefficient and misleading" (WILSON 1975: 551). Wilson wanted to move away from the ideas of instinct in ethology to the modern biological idea of interaction between genes and the environment. He aimed to investigate how our evolutionary history has resulted in selection for underlying genetic predispositions in modern behaviour, using the principles of population ecology and genetics (KUPER 1994; SEGERSTRÅLE 2000; BATESON 2008; MAXWELL 1991). Hamilton's theory of kin selection and inclusive fitness (1964) was at the heart of this new approach to human behaviour, underlying predictions of interactive behaviour between individuals. Also important were the reciprocal altruism ideas of TRIVERS (1985), accounting for co-operation between unrelated individuals. The sociobiology approach was explicitly gene-centred, and viewed organisms as 'vehicles' for the reproduction of genes (DAWKINS 1976). Behavioural traits, like physical traits, can be genetic adaptations, and genes influencing phenotypic traits which result in higher inclusive fitness for the organism will be selected for and will propagate in future generations. Using this basic principle of natural selection, WILSON (1975; 1978) claimed that many human behaviours, for example male promiscuity, incest avoidance and hostility to strangers, are genetic adaptations (BATESON 2008).

*Sociobiology* was initially well received by most biologists, who appreciated the detailed empirical and theoretical work on animal social behaviour (WEINGART,

MAASEN and SEGERSTRÅLE 1997). However, a huge controversy throughout the 1970s and 80s, known as the sociobiology debate, soon followed (LALAND and BROWN 2002; RIDLEY 1993; PIETIKÄINEN 2004). Critical response to the book was swift from the left-wing, liberal Sociobiology Study Group, which was formed later in 1975 and led by members of Wilson's own biology department at Harvard; Richard Lewontin and Stephen Jay Gould (SEGERSTRÅLE 2000; PIETIKÄINEN 2004; JUMONVILLE 2002). The opponents immediately characterised sociobiology as politically motivated biological determinism, and linked it with racism, eugenics and Nazi policies (SAHLINS 1976; ROSE 1980; RUSE 2000; SEGERSTRÅLE 2000; PIETIKÄINEN 2004; MEIER 1999; BROWN 1999). Wilson strongly denied such accusations, and accused the critics of distorting his position and quoting him out of context, but he was naïve about the political and historical associations of his approach (RUSE 2000; SEGERSTRÅLE 2000; LALAND and BROWN 2002; DENNETT 1995).

Many American biologists could see merit in sociobiology applied to humans, but they were reluctant to become tainted by the controversy by defending Wilson and the original allegations perpetuated (LALAND and BROWN 2002; SEGERSTRÅLE 2000). Criticism concentrated on moral and political condemnation; for example, the left-wing critics accused Wilson of committing the naturalistic fallacy and arguing that social reform is against human nature (ROSE, LEWONTIN and KAMIN 1984). The Sociobiology Study Group escalated the debate by contriving false opposition and attributing extreme views to their opponents in order to pursue their own scientific and moral agendas. Members of the Sociobiology Study Group felt a duty to unmask perceived underlying political biases in approaches they disagreed with, and the history behind Wilson's new theories provided a perfect opportunity (PIETIKÄINEN 2004). Wilson belonged to a traditional group of positivist scientists with trust in the integrity of the scientific method and pursuit of knowledge without boundaries, while LEWONTIN et al. were born of radical 1960s Marxist politics and saw dangerous political values permeating science in controversial areas (WEINGART et al. 1997; SEGERSTRÅLE 2000). Moral and social implications were read into sociobiological theories by the critics and used to attack the whole approach, leading to serious misrepresentation. The Sociobiology Study Group regarded its exposure of apparent political motives as legitimate *scientific* criticism; what is politically bad must also be bad science. In effect this is the naturalistic fallacy in reverse: What *ought not* to be cannot be identified as what naturally *is*. This difference in scientific viewpoints was used to accuse individual scientists who disagreed with them of scientific errors, punishing and defaming them for taking a different approach (SEGERSTRÅLE 2000). In return, sociobiologists fought back against such attempts to suppress certain areas of research by comparing the critics to Lysenko, who destroyed Soviet genetics until the late 1960s by abandoning a Mendelian approach due to political ideology (SEGERSTRÅLE 2000; PIETIKÄINEN 2004). From this perspective, the political dangers to science came from curtailing it.

Thus the controversy became hijacked. It became a personal debate between Wilson and Lewontin and Gould, and later between Dawkins and Steven Rose in the UK. Even at the time there were those warning that the overblown nature of the dispute was unhelpful, as it polarised academic positions, overshadowed the real issues and differences between the two sides, and clouded comprehension and acceptance of evolutionary ideas outside the discipline (MIDGLEY 1980a; Steve Jones, personal communication).

The social sciences were criticised by sociobiologists for having a pre-Darwinian view of the social world (for example, TRIVERS in DAWKINS 1976). Much of the debate was an attack on a straw man rather than on the modern conception of evolution.

Postmodernism infiltrated the social sciences from the mid-1970s and became part of the wider 'Science Wars' in the 1990s, as postmodern theorists deconstructed scientific texts to reveal underlying power structures and counter the traditional rationalist philosophy of science (GROSS and LEVITT 1998; SEGERSTRÅLE 2000; CARROLL 2007; FLYVBJERG 2001; D'ANDRADE 2000; TURNER et al. 1997). The postmodern perspective interprets science as simply another social construction of knowledge, with no consideration of the validity of its empirical arguments or the cognitive value of the scientific method (SPIRO 1996; ROSE, H., 2000; SEGERSTRÅLE 2000; CARROLL 2007; SOKAL and BRICMONT 1998; ELLEN 2002). This approach is absurd to most scientists, and regarded as intellectually dishonest, even dangerous because it undermines trust in science (GROSS and LEVITT 1998). The conflict between scientific and postmodern perspectives in, for example, anthropology (CALCAGNO 2003; ELLEN 2002; CRONK 1999; LEWIS 2001) and sociology (LOPREATO and CRIPPEN 1999) is ongoing.

Cultural determinist views remain predominant in social sciences, reinforced by the dominant cultural relativist perspective in sociocultural anthropology, in which the meanings of cultural phenomena are interpreted relative to each other (ELLIS 1996; SPIRO 1996; KUPER 1994). This is in part linked to the continued prevalence of the nature-nurture dichotomy; a result of the Cartesian dualism between mind and body, which is also shared with religious believers (BARKOW 2006; ELLIS 1996; MACHALEK and MARTIN 2004; MYSTERUD 2004; PLOTKIN 2007). The traditional debate about the relative importance of nature versus nurture has in fact been settled, at least in biology, as a false dichotomy. Genes do not operate in isolation from environmental factors, including culture, and their interaction is the primary consideration. But major meta-theoretical and institutional barriers grew up which inhibit interdisciplinary understanding, with the social sciences regarding culture, as a product of the mind, as the main determinant of behaviour and independent of biology (CRONK 1999; ELLIS 1996; JACKSON and REES 2007; CRONK and GERKEY 2007). MONTAGU (1980: 10) claimed that the mind is "completely malleable under the shaping influences of culture". Many social scientists still consider cultural and biological influence as mutually exclusive.

However, amongst the general public, by the end of the 1980s there was increasing interest in biological influences on humans, which may have been in part to do with a general increase in interest in genetics, helped by the advent of biotechnology and the Human Genome Project.

### Modern approaches to human social evolution

Due to the turbulent and controversial history of the 'sociobiology' label, The Human Behaviour and Evolution Society's journal changed its name from *Ethology and Sociobiology* to *Evolution and Human Behaviour* in 1996 in order to distance itself from the term (MYSTERUD 2004). The tainting of the name has even led most evolutionary biologists working on non-human animal behaviour to reject it (WILSON and WILSON 2008). Nevertheless, the controversy was productive to some extent in provoking greater clarity and formalisation of sociobiological ideas (SEGERSTRÅLE 2000; BORGERHOFF MULDER et al. 1997). The main intellectual descendants of sociobiology fall roughly into three new schools of thought: evolutionary psychology, human behavioural ecology and gene-culture co-evolution.

The modern approaches of evolutionary psychology and behavioural ecology are not concerned with linking genes and behaviour, instead focussing on mental processes and the fitness consequences of behaviour, respectively. The new approaches continue with the same sociobiological foundation, based on theories by HAMILTON, TRIVERS et al., to build an evolutionary social science (SMITH, BORGERHOFF MULDER and HILL 2001). This centres on the adaptive significance of behaviour. Evolutionary psychology focuses on psychological mechanisms as adaptations, while behavioural ecologists investigate adaptive behavioural responses to environments, often through testing formal models. While there are definite distinctions between behavioural ecology and evolutionary psychology (SMITH, BORGERHOFF MULDER and HILL 2001), they have been overemphasised. Disputes, for example over the relevance of the EEA (environment of evolutionary adaptiveness) concept (MALIK 2000) and measurement of current adaptiveness through fitness differentials (SYMONS 1990), have helped to obscure understanding and appreciation of the underlying ideas by those in outside the discipline. Fragmentation of the evolutionary approaches to human behaviour may have weakened their overall position and had an adverse effect on their acceptance in the social sciences. However, these approaches share common ground that enables them to be used in complementary ways to address the same problems (DUNBAR and BARRETT, 2007; BORGERHOFF MULDER et al. 1997; SMITH 2000; LALAND and BROWN 2002). The behavioural ecology approach, focussing on behavioural strategies and adaptive consequences, can be combined with consideration of underlying psychological mechanisms to test evolutionary psychology hypotheses (BARRETT, DUNBAR and LYCETT 2002; BATESON 2008; DOWNES 2001).

Many behavioural ecology and evolutionary psychology studies have not directly addressed cultural influences (such as social learning). Behavioural ecologists

are usually playing a 'cultural gambit' i.e. focussing on the ultimate adaptive reason why a behaviour exists, assuming culture will somehow arrive at an evolutionarily optimal solution without explicitly addressing the proximate mechanisms through which behaviour develops (BARRETT, DUNBAR and LYCETT 2002; BOYD and RICHERSON 2005; RICHERSON and BOYD 2005; CRONK 1995; 1999). Perceived disregard for culture in evolutionary perspectives is anathema to most social scientists, with their emphasis on cultural determinants of behaviour. Consequently, one of the key criticisms of evolutionary approaches from social scientists is that they ignore cultural explanations at the heart of, for example, sociology (MACHALEK and MARTIN 2004) and sociocultural anthropology (MONTAGU 1980; LIEBERMAN 1989).

However, culture was considered from an evolutionary perspective in gene-culture co-evolution or cultural evolutionary studies, in papers almost as old as socio-biology itself (e.g. FELDMAN and CAVALLI-SFORZA 1976; LUMSDEN and WILSON 1980). From an evolutionary perspective, culture has a biological basis and is expressed as socially transmitted information grounded in psychological capacities for symbolic thought, language and learning (RICHERSON and BOYD 2005; CRONK 1995; GINTIS 2007; MESOUDI, WHITEN and LALAND 2006). The ability to learn cultural norms from others can be adaptive in the Darwinian sense if it enables efficient epigenetic information transmission without the need for trial and error individual relearning; thus inherited behaviours, ideas, beliefs and values are accumulated over generations (MESOUDI et al. 2004; MACE and HOLDEN 2005; HENRICH and MCELREATH 2003; RICHERSON and BOYD 2000; PLOTKIN 2007). Many studies of the evolution of human cultural behaviour aim to integrate proximate cultural factors, situating behaviour in the context of complex cultural and social environments (DURHAM 1991; BARKOW 1980; RICHERSON and BOYD 2005; MESOUDI, WHITEN and LALAND 2006; CRONK 1995; DENNETT 1995; MALIK 2000). Thus the question for evolutionary anthropologists now is not whether behaviour is 'determined by culture', but what is the evolutionary basis of that cultural behaviour and of cultural norms. The growth of modern evolutionary approaches which give serious consideration to culture and its transmission through social learning may be more in tune with the social science perspective (DUNBAR and BARRETT 2007; LALAND and BROWN 2002; MACHALEK and MARTIN 2004). Some in this field have argued that cultural evolution has the potential to unify the social sciences in the same way that organic evolution synthesised biology (BOYD and RICHERSON 2005, GINTIS 2007; 2009).

How have these modern approaches to the evolution of human behaviour been received? Behavioural ecology and evolutionary psychology are the dominant evolutionary approaches to human behaviour (LALAND and BROWN 2002), but the response to them from the broader social science community has been limited (NELSON 2007; BARKOW 2006; WINTERHALDER and SMITH 1992). Surveys by SANDERSON and ELLIS (1992) and LIEBERMAN (1989) found that sociologists and cultural anthropologists, respectively, remain relatively unreceptive to them.

Gene-culture co-evolutionary approaches were initially largely ignored (perhaps in part due to their mathematical focus). Then cultural evolution and gene-culture co-evolution began to attract familiar criticism. Some dismissed it due to repeated resistance to colonising of the social sciences with biological theories (ERIKSEN 2007; LIEBERMAN 1989; INGOLD 2007; REYNOLDS 2007; KUPER 1994; MILLS 2007); and some social scientists continue to characterise evolutionary approaches as prioritising genetic causal factors. In short, earlier criticisms of sociobiology were not really updated (DERKSEN 2005). For example, even claims that cumulative, 'progressive' cultural change were racist towards traditional communities, and political criticisms of adaptationist approaches regarding humans as passive against social forces have been repeated (INGOLD 2007). CALCAGNO (2003) notes the irony that anthropologists' respect for cultural diversity does not extend to the diverse intellectual cultures in their own discipline.

However, evolutionary anthropology (which includes human behavioural ecology and cultural evolutionary studies) and evolutionary psychology, are now significant sub-disciplines in their fields, and evolutionary sub-disciplines have appeared in archaeology, economics, and demography; evolutionary studies of human behaviour are also attracting more interest amongst biologists. All this is suggestive of something of a renaissance in evolutionary studies of human behaviour. Therefore it is interesting to ask whether vocal critics of such approaches, which certainly remain, are still generally representative of their fields. Are the social sciences still anti-Darwinian?

## METHODS

### Questionnaire survey

Over the summer of 2007, an online questionnaire survey was sent to students and staff in social science departments at UCL and other UK universities. Other academic departments were also surveyed to allow comparison of the results with different disciplines and include a greater variety of respondents. The questionnaire was formulated to gather data on attitudes to science, evolution and its application to human behaviour, religious belief and education, using responses to statements on a Likert scale, and demographic, political, cultural and psychological background information. Reverse phrased items were used to reduce response bias, and possible self-selection biases were minimised by keeping the intentions of the study vague; only describing it as a survey on attitudes to evolution, without mentioning sociobiology or its later variants. The survey was hosted on the UCL Opinio website and responses were anonymous. An invitation and link to complete the questionnaire was distributed by e-mail via faculty and departmental co-ordinators to all UK universities. The response rate was very good, and there were 7763 completed responses. This was reduced to a final usable sample size of 7621 after the removal of non-academic staff who were not the target sample.

### Hypotheses

- a) A social science background will decrease acceptance of the relevance of evolution to human behaviour. Conversely, a biological / scientific background will increase acceptance.
- b) Greater knowledge of evolution will increase acceptance of evolutionary approaches to human behaviour.
- c) Religious belief will decrease acceptance of the relevance of evolutionary theory applied to human behaviour.

### Factor Analysis

Factor analysis was performed on the data in SPSS, and the content of the component questions that loaded onto each factor was analysed to identify common themes which could be reliably interpreted. A factor score for each factor was calculated by SPSS for each respondent in the sample. *Table 1* shows that two factors that were identified called: Acceptance of the relevance of evolution to human behaviour (*Table 1a*) and Religiosity (*Table 1b*)

*Table 1.* Factors emerging from the factor analysis a) Acceptance of the Relevance of Evolution to Human Behaviour and b) Religiosity

<b>a) Component Variables – Acceptance of the Relevance of Evolution to Human Behaviour</b>	<b>Factor Loading</b>
<i>The evolutionary history of humans is relevant in studying human behaviour</i> (q. 39)	.659
<i>Human behaviour can be explained in the same way as that of other animal species</i> (q. 32)	.587
<i>Humans are a species of animal, related to other species</i> (q. 29)	.430
<i>I am interested in the theory of evolution</i> (q. 20)	.416
<i>The social sciences provide a greater understanding of humans and their behaviour than evolutionary theory</i> (reverse) (q. 40)	-.727

  

<b>b) Component Variables – Religiosity</b>	<b>Factor Loading</b>
<i>Would you describe yourself as religious?</i> (q. 12)	.880
<i>Were you brought up with religious views?</i> (q. 13)	.776
<i>A spiritual / supernatural influence can explain the nature of life and the world</i> (q. 19)	.766

### Regression models

Initial multiple regressions were carried out against *Acceptance of the Relevance of Evolution to Human Behaviour* using variables applicable to the whole sample to reveal which attitude and background variables had a significant effect and substantial contribution to the model's predictive power. Those variables which were not significant or overlapped in variance with others were excluded from the final analyses.

The main *Current Discipline* and *Religiosity* variables were added hierarchically to the background demographic, cultural and psychological variables in Model 1 to reveal the additional individual explanatory power of each, given the influence of the others. This was necessary due to the categorical nature of the *Current Discipline* variable, which was coded into a group of dummy variables, to distinguish the predictive power of its overall variance.\*

### RESULTS

Table 2 shows that, controlling for the other background variables, *Current Discipline* is the most important predictor in this model, explaining 9.1% of the variance in *Acceptance of the Relevance of Evolution to Human Behaviour*.

Of the variance within this, the most important significantly negative predictor of *Acceptance of the Relevance of Evolution to Human Behaviour* is studying social sciences (compared to disciplines unrelated to science and human behaviour). This indicates that social scientists are more likely to reject evolutionary approaches to studying humans. *Acceptance of the Relevance of Evolution to Human Behaviour* also decreases with study of religious studies and sociocultural anthropology.

Studying biosciences, psychology and biological anthropology have the strongest positive relationships with *Acceptance of the Relevance of Evolution to Human Behaviour*. It is interesting to note that psychology has the second most important subject relationship, and indicates that psychologists are receptive to evolutionary approaches in their discipline. Evolutionary approaches are becoming increasingly popular in psychology, not least because they can unite its diverse perspectives.

These results replicate the overall pattern of LIEBERMAN's (1989) survey of acceptance of the relevance of sociobiological concepts twenty years ago, which revealed significant differences between disciplines; with biologists the most accepting, followed by biological anthropologists, and cultural anthropologists the least accepting of the relevance of evolution to understanding human behaviour.

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\* Note: When variables are added hierarchically, their influence is only calculated relative to the variables already in the model (TABACHNICK & FIDELL 2007; HARDY 1993)

Table 2. Results of Model 1 showing background variables influencing the factor *Acceptance of evolutionary approaches to human behaviour*

Independent variables	Unstandardized Coefficients		Standardized Coefficients	Hierarchical $R^2$ change
	B	Std. Error	$\beta$	
(Constant)	4.033	.104		.044
Age	.011	.001	.098***	
Sex ( <i>Male [1]</i> v <i>Female [0]</i> )	.084	.023	.041***	
Politics (v none):				
Right-wing	.042	.034	.015	
Left-wing	.119	.023	.059***	
Psychological Variables:				
Extraversion	.002	.004	.006	
Agreeableness	-.026	.005	-.061***	
Conscientiousness	-.003	.005	-.008	
Neuroticism	.003	.004	.008	
Openness	.030	.004	.074***	
Region Brought Up In (v Britain):				
North America	.084	.047	.019	
Western Europe	-.041	.035	-.012	
Eastern Europe	-.176	.090	-.021	
Australasia	.120	.096	.013	
Eurasia	-.284	.124	-.024*	
East Asia	-.314	.053	-.064***	
Middle East	-.662	.111	-.063***	
Africa	-.350	.093	-.040***	
Latin America	-.083	.114	-.008	
Religiosity	-.668	.048	-.151***	.029
Current Discipline / Department (v unrelated disciplines):				.091
Anthropology ( <i>Biological</i> )	.986	.092	.119***	
Anthropology ( <i>Sociocultural</i> )	-.245	.058	-.051***	
Archaeology	.342	.049	.090***	
Biosciences	.488	.038	.210***	
Mathematics	.239	.066	.043***	
Other Sciences	.289	.045	.092***	
Philosophy	.211	.065	.039**	
Psychology	.411	.044	.134***	
Religious Studies	-.386	.075	-.060***	
Social Sciences	-.243	.040	-.092***	

$R^2 = .164$ .  $N = 7621$ . \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

*Religiosity* is the second strongest predictor in the model; accounting for an additional 2.9% of the variance in *Acceptance of the Relevance of Evolution to Human Behaviour*. It has a significant negative relationship; as religiosity increases, acceptance decreases. This indicates that individuals with stronger religious beliefs are more likely to reject evolutionary approaches to human behaviour. Richard Dawkins is famously critical of religion as it shapes peoples' worldviews and believes it is a major impediment to the public understanding of science (DAWKINS 2006). Our results support the view that evolutionary and religious ideas do indeed compete to influence our perception of creation and morality.

Holding left-wing political views has a positive relationship with *Acceptance of the Relevance of Evolution to Human Behaviour*. This result does not support the commonly held assumption that individuals in favour of evolutionary approaches to human behaviour have a right-wing bias.

The background demographic, psychological and cultural variables individually contribute relatively little to the explanatory power of the model, but they do have some significant effects. Males are slightly more convinced of the relevance of evolutionary approaches than females. The old are more convinced than the young. This does not suggest that acceptance of evolutionary approaches to understanding human behaviour is increasing.

### A sub-sample of social scientists

It can be seen from *Table 2* that *Current Discipline* has the strongest relationship with *Acceptance of the Relevance of Evolution to Human Behaviour* in Model 1. This model reveals that social scientists are significantly less accepting of evolutionary approaches to human behaviour than those studying unrelated subjects. The subset of those educated in social science was examined, controlling for *Current Discipline* and the original background variables. Further background variables were included to give greater insight into the 'life-history' of respondents' education and contributing factors to their attitudes to evolution, including *Knowledge of Evolution* which was measured by responses to factual questions about evolutionary theory in the survey. Results covering only social scientists are shown in *Table 3*.

Within the social sciences, *Knowledge of Evolution* is the most important predictor of *Acceptance of the Relevance of Evolution to Human Behaviour*; this positive relationship indicates that individuals with greater knowledge of evolution are more likely to accept evolutionary approaches. These results suggest that education is a pertinent factor in shaping attitudes and, correspondingly, lack of knowledge of evolution is important in rejection of evolutionary methods.

The *Number of Years Studying Social Sciences* has a significant negative relationship with *Acceptance of the Relevance of Evolution to Human Behaviour*. These results suggest that negative attitudes to sociobiology may be culturally transmitted and reinforced by social science study, rather than being entirely due to existing at-

titudes of individuals who self-select these disciplines. Thus conformist bias against an evolutionary perspective appears to increase with the amount of social science influence.

Table 3. Results of model 2, showing the influence of other variables on the factor *Acceptance of the Relevance of Evolution to Human Behaviour* with only social scientists included in the sample

Independent variables	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	$\beta$
(Constant)	3.271	.253	
Age	.018	.003	.170***
Sex ( <i>Male [1] v Female [0]</i> )	-.030	.055	-.015
<i>Politics (v none):</i>			
Right-wing	.062	.080	.023
Left-wing	.019	.058	.010
<i>Psychological Variables:</i>			
Extraversion	.021	.011	.056*
Agreeableness	-.045	.011	-.107***
Conscientiousness	.010	.011	.025
Neuroticism	.013	.010	.037
Openness	.000	.011	-.001
<i>Region Brought Up In (v Britain):</i>			
North America	.104	.113	.024
Western Europe	-.119	.083	-.038
Eastern Europe	-.256	.169	-.040
Australasia	.294	.270	.029
Eurasia	-.173	.250	-.018
East Asia	-.087	.124	-.019
Middle East	-.373	.271	-.036
Africa	-.194	.242	-.021
Latin America	.105	.260	.011
Religiosity	-.190	.114	-.046
Knowledge of Evolution	.154	.016	.263***
Number of Years Studying Social Sciences	-.027	.011	-.078*

$R^2 = .122$ .  $N = 1322$ . \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

## DISCUSSION

Despite optimistic predictions that an evolutionary perspective would be embraced by the social sciences (HARPENDING, ROGERS and DRAPER 1987), there is little evidence that this has occurred (LIEBERMAN 1989; SANDERSON and ELLIS 1992; ELLEN 2002). Science and social science have very different epistemologies. Some social science studies are based on qualitative rather than quantitative methods, so it is usually unnecessary to learn scientific methods to work in such fields. There is great continued lack of knowledge of biology in many of the social sciences (MACHALEK and MARTIN 2004; SCHUBERT 1991), which has become an impediment to inter-disciplinary integration (LOPREATO and CRIPPEN 1999; WINTERHALDER and SMITH 1992). Some genuine attempts to engage social scientists by evolutionary researchers appear to have underestimated their unscientific nature (MAMELI 2007). Anthropologists focus on interpreting localised ethnographic accounts (SHANKLAND 2001; D'ANDRADE 2000). Contextually embedded qualitative data open to different interpretations is regarded as a strength in understanding complex human behaviour, but such data is often thought to lose meaning in quantitative analysis.

Other social scientists take the opposite view, arguing social sciences are unformed and fragmented (BLOCH 2000; MESOUDI, WHITEN and LALAND 2006; LIEBERMAN, 1989; ELLIS 1996) without a theoretical framework. GINTIS (2009) bluntly observed, with reference to the rational actor model of behaviour, that 'behavioural disciplines such as anthropology and sociology, as well as social and cognitive psychology, that have abandoned this model have fallen into theoretical disarray.'

What may have started as hostility to evolutionary approaches based in part on past abuses of that theory is now reinforced more by epistemological and institutional differences. Many of the questions relating to how cultural and biological evolution interact to generate behaviour patterns are essentially empirical questions, that may be difficult to address, but are not beyond the reach of scientific enquiry. Many social sciences study proximate determinants of behaviour in ways that may not rely on any underlying theory of behaviour, and some are no longer interested in any general patterns in human nature (only in specific histories) and thus do not approach their disciplines through a framework of hypothesis testing at all. The way many social scientists are now trained, means that they have neither the motivation nor the scientific training to follow the literature in evolutionary studies nor to collect or analyse the relevant data with which to test hypotheses about human behavioural or cultural evolution (and the converse also holds). Interests lie elsewhere, leaving something of a vacuum in the social sciences in this area. This vacuum is now beginning to be filled, but as often as not by those trained in biological rather than social science disciplines. How the next generation researching the evolution of human social behaviour are received will doubtless vary discipline by discipline and institution by institution, according to local culture.

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