

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

and Nettle present a complementary proposal that, as extrinsic risks to mortality increase, the payoffs to investment in preventative health behaviour will decline. They suggest actual and perceived mortality risk should be responsibly modified to encourage increased healthy behaviour for socioeconomically disadvantaged groups. Jonathan Wells (Chap. 11) develops a conceptual model to explain the dual nutritional burden (of under- and over-nutrition) characteristic of many modernising countries. He argues that developmental plasticity which allowed humans to survive challenging environmental shifts over evolutionary history renders some contemporary populations vulnerable to chronic diseases (such as diabetes, hypertension and coronary vascular disease). Wells emphasises the negative effects of global economic forces, particularly the commercial activities of large corporations (via food marketing and distribution), which target ‘emerging’ economies. Robert Aunger and Valerie Curtis (Chap. 12) also offer a theoretical model. This chapter advocates the value of an ‘evo–eco’ approach to understanding behavioural change and the mechanisms that underlie it. The model is based around the dynamic relationship between the environment, evolved human cognition and behaviour. They review case studies which reveal how this approach can be used to develop public health and hygiene programmes, for example, in the promotion of hand-washing behaviour.

1.3 What are the Contributions of Applied Evolutionary Anthropology?

Each chapter in this volume makes its own case for the major contributions of evolutionary anthropology, identifying key theoretical, methodological and applied dimensions which may improve human well-being within the contemporary world. In general, three main types of contribution can be distinguished. We briefly outline each below.

1.3.1 Strong Integrative Theory

Evolutionary approaches are led by well-grounded theoretical predictions concerning human motivations, preferences and behaviours. Importantly, this includes a unique consideration of *ultimate causation*, i.e. explanations for behaviour grounded in terms of evolutionary history and adaptive function. Improving our understanding of the evolved design of human body, mind and culture in this way provides a strong predictive and interpretative framework for the study of human susceptibility to conflict, ill health or unhappiness. Indeed, a fundamental observation of evolutionary anthropology is that natural selection has ‘designed’ the human organism to deploy behaviour which maximises the production of genetic descendants, not health, financial gain or other measures of personal or societal well-being. The

chapters in this volume are united in their view that this knowledge has much potential to be of use to the wider society; to help design better interventions, facilitate trade, minimise conflict and to market public health initiatives which improve human well-being (also see Roberts 2011). Furthermore, by embedding *proximate* explanations of behaviour, i.e. those based on the assumed properties of human physiology, psychology or culture, into an ultimate framework, an evolutionary perspective can serve to integrate disparate theoretical frameworks, identifying new links and directing attention to new areas of research. Thus, the integrative nature of evolutionary thinking holds great promise to unify alternative approaches in the social sciences. An anthropological focus complements this unifying potential, assuring that theoretical models are sensitive to the diversity of human history, culture and experience.

1.3.2 Ecological Contingency

One important focus within evolutionary anthropology, of particular relevance to applied studies, is its emphasis on the context dependency of human behaviour. An evolutionary approach argues that huge variation in behaviour exists, because the payoffs to alternative strategies are dependent on local ecology and individual condition, as well as constraints of culture and evolutionary legacy. This standpoint has contributed to an increased recognition in evolutionary sciences that human nature is variable (across both space and time), indicating that findings from one society are very rarely relevant to the wider picture across cultures (e.g. Henrich et al. 2010), and emphasising the value of culturally appropriate methods, data analysis and interpretation. With regard to policy relevance, this perspective supports a long-standing tradition within anthropology, arguing for targeted intervention projects which are designed to address local conditions and specific needs (rather than ‘blanket’, broad-based initiatives which are applied cross-culturally with little regard to local context).

Additionally, an ecological focus places evolutionary anthropologists in a good position to tackle topics relating to recent changes in lifestyle and physical environment which are having a dramatic impact on human well-being. This includes addressing both how and why humans are likely to respond: for example, by identifying which groups or individuals are likely to be most vulnerable to negative effects of climate change and dietary shifts in transitional economies, or by revealing situations where conflict and social unrest may occur (highlighted in Chaps. 3, 8, 9, 10 and 11 by Lamba, Layton, Bryson, Pepper & Nettle, and Wells).

1.3.3 Mixed Methodologies

AEA builds on a broader disciplinary tradition of applying scientific and social methods and principles to address contemporary world issues. Methodologically,

it benefits from the exploitation of mixed methods. It combines scientific rigour (favouring evidence-based research, exploitation of natural experiments and the use of quantitative statistical methods) with contextual detail from anthropology (most notably engaging with ethnographic methods, which draw on in-depth and long-term fieldwork). Increasingly, the complementary collection of qualitative data on local perceptions, attitudes and beliefs provides important detail on the context of human decision-making and behavioural change (see Chaps. 2, 4 and 6 by Tucker, Gibson and Núñez de la Mora,).

1.4 Recommendations

As Monique Borgerhoff Mulder points out in her foreword to this book, transforming loose statements of policy relevance into real impact may present both theoretical and methodological challenges for evolutionary anthropologists. However, in this respect, we are not alone. Balancing applied and pure research remains a long-standing issue in anthropology (and indeed across much of academia) (Sillitoe 2007; Mosse 2013). The chapters in this volume reveal that these challenges may also be the source for new research opportunities for evolutionary anthropologists. To this end, we conclude our introduction with five simple recommendations for evolutionary anthropologists who wish to make their work more applied. These include: (1) directing our research focus towards transitional populations, particularly those most vulnerable to the effects of rapid and recent changes in society and health; (2) improving communication and collaboration with appropriate decision-makers, including national policymakers, research think tanks and non-governmental charities (organisations which can help to guide our research towards the most pressing human issues, but also implement our recommendations); linked to this, (3) disseminating research to a wider audience, through on-line open access reports, presentations to the public and other non-academic publications; (4) using and promoting mixed-methods approaches which demonstrate the value of integrating small-scale anthropological analyses, which reveal the primacy of local context, with the large-scale data sets prioritised by economists and population scientists; and finally, but most importantly, (5) ensuring active consideration of how research insights may improve human welfare, in particular encouraging students and junior researchers to stay well-informed on key public debates. We hope this book itself succeeds in addressing this final recommendation, stimulating further research and teaching as well as inspiring dialogue on topics relating to the application of evolutionary anthropology.

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