

BOOK REVIEW 2010 - #1

Shennan, Stephen (Editor). Pattern and Process in Cultural Evolution. 2009. viii + 341 pages; figures; tables; chapter references; index. University of California Press, Berkeley, California. ISBN 978-0-520-25599-9. Hard Cover. Price: \$60.00. Available from: University of California Press, 2120 Berkeley Way, Berkeley, CA 94704

The contributors to Pattern and Process in Cultural Evolution endeavor to make the case that cultural change and biological evolution are sufficiently similar that theoretical and analytical concepts from evolutionary biology can productively be applied to cultural “evolution.” Their position justifies an evolutionary anthropology that can embrace a variety of approaches to the archaeological and ethnographic records. Some of the more theoretical pronouncements are problematic (see below), and some of the applications are a bit strange (e.g., the phylogenetic branching of European knives and forks). Collectively, however, the volume’s chapters clearly demonstrate the middle-range potential of evolutionary approaches for generating and testing hypotheses about the mechanisms underlying cultural change.

Shennan’s introductory chapter makes clear that practitioners of evolutionary anthropology and archaeology are a diverse group and may sometimes disagree with each other about theory and method. For example, human behavioral ecology (HBE) is advanced by its advocates as the quintessential evolutionary approach to archaeology and ethnology (e.g. Kennett and Winterhalder, 2006) but is regarded by others (e.g. Fitzhugh and Trusler, chapter 14) as insensitive to creativity and social and technological innovation. These authors favor cultural transmission theory (CT) which focuses on how skills, attitudes and artifacts are passed between generations (vertical transmission) and across social boundaries (horizontal transmission).

Following Shennan’s introduction, the volume is divided into three sections: Understanding Cultural Transmission (chapters 2 through 9), Testing Evolutionary Hypotheses (chapters 10 through 14), and Social Evolution (chapters 15 through 21). The chapters in each section are loosely organized around the section theme, although some could be shuffled among the themes without loss of coherence. Understanding Cultural Transmission is the most theoretically and philosophically dense section, although not necessarily the most illuminating. Mesoudi and O’Brien (chapter 2) argue for incorporating an analog of virtually every concept from evolutionary biology—from selection to phylogenesis (in biology, the appearance of new taxa)—into evolutionary anthropology. They also introduce the reader to dual inheritance theory (i.e. genetic and cultural inheritance) and its offspring, cultural transmission theory (CT). Briefly, CT attempts to specify all of the ways that cultural knowledge can be passed from individual to individual and group to group, along with predictions about the degree of variation associated with each transmission pathway.

Strong advocates of mathematical modeling and simulations, Mesoudi and O’Brien argue that, “only by using quantitative methods such as gene culture coevolution models or phylogenetic analyses, together with controlled experimental simulations, can we begin to unravel [the] complexity” of multiple variables influencing the trajectories of cultural change (p. 28). In their insistence on experimentation and simulation, Mesoudi and

O'Brien recall the New Archaeology of the 1970s and 80s (e.g. Binford, 1977), whose practitioners argued that archaeological interpretation must be based on models derived from experiment and ethnographic observation.

Robert Aunger (chapter 3) expands on cultural transmission theory, arguing that human beings use communication to construct individual and social niches: "communication can be defined as *an instance of niche construction using signs, signals, or artifacts that is targeted at changing the behavior of conspecifics*" (original emphasis). Unfortunately, in promoting his own view Aunger distorts or misrepresents the work of other theorists. A good example is his treatment of the epidemiological model for the transmission of cultural information developed most fully by Dan Sperber (e.g. Sperber, 1996). The model proposes that "ideas" spread in a way analogous to the spread of an infectious agent. In Aunger's account, the epidemiological model takes little account of mutation or variation. In fact, Sperber (1996, pp. 25-27) noted that mutation of ideas is likely much more common than mutation of organisms: it is the rule in the former, the exception in the latter. Moreover, Sperber suggested that communication begins when an individual forms a mental representation of an idea in her head. It is the mental representation, not the idea itself, that is transmitted via a public representation. Yet Aunger cannot grasp how an idea could exist in a mind independently of its representation. He claims that, "it is rarely assumed that ideas duplicate themselves within one mind prior to being ejected into the external environment...: people would have to sneeze away the only copy of the idea they have" (p. 36). This, too, is a misrepresentation, and a rather silly one at that.

The remainder of the chapters in the book focus on illustrative case studies, each accompanied by an explanation of the theoretical orientation and methods employed. The contributors investigate a fascinating variety of topics, from the technological "evolution" of bicycle design (Lake and Venti, chapter 10) to a persuasive if ultimately speculative proposal for the evolutionary origins of social prestige and prestige goods (Plourde, chapter 18). In general, the case studies prove more interesting and potentially useful the farther away they get from grand theorizing.

An excellent example is chapter 12 by Smith, Hughes and Mithen, which illustrates the potential of Darwinian concepts for testing and generating hypotheses about cultural transmission and change. Their focus is on the Lower and early-Middle Paleolithic, ca. 1.8 to 0.5 million years ago, and the analysis attempts to clarify and explain the so-called Movius Line, named for archeologist Hallam Movius. Movius observed that the Acheulean stone tool tradition, which appeared in East Africa some 1.6 million years ago, seems never to have arrived in east Asia. Instead, an older pebble tool tradition similar to the African Oldowan seems to have persisted for hundreds of thousands of years. The Movius Line, which runs roughly southeast from the Black Sea to the Bay of Bengal, marks the eastern boundary of the Acheulean. The authors employ a mathematical simulation to investigate several proposed explanations: hominids dispersing to Asia left Africa before the Acheulean appeared; geographic or ecological barriers impeded cultural transmission; Asia lacked appropriate stone or offered an abundance of alternative tool materials (e.g. bamboo); or hominids simply forgot the techniques for making Acheulean tools.

Multiple runs of the simulation, with changes in environmental and cultural variables, provide persuasive support for the hypothesis that geographic and/or ecological barriers impeded the transmission of Acheulean technology from Africa to Asia and, to a somewhat lesser degree, from Africa into Europe. The simulations also predict that in India a pebble tool tradition should precede the late-arriving Acheulean, an eminently testable hypothesis. Thus, this kind of modeling is highly useful for both testing and generating hypotheses about the diffusion of hominid populations and technology across the Old World.

While the contributions to Pattern and Process in Cultural Evolution are interesting and sometimes provocative, the question remains: In what sense is cultural change “evolution?” Mesoudi and O’Brien (p. 21) assert that culture change arises from the same “underlying Darwinian processes” as biological evolution: “variation, differential selection, and the inheritance of selected variants.” In biology, however, variants are selected on the basis of the fitness advantage (differential reproductive success) they confer on the individuals that possess them. While it may be possible to represent changing fashions in European knives and forks by a phylogenetic tree, it is not clear that either the implements or their inventors enjoyed any fitness advantage.

Furthermore, cultural evolution can be viewed as Lamarckian at least as much as Darwinian. That is, variants produced during the lifetime of an individual or an artifact (i.e. acquired characteristics) can be inherited. Indeed, guided or directed variation is crucial to any notion of human innovation or creativity. In making this point, Fitzhugh & Trusler (chapter 14, p. 205) complain that some evolutionary anthropologists “assume that the generation of novelty is undirected or effectively random—like genetic mutation,” which would be a requirement under a strict Darwinian model.

Finally, not even the contributors to this volume agree on how literally to apply biological analogs to things cultural. One indicator is some authors’ tendency to hedge their bets. Tehrani and Collard do so when they state that “these studies have sought to evaluate how well cultural patterns fit a branching, treelike model of evolution in which ancestral traditions split into new ones” (chapter 7, p. 99). Cochrane makes a similar point: “This framework [for archaeological studies] is based on generalizing evolutionary theory beyond its original biological purview, so that artifactual variation is *conceptually* similar to phenotypic variation and is a product of cultural transmission, distinct from biological transmission” (chapter 8, p. 113, original emphasis).

These caveats in no way diminish the usefulness of Pattern and Process in Cultural Evolution. The differing theoretical and methodological approaches showcased in the volume make it especially appropriate for undergraduate and graduate-level classes in anthropology, archaeology, human ecology and a variety of related disciplines. Outside of the classroom, the book will be of interest to anyone interested in human prehistory and the broader issues of social and technological change.

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