

Advances in the Evolutionary Analysis of Human Behaviour

Mhairi A. Gibson
David W. Lawson *Editors*

Applied Evolutionary Anthropology

Darwinian Approaches to Contemporary
World Issues

 **ehbea** european human behaviour
and evolution association

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Foreword

Monique Borgerhoff Mulder

There is a new confidence in the social and biological sciences in the value of our work, and nowhere is this more apparent than in the emergence of “evidence-based” fields. In the wake of the successes of evidence-based medicine (Sackett et al. 1996), in conservation biology we now have evidence-based conservation (Sutherland et al. 2004), in economics something fast approaching evidence-based development economics (Banerjee and Duflo 2012), and in policy the stirrings of similar movement (Biglan and Cody 2013). Sharing a commitment to systematic comparison, whether this be based on randomized controlled interventions (Cohen and Dupas 2010) or, where experimental manipulation is impossible, tightly controlled comparison (Andam et al. 2008), systematic reviews and meta-analyses (e.g. Brooks et al. 2012), these fields provide rigorously-assessed, and often widely vetted, knowledge for deployment in direct action.

So where are we with respect to an evidence-based evolutionary anthropology? The dozen chapters in this stimulating collection offer some intriguing pointers towards where we should be going. Clearly “behavioural change”, the holy grail of so many conservation and public health projects, cannot be attained, either through educational interventions or restructured incentives, without a genuine understanding of how and why humans behave as they do. How can you change a person’s firewood collection practices or health-seeking strategy if you do not understand the dynamics entailed in how ecology and individual circumstance shape opportunities and constraints, how opportunities and constraints shape preferences, and how preferences influence decisions? Furthermore, it is equally critical to understand the principle avenues whereby behaviour and ideas are transmitted between individuals if campaigns, pamphlets and educational outreach are to have any effects.

As many of the contributors to this volume make abundantly clear, behavioural ecology (the dominant framework of evolutionary anthropologists), and the evolutionary social sciences more generally, offer a powerful framework for tackling these issues, given their commitment to both distinguishing explanations of ultimate function from those of proximate mechanism and determining universal rules

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that underlie the diverse patterns of behaviour within and between different human populations. By examining decision-making within the matrix of the costs and benefits that structure the marginal returns to fitness associated with any particular action (or inaction), behavioural ecologists can develop hypotheses for how and why humans behave as they do, given a particular set of environmental opportunities and constraints. As a rigorously empirical discipline, these predictions are then tested with data from multiple populations in different parts of the world, with the objective of revising model assumptions (Borgerhoff Mulder and Schacht 2012). Furthermore, by using evolutionary models to identify, explore and describe theoretically-informed proximate triggers of behaviour, evolutionary social scientists should be in a position to design effective policy interventions. And then, with additional input from cultural evolutionary theory (Mesoudi 2011), they can identify key influences on how certain patterns of behaviour are transmitted within and between generations.

From the chapters in this volume we now know, for example, of extrinsic mortality's role in shaping reproductive and health decisions, of the salience of habit forming, of the highly contingent patterning of cooperation and punishment across human populations, and of the dangers of using simple models based on the assumption that individuals strive to maximize resource acquisition when we design strategies for reducing poverty. Are we ready to make evidence-based recommendations? Certainly some of the contributors to this volume are willing to move in that direction, always with caution given both past and present misuses and/or misinterpretations of evolutionary reasoning. Where we are typically lacking, however, is in clear policy recommendations. It is one thing to say 'We now know X, and this should guide policy' and quite another to say 'Knowing X leads us to recommend policy Y'.

To do this we need more evolutionary political science—a field largely missing from this collection because it is still so young. For example, it is certainly useful to know that the poor invest little in health care (their own and that of their children) not simply because of their limited finances but because of their high vulnerability to extrinsic sources of mortality and their consequential heavy discounting of future states of health. But this is only a start, and we need more ideas: to get policies which motivate people living in deprived neighbourhoods to find innovative ways of reducing extrinsic risk, which provide tax monies for the material and social capital to do this, or which offer incentives for those who wish to find new homes in less risky environments. These are fundamental policy shifts that change the structural parameters of inequality. They require ideological shifts in tolerating inequality that seem to occur more naturally in some contexts than others (Borgerhoff Mulder et al. 2009), but we still do not understand exactly why. Scientists are rarely good politicians. But by blending the insights of models, experiments, and systematic empirical comparisons, in the way Ostrom (2007) pioneered in the field of natural resource management, we need to start thinking about establishing a more comprehensive evidence-based social science.

So, to avoid being hoisted on my own petard, how do we as evolutionary anthropologists do this? The suggestions are deceptively simple. First, we should strive for

greater communication with on-the-ground organizations dedicated to improving public health, alleviating poverty and finding sustainable use of natural resources; this is critical because these organizations typically have much greater access to policy-makers than do academics. We should also aim to integrate academic research more closely with project evaluation, as is occurring so successfully in development economics (e.g. Palm et al. 2005). It is also very important to make the results of our research accessible to those in the executive branches of government who can make best use of them. That said, being effective in any of these goals is difficult, and we still have many lessons to learn. Hopefully these chapters will attract new interest and fresh talent.

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Chapter 1

Applying Evolutionary Anthropology to a Changing World

Mhairi A. Gibson and David W. Lawson

Abstract Evolutionary anthropology presents a powerful theoretical framework to understand how both current environments and legacies of past selection shape human behavioural and cultural diversity. Combining ethnographic, economic and demographic methods, this integrative and pluralistic field has provided new insights into the ultimate motivations and proximate pathways that guide human adaptation and variation. In recent years, anthropologists and related social scientists have also begun to explore how evolutionary theory may be used as a tool to address questions of public health and social policy relevance. This marks a watershed development in evolutionary approaches to human behaviour, as the field moves beyond purely academic boundaries and into the realm of applied social science. As a species, we are currently experiencing dramatic shifts in our lifestyle, family structure, diet and health and global contact. ‘Applied evolutionary anthropology’ (AEA) can provide new insights into the causes and the consequences of such human behavioural shifts by studying populations at the cusp of these transitions. It also holds great, largely untapped, potential to guide the design, implementation and evaluation of effective social and public health policy. This edited volume reviews the current state of the emerging field of AEA, highlighting the work of a number of interdisciplinary evolutionary scientists studying contemporary world issues. In this chapter, we briefly introduce the objectives and main contributions of AEA, and discuss the key research themes explored both in this book and the wider literature.

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1.1 Introduction

An anthropologist's primary duty is *'to present facts, develop concepts [and] destroy fictions and empty phrases, and so reveal relevant active forces'* (Bronisław Malinowski, cited in Firth, 1981, p. 195).

Anthropologists have a long history of acting as two-way communicators between local peoples and external global agencies/forces. The early goals of anthropology were not only to provide an explanation of the behaviour of unfamiliar and 'exotic' peoples, but also to present the 'native' view, highlighting local concerns to administrators and policymakers to facilitate better governance (Sillitoe 2007). With the wane of colonialism and the emergence of global communication networks and development aid, the significance of this dual role has grown (Crewe and Axelby 2013; Mosse 2013). Many anthropologists today seek to both identify and communicate the needs of peoples to policymakers (with the aim of ensuring culturally appropriate and effective forms of development), but also to address a range of issues affecting communities across a rapidly changing and increasingly globalised and interconnected world.

Since the early twentieth century, some anthropologists and social scientists have employed evolutionary theory to provide new insight into the behaviours of contemporary peoples, in both 'traditional' and 'Westernised' societies. Developing from the natural sciences, evolutionary anthropology argues that human biological and behavioural diversity and change result from variation, inheritance and adaptation to specific environments. This approach has improved our understanding of how local ecologies (both physical and cultural environments), legacies of past selection and current reproductive goals can explain human diversity (for recent reviews, see: Nettle et al. 2013; Brown et al. 2011). Informed by these Darwinian principles, and ongoing theoretical developments in evolutionary biology, a new generation of evolutionary anthropologists have begun to address a range of questions relating to human health, social welfare and public policy.

The aim of this edited volume is to highlight the work of those researchers who are currently using the theoretical framework of evolutionary anthropology to both deepen our understanding of human behaviour and help the people with whom they work. They seek to apply evolutionary principles to a range of issues of relevance to public health and social welfare. This includes not only identifying the concerns and needs of marginalised or disadvantaged peoples, assisting with the design and critique of policies which seek to implement changes to environments or in behaviour(s), but also addressing problems facing industry, government and society more widely. In many instances, this work not only addresses long-standing and unsolved human issues (e.g. how to solve cooperative dilemmas, mitigate risk and encourage positive health behaviours), but also stimulates research on new topics relating to dramatic recent changes in lifestyles and ecologies.

1.1.1 Why now?

We believe an appraisal of ‘applied evolutionary anthropology’ (AEA) is timely for a number of reasons. Firstly, the number of academic researchers explicitly addressing evolutionary explanations of human behaviour, within and outside of anthropology, has grown substantially in recent years (Nettle et al. 2013; Brown et al. 2011), perhaps particularly with regard to evolutionary models of cultural transmission (Mesoudi 2011). Researchers are increasingly seeking to demonstrate the value of an evolutionary approach to neighbouring disciplines, extending beyond the core academic objectives to address applied concerns regarding human well-being (e.g. Tucker and Rende Taylor 2007; see also Diamond 2012, Sloan Wilson 2011, for recent more popular accounts). Similar commitments to applied research can also be seen in the overlapping fields of biosocial anthropology (Panter-Brick and Fuentes 2009), anthropological demography (Kertzer and Fricke 1997), evolutionary medicine (Nesse and Stearns 2008; Stearns et al. 2010) and evolutionary psychology (Roberts 2011). Such enthusiasm is paralleled by an increasing acceptance across the human sciences that evolutionary considerations can complement and substantially deepen our understanding of (both the ultimate and proximate) factors underpinning human decision-making and behavioural diversity. Furthermore, the value of anthropological expertise and cross-cultural comparative research have also become more readily acknowledged within psychology and economics (e.g. Henrich et al. 2010), disciplines that often have more (in)direct influence on social policy. All of these developments indicate that the emerging and integrated field of AEA is in good health and the intellectual climate is receptive.

A second factor is that there are clear signs that governments, charitable organisations and those social scientists working on the front line of global health and economic development policy are in a reflexive mood. Numerous, and often controversial, popular books, highlighting the mixed success of international aid and non-governmental projects, have frequented headlines and bestseller lists in recent years (e.g. Moyo 2009; Banerjee and Duflo 2011; Karlan and Appel 2011). There has also been a spate of articles and books mounting critiques of the tools traditionally prioritised by policymakers in the measurement of physical, mental and socioeconomic well-being, both at the individual and national scale. Jerven (2013), for example, presents a damning appraisal of the calculation, interpretation and ultimately misuse of African gross domestic product (GDP) statistics. Randall et al. (2011, 2013) highlight the shortcomings of generic large-scale demographic and health surveys in accurately mapping cross-cultural diversity in human residence and resource flows, obscuring true relationships between household structure, health and reproductive behaviours (see also Lawson and Ugglá, Chap. 5). Moreover, there is now more recognition than ever before that, if international development policy is to be successful and cost-effective, it needs to be evidence-based, whether that is through randomised control trials or systematic project evaluation (Haynes et al. 2012; Székely 2013; Banerjee and Duflo 2011). Indeed, there is some indication that governments and NGO public policymakers are taking note of the findings in

the academic literature. For example, research on the unforeseen impacts of water-tap installation on population change in Ethiopia described in Gibson (Chap. 4) was raised at a recent UK government parliamentary enquiry on Development and Reproductive Health (e.g. Population Action International Report; see Engelman 2006). The potential for rigorous empirical research to influence policy is now apparent, and we believe it is timely for evolutionary anthropologists to demonstrate their contribution.

Finally, stemming from the increased economic pressures placed on universities and other research institutions, funders are increasingly demanding that researchers across the social and natural sciences engage with the applied value and social relevance of their work (e.g. the UK Research Exercise Framework (REF) and Research Councils UK). For example, the 2014 REF, which ultimately determines the allocation of government funding and university league table positions within the UK, required all academic departments to provide case studies of how research has had a direct impact on the wider society. Anthropologists, like all other academics, are being asked to prove their worth.

1.2 Contents of this Book

This edited book is based on a collection of papers presented at a workshop entitled ‘Applied Evolutionary Anthropology: Darwinian Approaches to Contemporary World Issues’, which we organised at the University of Bristol from 14 to 16 September, 2011. The workshop was funded through generous financial support from the *European Human Behaviour and Evolution Association (EHBEA)*, the *Bio-Social Society* and the *Galton Institute*. The book also represents the first volume in a new EHBEA book series, which aims to showcase the work of researchers exploring evolutionary questions about human behaviour (www.ehbea.com).

Our contributing authors address a wide range of research topics and collectively combine a range of methodologies and sources of data. Each contributed chapter focuses on the integration of evolutionary theory with neighbouring social sciences to yield new and practical insights into major social and health issues of the twenty-first century (e.g. natural resource management, population growth and public health service delivery). In doing so, they demonstrate the potential utility of an evolutionary perspective in the design and evaluation of development and public policy. In addition, each highlights a central feature of evolutionary anthropology, the need to understand human responses to our physical and cultural environment as multidimensional and integrated.

We have divided the book into four parts, each comprising of two to three chapters grouped around an overarching shared theme. This division of themes is somewhat artificial; several key topics and theoretical frameworks are recurrent throughout.

Part 1 '*Development Intervention*' contains three chapters, each concentrating on what evolutionary anthropology has to offer the design of external interventions aimed at improving well-being and/or the mitigation of economic risks in disadvantaged rural communities in the less developed world. Bram Tucker (Chap. 2) tackles the complex topic of agricultural reform, reviewing how key assumptions regarding human rationality have historically played a foundational role in the design and evaluation of large-scale programmes aimed at improving agricultural productivity. Cautioning against the application of a naïve, and ethnographically poorly supported, model of farmers acting to selfishly maximise individual profits, Tucker instead emphasises the importance of collective interests, the propensity for non-selfish behaviour and the avoidance of food insecurity, rather than the prioritisation of profit maximisation. Implications are drawn for the new Alliance for a Green Revolution in Africa (AGRA), with suggested increased focus on community cohesion and the evaluation of wider markers of well-being and equity rather than increases of yield and cash earnings alone. Shakti Lamba (Chap. 3) argues a strong case for convergent evolution between two independent fields addressing the determinants of human cooperation: (1) the academic evolutionary literature, relying mainly on the use of experimental economic games to test hypotheses regarding human cooperative tendencies, and (2) the applied economic literature studying the success and failure of microfinance initiatives, which present 'real world' cooperative dilemmas as loan-group members are liable for debts unpaid by other members. Lamba concludes that in many cases microfinance studies are consistent with the evolutionary literature and its core predictions, but highlights that much uncertainty remains in understanding the mixed success of microfinance programmes. Finally, Mhairi Gibson (Chap. 4) reviews the findings of a long-term study of the impact of labour-saving development project on population change in rural Ethiopia. The chapter reveals a number of unexpected shifts in local demography and health (larger family sizes, poorer child growth and increased outmigration) and parental investment behaviours (greater educational investment) arising as a direct consequence of development intervention. Gibson argues that the findings not only support development policy which favours routinely combining family planning with technological or health intervention, but also reveal the value of an evolutionary approach by providing an explanation of how and why population and health changes may occur.

In Part 2 '*Family Structure and Reproduction*', David Lawson and Caroline Uggla (Chap. 5) consider the theoretical and empirical contribution of evolutionary studies of family structure to the more directly applied literature of population health science. Evolutionary anthropology's emphasis on contextual variation, in both the drivers and impacts of observed diversity of human family structure, is contrasted with the use of large-scale nationally and regionally representative surveys in population health, which often obscure such variation. Focusing on sub-Saharan Africa, shared priorities for future research are highlighted and tentative recommendations made for policy related to topics including fertility decline, the legal status and potential health risks associated with polygynous marriage and the extent to which

extended kin can be anticipated to effectively substitute parental care for fostered and orphaned children. The theme of population health is further developed in chapters by Alejandra Núñez-de la Mora, and by Mary Shenk and colleagues. Núñez-de la Mora (Chap. 6) documents a striking variation in breastfeeding rates between first- and second-generation Bangladeshi immigrant populations to the UK. Using concepts from evolutionary life history theory and reproductive ecology, the role of shifting pay-offs to alternative breastfeeding behaviours are discussed. It is argued that declining health benefits and increased opportunity costs to breastfeeding for UK-born women of Bangladeshi origin underlie observed differences. Wider patterns of ethnic and socioeconomic variation in breastfeeding rates are discussed and suggestions made for culturally sensitive maternal and child health promotion programmes. Shenk et al. (Chap. 7) review how evolutionary- and non-evolutionary-minded demographers have approached the topic of biased sex ratios, with particular reference to the strongly male-biased sex ratios common to many regions in South Asia. Novel empirical analyses are presented on the determinants of family-level sex-ratio variation in Matlab, Bangladesh, where, counter to trends across much of the subcontinent, sex ratios have become substantially less male-biased in recent years. Shenk et al. suggest that the utility of evolutionary demography is not that it necessarily improves upon or replaces ideas in the mainstream demographic literature, but rather that it ties disparate concepts and hypotheses together in a broader integrative framework capable of yielding ultimate-level explanations for complex cultural phenomena such as son preference.

Part 3 ‘*Cooperation and Conflict*’ is composed of two chapters that consider the propensity for human violence and punishment. Robert Layton (Chap. 8) reviews influential early philosophical and more current anthropological stances on the extent to which our species should be considered predisposed to violence and aggressive competition in the absence of strong governance. Joanna Bryson and colleagues (Chap. 9) pursue an improved understanding of the puzzling phenomena of ‘antisocial punishment’, that is the tendency to punish those who contribute to the public good, even when those contributions directly benefit the punisher. The authors propose, supported by analysis of cross-cultural economic game data, that antisocial punishment may be best understood as aggressive behaviour directed to perceived out-group members, and that cultural variation in antisocial punishment corresponds to local likelihood that other participants are members of a trusted group. This interpretation identifies a clear need to ensure strong perceptions of mutual trust and shared goals for citizens themselves to respond positively to cooperators and reinforce contributions to public goods.

Part 4 concludes with a consideration of what evolutionary thinking can offer the study of ‘*Health and Diet Behaviours*’. Gillian Pepper and Daniel Nettle (Chap. 10) offer an evolutionary take on the sizeable positive socioeconomic gradients in health behaviour (i.e. activities such as healthy eating and regular exercise) routinely demonstrated in studies of public health. Despite a large volume of research dedicated to the topic, there is still little consensus on the causes of this gradient. Integrating existing explanations at both the proximate and ultimate levels, Pepper