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Abstracts

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Translocation Experiments Reveal that Vocal Dialects in Common Marmosets are Most Likely the Result of Vocal Learning

Yvonne Zürcher^a, Erik P. Willems^a, Judith M. Burkart^a

^aDepartment of Anthropology, University of Zürich

E-Mail: yvonne.zuercher@uzh.ch

Vocal dialects can result from vocal learning, but there are also alternative explanations, such as genetic or environmental differences between populations. In this study, we performed a series of translocation experiments to establish the most likely explanation for vocal dialects previously found between three captive populations of common marmosets (*Callithrix jacchus*). In a first experiment, we translocated 10 animals between different physical environments, specifically between different buildings with a different physical structure, and compared their vocalisations both before and immediately after translocation as well as after 5 – 6 weeks after translocation. We did not find any long-lasting changes in the call structure of the translocated animals due to the different physical environment in any of the three call types analysed. We corroborated this result in four additional animals that were translocated from their home colony to a quarantine facility and did not show any change in vocal structure. These four individuals were later translocated into a new colony with a different dialect, and thus also into a new social environment. We compared the vocal distance between them and four individuals from the new colony before translocation as well as over a time of 16 weeks after translocation. We could show that the vocal distance decreased significantly over time in two out of three analysed call types (phee- and trill calls, but not in food calls). As the translocated animals were only in acoustic, but not direct social contact with the new colony, these results indicate that common marmosets can modify their vocalisations due to passive exposure to a new dialect, so called crowd vocal learning. To our knowledge, this is the first study able to distinguish between different explanations for vocal dialects as well as to show crowd vocal learning in a primate species.

Symposia

Symposium

Technological Origins: Primate Perspectives and Early Tool Use in Africa

Susana Carvalho^{a,b,c,d}, David R. Braun^e

^aPrimate Models for Behavioural Evolution Lab, Institute of Cognitive and Evolutionary Anthropology, University of Oxford, Oxford, UK, ^bInterdisciplinary Centre for Archaeology and Evolution of Human Behaviour (ICArEHB), Universidade do Algarve, Faro, Portugal, ^cCentre for Functional Ecology, Department of Life Sciences, University of Coimbra, Coimbra, Portugal, ^dGorongosa National Park, Sofala, Mozambique; ^eCenter for the Advanced Study of Human Paleobiology, Anthropology Department, George Washington University, Washington, DC, USA

E-Mail: susana.carvalho@anthro.ox.ac.uk

Tool use is found in multiple animal lineages yet is a rare behaviour within the animal kingdom. Only half a dozen extant primates evolved tool use as an adaptation. From these,

only *Pan* and *Homo* display tool use as a 'generalised' trait, i.e. documented in all populations. This raises the possibility that chimpanzees, like humans, may be dependent on technology. But how does tool use become an obligatory behaviour? Recent reviews suggest tool-aided extractive foraging as a pervasive part of some primate adaptations. Past scenarios depicted the hominin lineage as the pinnacle of tool use. Data from primatology and archaeology over the last 20 years renders this perspective obsolete. The presumed evolutionary interconnected relationships between brain size, bipedalism, meat consumption and tool use are not supported by current data. The state of the art proposes technology as undeniably "Older than the Oldowan", reframing our expectations for the origin of tool use in hominins. An in-depth debate focused on the expectations of the archaeological record given this renewed perspective has yet to be realised. Inspired by the visionary approaches of Glynn Isaac, this symposium brings together an exceptionally interdisciplinary group of scientists conducting research at the heart of the origins of technology. Archaeologists examine the earliest hominin tool kits, primatologists report on precursor behaviours in the emergence of tool use, palaeoanthropologists discuss tool use in the LCA of *Pan/Homo*. We recommend avenues for future investigation and address essential questions: How much older than the Oldowan should hominin technology be? How pervasive could non-human primate tool use be in the past records? Were all hominins tool users? What ecological and social factors elicit tool use? Answers to these questions will need to build on the ecological and social context that can be observed in modern primates and explored in the deep past.

Primate Bifocals: Evolutionary Frames, Etho-Archaeological Lenses

Jeanne Sept^a

^aIndiana University, Bloomington IN, USA

E-Mail: sept@indiana.edu

Palaeoanthropologists have a long tradition of using heuristic analogies with living human and non-human primates to develop evolutionary models of human origins. Now researchers are increasingly analysing the site-specific tool use and resource exploitation behaviours of wild primates, like chimpanzees, with fine-grained methods that can facilitate archaeological comparisons. One benefit of these studies is they have the potential to help discern and evaluate archaeological records of the cultural variation of chimpanzee populations. Such comparative methodology is also critical because it can be used to develop testable hypotheses to account for the formation of early archaeological sites – time-consuming, but much more potent than the "primate models" of an earlier generation. For example, these ethological-archaeology studies can help discern how processes of chimpanzee behaviour, which vary across the landscapes and lifetimes of living animals, could potentially produce patterns of behaviour that are cumulative. But under what frameworks and spatial or temporal scales is it appropriate to extrapolate from such inter- and intra-site patterns? As ethnoarchaeologists and experimental archaeologists often remind us, we must cope with the challenges of equifinality; even simple processes can independently produce convergent patterns in a cumulative archaeological record. To avoid having behavioural studies of the material records of chimpanzees become cautionary tales without tails, we should develop frameworks to facilitate the comparison of data from expanded and repeated observations at multiple sites, with similar methodologies and comparative purpose, while fully recognising the complex differences in socio-ecological histories of different populations that contextualise the work.