BOOK REVIEW

PSYCHOLOGIA 63(2) special issue: Integrative science of human history: How can psychology, archaeology, anthropology and biology work together.

Steven Mithen
Department of Archaeology, University of Reading UK

'Out of Eurasia' is an ambitious inter-disciplinary project based at the Research Institute for the Dynamics of Civilisations at Okayama University and led by Professor Naoko Matsumoto. The project is supported by a prestigious Grant-in-Aid award from the Japanese Government. Both the project and institute have informative websites: http://out-of-eurasia.jp/en/outline/index.html ; https://ridc.okayama-u.ac.jp/english/ .

Volume 63 (2021) of *Psychologia* is devoted to the project's first set of publications. Its full title indicates the scale of ambition: "Integrative Human Historical Science of Out-of-Eurasia: Exploring the Mechanisms of the Development of Civilization'. Its interdisciplinarity appears to have no bounds, seeking to bring together theories and data from the humanities and natural and social sciences to explore how the co-evolution of biology and culture led to 'civilization', a term used without definition to indicate the gulf between modern humans and other animals, including our extinct ancestors. This set of initial articles focus on the integration between psychology and archaeology.

A brief editorial by Jun Saiki and Atsushi Iriki (pp. 93-95) introduces the project and describes how the articles that follow will contribute towards its overall aims. This introduces 'triadic niche construction' (TNC) as a 'conceptual pillar' of the project: the 'mutual interaction among neural, cognitive and ecological niches in a positive feedback loop'. TNC is explained at length in a following article by Atsushi Iriki and colleagues entitled 'The Sapient Paradox' (pp. 151-173) – the paradox being the elapsed time between the emergence of *Homo sapiens* as a species between 300,000 and 200,000 years ago, and the appearance of those behaviours that are distinctive to our species, such as art, religion and monumental architecture. These are dated to after 50,000 years ago and considered by Iriki et al. to reflect a cognitive revolution that bootstrapped the emergence of farming and then civilisations throughout the globe.

TNC is not the easiest pillar to grasp – some of its ideas are slippery and it encompasses so many that I struggled to get my arms around the whole pillar. It relies on a problematic idea that the expansion of the hominin brain resulted in 'latent cognitive capabilities' which were then recruited to undertake new cognitive functions, such as language and abstraction. How this occurred is wrapped up in a theory about how the human body mediates the triadic loop (brain, cognition, environment). Tool use and then bipedalism led to the inclusion of the self as an object within one's cognitive map – described as stage 2 of the TNC. Does that mean self-consciousness? I wasn't sure. While I applaud the attempt to build connections between the evolution of the brain, body, and cognition, and believe substantive progress has been made. TNC Nevertheless has some challenges to overcome. Why, for instance, did no other large brained, tool using, bipedal hominins, such as *Homo erectus* and the Neanderthals attain the re-wiring of the brain that leads to TNC-2 and 'civilization'. For *Homo sapiens*, why did this only happen 50,000 years ago? What was the role of language in this process?

Less challenging ground is covered in the contribution from Hideaki Kawabata et al. (pp. 116-136) that explores how people today perceive the faces of clay figurines from three periods of Japanese cultural history – the Earlier Jomon (c. 15,000-3500 BC), Later Jomon (c. 3500-800 BC) and the Kofun (AD 250-600). The Jomon was a period of relative egalitarianism, compared to the social stratification of the Kofun, during which figurines were ritual objects used in daily life. Those from the Kofun period depicted specific individuals for use in funerary rituals. Participants were asked to score the faces on five 'impressions', such as their complexity and humanness, and on their expression (happy, surprised, fearful, sad and angry). Key findings were that the Kofun figurines were perceived to be more human and well-made and had higher frequencies of

happy and sad expressions than found within the Jomon figures, with lower frequencies of surprised and angry faces. The more human-like quality of the Kofun figurines is not surprising given that they were made to depict specific persons. Why Jomon figures had a more even distribution of expressions than those of the Kofun period is unclear and not sufficiently discussed. The authors note that there is no information about whether the figures were intentionally made to express certain emotions. They also note the lack of contextual information. That needs to be collated and drawn upon – artefacts are of little value with it. By knowing the specific locations of recovery, such as burials, rubbish pits or houses, it would be possible to explore whether 'happy', 'sad' and 'angry' Jomon faces were associated with different types of ritual.

The only other article that is focussed on material culture is a study of pottery making in the present day village of Bila in the Philippines by Hideyuki Ōnishi (pp. 204-15). This explores how craft production can be dependent on tacit knowledge – that which is not expressed in language. Ōnishi describes how many practical activities we undertake cannot be entirely described in words, such as riding a bike; such knowledge is embodied and only realised by doing the task. This is the case for the potters in Bila who achieve highly standardised thicknesses for the walls of their vessels by scraping their inner surfaces but are unable to verbalise how that is achieved. While Ōnishi draws on this study to consider the impact of industrialisation on the role of knowledge and skills in production, a more interesting reflection is on the past. The complexity of making stone tools such as bifaces and Levallois points is often cited as evidence for language by *Homo erectus* and the Neanderthals respectively. How, it is asked, could such skills be passed to new generation without the use of words? The use of tacit knowledge by craftspeople such as the Bila potters indicates such arguments have may limited value – the manufacture of stone tools might have been as implicit and as embodied as that of riding a bike today.

The way material culture can influence perception is explored by Yoshiyuki Ueda and colleagues (pp. 96-115), basing their work within the theory of triadic niche construction. They focus on previous work by Ueda that Westerners and East Asians have different propensities with visual search: Westerners are more adept at finding long lines amongst short lines, and the converse is the case of East Asians. Does this difference reflect cultural or biological factors? Sources of the former might be the type of letters used in their respective writing systems and the properties of visual scenes, such as architecture in urban environments. As they note, however, cultural impacts on visual experience would only arise over the long-term, making short-term experiments of little value. This leads Ueda and his colleagues to make the case for 'World Cognitive Maps' – accumulating big data to enable cross cultural comparisons. The scale of work required would be far beyond that of a single researcher or research group and hence crowd sourcing seems essential, delegating experimental work to people – both experts and amateurs - online, with the inevitable loss of quality control. Another approach is the meta-analysis of existing results from a commonly performed experiment, with the Stroop test given as an example. This is where people are asked to respond to the meaning of a presented word while ignoring irrelevant information, the classic example being to read a colour word (e.g., red) when the letters are written in another colour (e.g., blue). Ueda et al. are constructing the 'Kokora World Map' to explore global cross-cultural variation on this task.

Keiko Ishii and colleagues (pp. 137-150) also explore the relationship between culture and biology. They describe how the dopamine receptor (DRD4) has been described as having genetic variants – notably the 7R allele - that lead to novelty-seeking behaviour. They ask whether the migration of *Homo sapiens* out of Africa between 60,000-45,000 years ago might have selected individuals with such variants? Similarly, might there be variation in the DRD4 alleles carried by those engaged in rice farming, which is understood to be more collectivistic and interdependent than wheat farming, which is more individualistic and independent? To explore this, Ishii et al. undertook an experimental study of participants of Japanese and European Canadian background, asking them to complete a questionnaire about their personality traits and measuring their DRD4 alleles. They had negative results – no associa-

tion between the DRD4 variants and novelty seeking, independence and so forth, failing to replicate previous studies. I was delighted that this negative result is fully published – an all too rare occurrence in science. Various reasons were discussed, including the use of self-reporting, limiting the participants to university undergraduates, and a raft of confounding variables such as socioeconomic status.

The problem with self-reporting is covered in a fascinating contribution from Shinya Yamamoto (pp. 174-190), although this considered chimpanzees rather than humans. He tackles the findings that chimpanzees have been shown to possess cognitive abilities that they do not always – or perhaps ever – manifest (which is a form of self-reporting). Previous research has shown, for instance, that chimpanzees can understand others' mental states but do not necessarily behave according to that understanding. Other studies have shown that the limitations in cooperation appear to derive from a lack of motivation rather than insufficient cognitive capacities. Toolmaking and using is another good example – this is found in some individuals and groups, but not in others. Having reviewed such evidence, Yamamoto concludes that chimpanzees have latent cognitive abilities, such latency being a key element in the concept of triadic niche construction (TNC) that is central to the Out of Eurasia project. I am not persuaded that 'latency' is the best interpretation, or at least the best term. Are we not simply dealing with domain-general processes? I could, for instance, learn to read Japanese, just as a chimpanzee could learn to make a new tool, but I don't have a latent cognitive ability for Japanese.

The final paper in the collection is by Naoko Matsumoto (pp. 216-224), the lead academic of the 'Out of Eurasia' project and a pioneer of cognitive archaeology in Japan. She provides a succinct review of the history and current status of archaeology of the mind, explaining how it has led to 'integrative historical science'. This contribution would have been better placed immediately after the short editorial at the start of the journal because it places the 'Out of Eurasia' project into its academic historical context. Matsumoto reasserts how we can neither understand culture change without addressing the mind, nor the mind without addressing its evolution. I would have also inserted that we cannot understand the human mind without taking account of the material culture with which we surround ourselves. Matsumoto reviews archaeological approaches since the 1980s, covering aspects of post-processual archaeology, the cognitive archaeology that primarily emanated from Cambridge by Renfrew and his colleagues, gene-culture coevolution, and ends by considering work broadly described as the extended mind, embodied, and distributed cognition. It is the latter than provides the basis for the Out of Eurasia project. While a good review, I would have liked more of Matsumoto's critical reflections on this history. Did, for instance, post processual archaeology make any substantive contribution? Did Renfrewesque cognitive archaeology ever have a coherent body of theory? My answer is that it didn't because it failed to engage with the cognitive sciences and adopt an evolutionary perspective – fatal weaknesses that the Out of Eurasia project is rectifying.

Out of Eurasia is an ambitious project. How could the task of building an integrative historical science be otherwise? This collection provides an outstanding start to the project, illustrating the breadth of disciplines being drawn upon and the necessity of such inter-disciplinarity. It raises some profound issues about how the task can be accomplished. 'Word cognitive maps' are desirable, but the practicalities of constructing these with sufficient levels of quality control to provide meaningful results is daunting. We cannot doubt that we need to understand the interactions between the brain, body, cultural and natural environment, but devising and then testing models for how that occurs, and we must assume evolved throughout the course of human evolution (and life in general), is an immense intellectual challenge. I applaud Naoko Matsumoto and her colleagues for taking on these tasks, and the funding agency and their institutions for providing such support.

PSYCHOLOGIA 63(2)（2021）
Special issue: Integrative science of human history: How can psychology, archaeology, anthropology and biology work together. Online ISSN: 1347-5916, Print ISSN: 0033-2852, ISSN-L: 0033-2852