

Dynamics of Learning in Neanderthals and Modern Humans. Volume 1: Cultural Perspectives

Takeru Akazawa, Yoshihiro Nishiaki, and Kenichi Aoki (eds.)

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Reviewed by PAMELA R. WILLOUGHBY

Department of Anthropology, University of Alberta, Edmonton, Alberta T6G 2H4, CANADA; pwilloug@ualberta.ca

This is the first of two volumes reporting the results of an inter-disciplinary conference held in Tokyo in November 2012. The conference was held by members of a five year research project (2010–2014) titled the “Replacement of Neanderthals by modern humans: testing evolutionary models of learning.” The research was designed to contrast the success of early modern humans as measured up against the failure of Neanderthals “in solving strategic survival problems” (page v). Right from the start, the members of this team assume that there is a fundamental difference or differences between Neanderthals and moderns, and they use a myriad of scientific methods to determine what these differences really were.

The proceedings of the conference were divided into 43 chapters; these were grouped into 7 sections, then into 2 volumes. This first volume, composed of 18 chapters, deals with cultural perspectives related to learning. The authors generally assume that different learning strategies lead to differences in technology and culture, and that this can explain changing patterns in archaeological cultures. From this, the authors propose general models for theoretical interpretation.

After an introductory chapter written by the editors, the volume is divided into three sections. The first is an archaeological overview of the replacement theory; the second is learning behaviors in prehistoric and modern hunter-gatherers; and the third is human—specific learning strategies and cultural evolution. In Chapter 2, Ofer Bar-Yosef presents a review of evidence for Neanderthals and moderns humans across Eurasia. He points out that hominin fossils are rarely recovered, but that archaeological evidence is abundant. He offers a review of this evidence, covering Europe, the Levant, and Siberia. He explains the history of ideas about Middle Paleolithic tools kits, starting with François Bordes and Lewis Binford’s contrasting explanations for inter-assemblage variability. He stresses the skills required for Levallois production, and how this forces us to admit that Middle Paleolithic technology is more complex than previously thought. Then he goes on to describe the encounter of Neanderthals with modern / Upper Paleolithic peoples. Upper Paleolithic Eurasians contrasted markedly with Neanderthals; they show material evidence of high mobility, the ability to express ethnic identity, innovations such as personal adornment (ornaments), new hunting tools, and new means of communication. All of this made moderns successful, while Neanderthals disappeared.

In Chapter 3, João Zilhão presents a marked alternative. He supports a version of the assimilation model, where Neanderthals already had new technologies before modern humans appeared in Europe. Like many researchers, he argues that the arrival of modern humans in the Levant as well as in Europe corresponds with the appearance of the Aurignacian. But some Upper Paleolithic technological elements appeared well before this. As a result, the so-called transitional industries between the Middle Paleolithic and the Aurignacian had to have been made by Neanderthals. He dismisses the possible evidence for pre-Aurignacian moderns in Europe, and stresses that radiocarbon dates are questionable, as the start of the Upper Paleolithic lies right on the limit of the method. For him, the presence of pigments in a Middle Paleolithic context in southern Spain is critical; symbolic behaviors do not equal modernity.

In Chapter 4, Seiji Kadowaki presents a discussion of technology and technological change in the Levant over the course of the Middle Paleolithic, Upper Paleolithic and Epipaleolithic periods. Sites range from 300,000 to 20,000 years ago. Using information from published sources, he produces an archaeological database of sites, their location, type, stratigraphic and cultural sequence, age estimates, and lithic assemblages. He concludes that at this point in time it is still hard to measure the transition from Neanderthals to moderns using the archaeological record.

In Chapter 5, Hirofumi Kato reviews the evidence for Middle to Upper Paleolithic Siberia in three regions: the Altai, the Urals, and around Lake Baikal. The appearance of the Upper Paleolithic is marked by blade or microblade production. This article is especially useful for its review of the archaeological sequence of the famous Denisova Cave, which extends back to around 280,000 years ago in the Late Acheulean.

Steven Kuhn discusses the energetics of Middle Paleolithic people in Chapter 6. He argues that they represented small fragmented populations, and that this in turn led to slow rates of cultural evolution, weak social ties, and social and biological fragility in the face of the arrival of modern people. He contrasts Neanderthals with their cousins producing Middle Stone Age sites in Africa, who seem to be involved in active social networking. He believes that these demographic differences were critical, and that demographic and cognitive variables are not independent of one another. While he cannot prove that demography was the key to understanding why one group survived and the other did not, he believes that “it helps” (p. 110) explain

why Neanderthals eventually lost out.

Ran Barkai and Avi Gopher (Chapter 7) take a longer perspective. Rather than looking at the Middle and/or Upper Paleolithic in the Levant, they go back to the end of Lower Paleolithic around 400,000 years ago, when *Homo heidelbergensis* was appearing. They suggest that the extinction of large mammals such as elephants led to dietary stress in *Homo erectus*, and that this resulted in the appearance of new hominin groups who could hunt smaller animals. Their prey became medium sized prime adults, a pattern which would continue into the Middle Paleolithic. They focus their attention on the Acheulo-Yabrudian, which shows a lot of internal cultural variation. While some assemblages retain Acheulean handaxes, others focus on blades and/or Quina scrapers. They use Qesem Cave to show that key changes are happening between 400,000 and 200,000 years ago. One interesting thing they describe is that the cutmarks on bones from the Acheulo-Yabrudian are quite different in orientation and location from those both before and afterwards.

The second section of this volume focuses on learning technology and behaviors in prehistoric and modern hunter-gatherers. In Chapter 8, H. Terashima focuses on identifying the evolutionary development of learning and teaching strategies in human societies. He points out that people have very long childhoods, which gives them increased time for learning. But how does learning take place in societies without formal systems of education? The author points out that in many hunter-gatherer societies, children learn things on their own (=autonomous learning). Over time, adolescents expand the range of their learning opportunities, and often deal with people and communities further away from home. The author creates a series of evolutionary stages of human education, framing it first as a biological, then social, and finally as a cultural institution. The difference between moderns and Neanderthals, it is proposed, lies in the ability to learn about learning (= meta-cognition or meta-learning). While Neanderthals appeared to have excellent social teaching and learning, modern learning was different and was ultimately more successful.

In Chapter 9, J. Takakura examines the ability to refit lithics from Upper Paleolithic sites on Hokkaido Island in northern Japan. These sites date between 17,000 and 14,000 years ago. Clearly certain skills had to be learned, and that observation, imitation, and instruction took place within a behavioral context. Novice knappers got a change to reduce cores, and the detached products were refitted in the same way as the actual artifacts. In Chapter 10, Y. Nishiaki

uses ethnographic data collected by Hitoshi Watanabe in 1971 to discuss how people learn to produce bows and arrows in a village in West Papua New Guinea. He points out that giving these items to novices enhances their ability to learn how the items are produced. In Chapter 10, Bonnie Hewlett studies how Aka foragers in central Africa learn to innovate; she discovers that they seek out adults from whom to learn.

The third section deals with human – specific learning strategies and cultural evolution. In Chapter 12, Kenichi Aoki tries to quantify the determinants of cultural evolutionary rates. He uses a model from population genetics which measures life stages, and tries to apply it to data on learning and cultural evolution. In Chapter 13, N. Creanza, L. Fogarty, and M.W. Feldman attempt to reconstruct a cultural niche construction for hunter-gatherer societies from the Paleolithic to historic times. They argue that a society and its culture can both be influenced by natural selection. In Chapter 14, S. Horuichi and S. Kubota examine the effects of cross-boundary rituals on cultural innovation in a subset of a Japanese group, *kagura* dancers.

In Chapter 15, Y. Kohayashi presents a simulation study of the replacement of Neanderthals by modern humans. The author presents a series of hypotheses dealing with climate conditions and/or climate change and how hominins responded to them. In Chapter 16, W. Nakahasi also addresses cultural evolution and learning strategies in hominins, and how these could have become more complex over time. In Chapter 17, Nakahashi presents a mathematical model to study cultural interactions of modern and archaic humans. The author considers the situation between 200,000 and 20,000 years ago, and discusses the speed of cultural evolution. He has one caveat: “cultural interaction sometimes functions as a rotten apple and sometimes provides a negative exemplar of how not to behave” (p. 255). In Chapter 18, J. Y. Wakano also presents a perspective on evolutionary models of learning strategies. He points out that such models allow one to identify interests of empirical researchers which never are modeled by theoretical researchers.

This is an unusual range of papers and the conference must have been quite lively. Some of the chapters deal with conventional archaeological data while others examine learning and cultural transmission. This volume brings together a wide range of perspectives and shows the different lines of evidence which can be studied in order to understand the initial encounters between Neanderthals and modern humans in Eurasia.