# EAORC BULLETIN 1,134 – 9 March 2025

## CONTENTS

# NOTICES

## FORMATTED VERSION OF THIS BULLETIN

A pdf formatted version of this Bulletin is available for download at martinedwardes.me.uk/eaorc/eaorc_bulletins.htm.

## PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.
If there is a journal you feel I should be tracking on a regular basis, let me know.
And if you have any other ideas for extending the "EAORC experience", please contact me.

## EDITORIAL INTERJECTIONS

Comments in curly brackets are editorial interjections. The Editor reserves the right to be wrong, and doesn't object to being called out on it.

## ACADEMIA.EDU – A critique of the theory of human cognitive and behavioural evolution

***Quaternary International 270, 4-14 (2012).***

**MARCO LANGBROEK – Trees and ladders: A critique of the theory of human cognitive and behavioural evolution in Palaeolithic archaeology**

The modern biological model of (human) evolution is that of a branching tree. By contrast, prevailing models for human cognitive evolution remain unilinear in character, representing a ladder. The linear ladder model is the result of the opposition of an ethnographic and a primate reference frame for cognition, representing the two ends of what by definition

becomes a linear line of evolution. It forces all types of behaviour that are not considered fully "modern" to assume a position at a lower level of cognition. The linear model is in addition pushed by the (flawed) perception of a linear encephalization trend over time. The structure of this linear model is not fundamentally based in either modern evolutionary theory or the archaeological record. The model itself is even structurally immune to constraints from pertinent data. Adopting a branching tree model instead has serious implications for views on hominin cognition and particularly the meaning of being "behaviourally modern". In a branching model, "modern behaviour" no longer has a unique status as being by necessity the most sophisticated level of cognition, turning many of the traditional implications derived from the possession of "modern behaviour" moot. The challenge that adoption of a branching tree model creates is that ways have to be devised to account for unique cognitive expressions that are not covered by the existing framework of ethnography and primatology. In addition, notions about the "superiority" of "modern behaviour" over other forms of cognitive expression have to be abandoned. The advantage is that the model is structured to pertinent archaeological data and actually testable with archaeological data. Two case studies from the Lower and Middle Palaeolithic of Europe probe the construction of unique models for mobility strategies "bottom up" from archaeological data, providing a unique alternative to mobility models and their cognitive implications as derived from "bottom down" application of an ethno-primatological framework.
PUBLISHED VERSION: https://www.sciencedirect.com/science/article/abs/pii/S1040618211001418
TEXT:
https://www.academia.edu/480123/Trees_and_Ladders_A_critique_of_the_theory_of_human_cognitive_and_behavioural_evolution_in_Palaeolithic_archaeology

**DUILIO GAROFOLI – Comment on "Trees and ladders: A critique of the theory of human cognitive and behavioural evolution in palaeolithic archaeology" by Langbroek, M. (Quaternary International 270: 4–14)**
***Quaternary International 299, 116-118 (2013).***
In his paper "Trees and ladders: A critique of the theory of human cognitive and behavioural evolution in Palaeolithic archaeology", Marco Langbroek puts forward an important argument against simply using linear methodologies in cognitive archaeology (CA). In this comment I shall argue that the reasons why linear models are problematic are not those proposed by Langbroek but rather lie in weaknesses in the way in which arguments based on models have generally been constructed. Top-down and bottom-up approaches in CA should not be viewed as in opposition, but rather as making complementary contributions within the generation of well-formed families of models. The real problem with linear models arises when flawed theories of behavioral systems are improperly mapped onto mental systems, on the basis of arbitrary rules of connection and unsubstantiated assumptions. Neglecting reference to precise analytic categories is a particularly crucial problem in CA, and this applies also with some aspects of Langbroek's argument. To highlight and overcome these issues with the author's original formulation, I shall suggest the formulation be augmented by implementing some recently introduced epistemic tools for CA.
https://www.sciencedirect.com/science/article/abs/pii/S1040618213001523

## ACADEMIA.EDU – Hominin cognitive evolution

***Philosophical Transactions of the Royal Society B 367, 2130-2140 (2012).***

**SUSANNE SHULTZ, EMMA NELSON & ROBIN I.M. DUNBAR – Hominin cognitive evolution: identifying patterns and processes in the fossil and archaeological record**
As only limited insight into behaviour is available from the archaeological record, much of our understanding of historical changes in human cognition is restricted to identifying changes in brain size and architecture. Using both absolute and residual brain size estimates, we show that hominin brain evolution was likely to be the result of a mix of processes; punctuated changes at approximately 100 kya, 1 Mya and 1.8 Mya are supplemented by gradual within-lineage changes in Homo erectus and Homo sapiens sensu lato. While brain size increase in Homo in Africa is a gradual process, migration of hominins into Eurasia is associated with step changes at approximately 400 kya and approximately 100 kya. We then demonstrate that periods of rapid change in hominin brain size are not temporally associated with changes in environmental unpredictability or with long-term palaeoclimate trends. Thus, we argue that commonly used global sea level or Indian Ocean dust palaeoclimate records provide little evidence for either the variability selection or aridity hypotheses explaining changes in hominin brain size. Brain size change at approximately 100 kya is coincident with demographic change and the appearance of fully modern language. However, gaps remain in our understanding of the external pressures driving encephalization, which will only be filled by novel applications of the fossil, palaeoclimatic and archaeological records.
https://www.academia.edu/48337693/Hominin_cognitive_evolution_identifying_patterns_and_processes_in_the_fossil_and_archaeological_record

## ACADEMIA.EDU – Chimpanzees (Pan troglodytes) and the question of cumulative culture

***Animal Cognition 11, 449-456 (2008)***

**SARAH MARSHALL-PESCINI & ANDREW WHITEN – Chimpanzees (Pan troglodytes) and the question of cumulative culture: an experimental approach**
There is increasing evidence for cultural variations in behaviour among non-human species, but human societies additionally display elaborate cumulative cultural evolution, with successive generations building on earlier achievements. Evidence for cumulative culture in non-human species remains minimal and controversial. Relevant experiments are also lacking. Here we

present a first experiment designed to examine chimpanzees' capacity for cumulative social learning. Eleven young chimpanzees were presented with a foraging device, which afforded both a relatively simple and a more complex tool-use technique for extracting honey. The more complex 'probing' technique incorporated the core actions of the simpler 'dipping' one and was also much more productive. In a baseline, exploration condition only two subjects discovered the dipping technique and a solitary instance of probing occurred. Demonstrations of dipping by a familiar human were followed by acquisition of this technique by the five subjects aged three years or above, whilst younger subjects showed a significant increase only in the elements of the dipping technique. By contrast, subsequent demonstrations of the probing task were not followed by acquisition of this more productive technique. Subjects stuck to their habitual dipping method despite an escalating series of demonstrations eventually exceeding 200. Supplementary tests showed this technique is within the capability of chimpanzees of this age. We therefore tentatively conclude that young chimpanzees exhibit a tendency to become 'stuck' on a technique they initially learn, inhibiting cumulative social learning and possibly constraining the species' capacity for cumulative cultural evolution.
https://www.academia.edu/56576285/Chimpanzees_Pan_troglodytes_and_the_question_of_cumulative_culture_an_experimental_approach

## ACADEMIA.EDU – Co-evolution of hominin tool-making teaching and language

***Nature Communications 6:6029 (2015)***

**T.J.H. MORGAN et al WITH A. WHITEN & K.N. LALAND – Experimental evidence for the co-evolution of hominin tool-making teaching and language**

Hominin reliance on Oldowan stone tools—which appear from 2.5 mya and are believed to have been socially transmitted—has been hypothesized to have led to the evolution of teaching and language. Here we present an experiment investigating the efficacy of transmission of Oldowan tool-making skills along chains of adult human participants (N ¼ 184) using five different transmission mechanisms. Across six measures, transmission improves with teaching, and particularly with language, but not with imitation or emulation. Our results support the hypothesis that hominin reliance on stone tool-making generated selection for teaching and language, and imply that (i) low-fidelity social transmission, such as imitation/emulation, may have contributed to the B700,000 year stasis of the Oldowan technocomplex, and (ii) teaching or proto-language may have been pre-requisites for the appearance of Acheulean technology. This work supports a gradual evolution of language, with simple symbolic communication preceding behavioural modernity by hundreds of thousands of years.
https://www.academia.edu/21981157/Experimental_evidence_for_the_co_evolution_of_hominin_tool_making_teaching_and_language

# NEWS

## KINGUISTICS – Cryptophasia: the secret language of twins

Cryptophasia is a phenomenon that mostly occurs in twins. The word derives from Greek, with 'crypto' meaning secret, and 'phrasia' meaning speech. As the name suggests, it is a language developed by twins that only the two children can understand. British psychologist, Dorothy Vera Bishop, writes that this phenomenon occurs in 50% of twins because they are in close proximity and may be very reliant on each other. Quite often, twins will phase out of their cryptophasia when they start gaining exposure to people beyond the home. However, for Poto and Cabengo, the Youlden twins, and the Gibbons twins (The Silent Twins), this did not happen.
https://kinguistics.wordpress.com/2025/03/05/cryptophasia-the-secret-language-of-twins/

## NATURE BRIEFING – Humans and bone tools go way back

Bone tools discovered in Tanzania reveal that ancient humans consistently used such tools at least one million years earlier than we thought. The previous estimate put the earliest use of bone tools at around 400,000 years ago. The new findings smash that record, dating the implements to around 1.5 million years ago. The utensils were crafted from elephant, hippopotamus and bovine bones, and were probably used for tasks such as butchering and digging out tubers, says palaeoanthropologist Jackson Njau.
https://www.nature.com/articles/d41586-025-00693-0

## NEWS FROM SCIENCE – Human ancestors invented a bone toolkit much earlier than previously thought

At least some early hominins leapt from stone to bone technology some 1.5 million years ago.
https://www.science.org/content/article/human-ancestors-invented-bone-toolkit-much-earlier-previously-thought

## SAPIENS – Dating the Arrival of Modern Humans in Asia

A team of researchers explains how the discovery of a human skull and jawbone helps push back the timing of modern humans' migration into Southeast Asia.
https://www.sapiens.org/archaeology/human-migration-asia/

## SCIENCEADVISER – Old bones

Some 1.5 million years ago, human ancestors made tools out of bone, demonstrating that they had the ability to apply what they knew about stonework to a new material. “The most exciting aspect is that [these early hominins] systematically produced standardized bone tools long before it was previously thought,” one archaeologist said.
https://www.science.org/content/article/human-ancestors-invented-bone-toolkit-much-earlier-previously-thought

## SCIENCE DAILY – Ghanaian babies grow up speaking two to six languages

Africa is a multilingual continent and many adults speak several languages fluently. An empirical study by a psycholinguist now shows that the roots of this multilingualism can be found in infancy: In Ghana, most babies grow up multilingually, with most of them coming into contact with two to six languages and just as many regular speakers of each language. The researchers also showed that the babies heard some languages primarily indirectly -- i.e. via radio, television or background conversations -- while other languages were used by their caregivers to directly communicate with them.
https://www.sciencedaily.com/releases/2025/02/250228113955.htm

## SCIENCENEWS – Human ancestors made the oldest known bone tools 1.5 million years ago

A set of tools found in Tanzania were fashioned from the bones of hippos and elephants.
https://www.sciencenews.org/article/human-ancestors-oldest-bone-tools

## THE CONVERSATION – Five essential strategies to master your habits

If humans are ‘bundles of habits,’ can we take control of them?
https://theconversation.com/five-essential-strategies-to-master-your-habits-250099

## THE CONVERSATION – How evolution might explain impatience

Human minds were shaped in a different world to the one we live in today.
https://theconversation.com/how-evolution-might-explain-impatience-249325

## THE CONVERSATION – Taung child: the fossil discovery that proved humanity’s common origins – podcast

Gemma Ware, The Conversation Historian Christa Kuljian, and paleoanthropologist Dipuo Kgotleng talk to The Conversation Weekly podcast about the complicated legacy of the Taung child skull, 100 years since its discovery.
https://theconversation.com/taung-child-the-controversial-story-of-the-fossil-discovery-that-proved-humanitys-common-origins-in-africa-podcast-251530

# PUBLICATIONS

## Cell

### PAPERS

**UGNE KLIBAITE et al – Mapping the landscape of social behavior**

Social interaction is integral to animal behavior. However, lacking tools to describe it in quantitative and rigorous ways has limited our understanding of its structure, underlying principles, and the neuropsychiatric disorders, like autism, that perturb it. Here, we present a technique for high-resolution 3D tracking of postural dynamics and social touch in freely interacting animals, solving the challenging subject occlusion and part-assignment problems using 3D geometric reasoning, graph neural networks, and semi-supervised learning. We collected over 110 million 3D pose samples in interacting rats and mice, including seven monogenic autism rat lines. Using a multi-scale embedding approach, we identified a rich landscape of stereotyped actions, interactions, synchrony, and body contacts. This high-resolution phenotyping revealed a spectrum of changes in autism models and in response to amphetamine not resolved by conventional measurements. Our framework and large library of interactions will facilitate studies of social behaviors and their neurobiological underpinnings.
https://www.cell.com/cell/fulltext/S0092-8674(25)00154-0

## Current Biology

### PAPERS

**NILO MERINO RECALDE et al – The demographic drivers of cultural evolution in bird song**

Social learning can give rise to shared behavioral patterns that persist as culture within animal communities, such as bird and whale songs and cetacean feeding techniques. These cultural traits evolve and can impact individual survival, population structure, and conservation efforts. Although theoretical work indicates that demographic processes—like population turnover, immigration, and age structure—significantly influence cultural evolution, empirical evidence from natural populations is limited. Using deep metric learning to analyze over 100,000 songs from >400 repertoires in great tits (Parus major), we show that demographic variation affects vocal cultures within the small spatial and temporal scales where

learning occurs. Within-population dispersal homogenizes song culture, and immigrant birds adopt local songs while increasing neighborhood diversity through larger repertoires. Birds of similar age tend to have more similar repertoires, which provides evidence of cultural change, with mixed-age neighborhoods showing higher cultural diversity. We estimate that individual turnover is a main driver of cultural change and that its pace is also moderated by dispersal, immigration, and population age structure. These findings support theoretical expectations regarding a key role of demographic processes in cultural evolution while highlighting their interaction with species-specific factors such as the timing and mode of song acquisition.
https://www.cell.com/current-biology/fulltext/S0960-9822(25)00150-2

## eLife

### PAPERS

**SAINAN LIU et al – Multi-dimensional social relationships shape social attention in monkeys**
Social relationships guide individual behavior and ultimately shape the fabric of society. Primates exhibit particularly complex, differentiated, and multidimensional social relationships, which form interwoven social networks, reflecting both individual social tendencies and specific dyadic interactions. How the patterns of behavior that underlie these social relationships emerge from moment-to-moment patterns of social information processing remains unclear. Here, we assess social relationships among a group of four monkeys, focusing on aggression, grooming, and proximity. We show that individual differences in social attention vary with individual differences in patterns of general social tendencies and patterns of individual engagement with specific partners. Oxytocin administration altered social attention and its relationship to both social tendencies and dyadic relationships, particularly grooming and aggression. Our findings link the dynamics of visual information sampling to the dynamics of primate social networks.
https://elifesciences.org/reviewed-preprints/104460

## iScience

### PAPERS

**AMALIA P.M. BASTOS et al with SCOTT CLAESSENS & QUENTIN D. ATKINSON – Evidence of self-care tooling and phylogenetic modelling reveal parrot tool use is not rare**
Putatively rare behaviours like tool use are difficult to study because absence of evidence can arise from a species' inability to produce the behaviour or from insufficient research. We combine data from digital platforms and phylogenetic modelling to estimate rates of tool use in parrots. Videos on YouTube revealed novel instances of self-care tooling in 17 parrot species, more than doubling the number of tool-using parrots from 11 (3%) to 28 (7%). Phylogenetic modelling suggests 11-17% of extant parrot species may be capable of tool use and identifies likely candidates. These discoveries impact our understanding of the evolution of tool use in parrots, revealing associations with relative brain size and feeding generalism and indicating likely ancestral tool use in several genera. Our findings challenge the assumption that current sampling efforts fully capture the distribution of putatively rare animal behaviours and offer a fruitful approach for investigating other rare behaviours.
https://www.cell.com/iscience/fulltext/S2589-0042(25)00417-1

## Mind & Language

### PAPERS

**JOHN COLLINS & TAMARA DOBLER – Polysemy and roots: Deep versus shallow fetching**
The paper argues for a model of polysemy based on the blueprint offered by Paul Pietroski whereby the meaning of a lexical item is an instruction to fetch a concept from an address. We show that the bare idea of fetching admits of a deep construal, where a concept is fetched, and a shallow construal, where the instruction merely links a lexical item to an address without automatically retrieving anything from the address; retrieval only occurs when the item is embedded within a syntactic structure. We offer considerations in favour of the shallow construal, which is consistent with a root conception of lexical items.
https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12539

## Nature

### NEWS

**Ancient humans used bone tools one million years earlier than thought**
Objects discovered in Tanzania and dated to 1.5 million years ago help to rewrite human ancestors' use of carved bone implements.
https://www.nature.com/articles/d41586-025-00693-0

**PAPERS**

**IGNACIO DE LA TORRE et al with FRANCESCO D'ERRICO – Systematic bone tool production at 1.5 million years ago**
Recent evidence indicates that the emergence of stone tool technology occurred before the appearance of the genus Homo1 and may potentially be traced back deep into the primate evolutionary line2. Conversely, osseous technologies are apparently exclusive of later hominins from approximately 2 million years ago (Ma)3,4, whereas the earliest systematic production of bone tools is currently restricted to European Acheulean sites 400–250 thousand years ago5,6. Here we document an assemblage of bone tools shaped by knapping found within a single stratigraphic horizon at Olduvai Gorge dated to 1.5 Ma. Large mammal limb bone fragments, mostly from hippopotamus and elephant, were shaped to produce various tools, including massive elongated implements. Before our discovery, bone artefact production in pre-Middle Stone Age African contexts was widely considered as episodic, expedient and unrepresentative of early Homo toolkits. However, our results demonstrate that at the transition between the Oldowan and the early Acheulean, East African hominins developed an original cultural innovation that entailed a transfer and adaptation of knapping skills from stone to bone. By producing technologically and morphologically standardized bone tools, early Acheulean toolmakers unravelled technological repertoires that were previously thought to have appeared routinely more than 1 million years later.
https://www.nature.com/articles/s41586-025-08652-5

## Nature Communications

**PAPERS**

**G. NIKE GNANATEJA et al – Cortical processing of discrete prosodic patterns in continuous speech**
Prosody has a vital function in speech, structuring a speaker's intended message for the listener. The superior temporal gyrus (STG) is considered a critical hub for prosody, but the role of earlier auditory regions like Heschl's gyrus (HG), associated with pitch processing, remains unclear. Using intracerebral recordings in humans and non-human primate models, we investigated prosody processing in narrative speech, focusing on pitch accents—abstract phonological units that signal word prominence and communicative intent. In humans, HG encoded pitch accents as abstract representations beyond spectrotemporal features, distinct from segmental speech processing, and outperforms STG in disambiguating pitch accents. Multivariate models confirm HG's unique representation of pitch accent categories. In the non-human primate, pitch accents were not abstractly encoded, despite robust spectrotemporal processing, highlighting the role of experience in shaping abstract representations. These findings emphasize a key role for the HG in early prosodic abstraction and advance our understanding of human speech processing.
https://www.nature.com/articles/s41467-025-56779-w

## Nature Communications Biology

**PAPERS**

**ZIYI YE et al – Generative language reconstruction from brain recordings**
Language reconstruction from non-invasive brain recordings has been a long-standing challenge. Existing research has addressed this challenge with a classification setup, where a set of language candidates are pre-constructed and then matched with the representation decoded from brain recordings. Here, we propose a method that addresses language reconstruction through auto-regressive generation, which directly uses the representation decoded from functional magnetic resonance imaging (fMRI) as the input for a large language model (LLM), mitigating the need for pre-constructed candidates. While an LLM can already generate high-quality content, our approach produces results more closely aligned with the visual or auditory language stimuli in response to which brain recordings are sampled, especially for content deemed "surprising" for the LLM. Furthermore, we show that the proposed approach can be used in an auto-regressive manner to reconstruct a 10 min-long language stimulus. Our method outperforms or is comparable to previous classification-based methods under different task settings, with the added benefit of estimating the likelihood of generating any semantic content. Our findings demonstrate the effectiveness of employing brain language interfaces in a generative setup and delineate a powerful and efficient means for mapping functional representations of language perception in the brain.
https://www.nature.com/articles/s42003-025-07731-7

## Nature Human Behaviour

**PAPERS**

**ARIEL GOLDSTEIN et al – A unified acoustic-to-speech-to-language embedding space captures the neural basis of natural language processing in everyday conversations**
This study introduces a unified computational framework connecting acoustic, speech and word-level linguistic structures to study the neural basis of everyday conversations in the human brain. We used electrocorticography to record neural signals across 100 h of speech production and comprehension as participants engaged in open-ended real-life conversations. We extracted low-level acoustic, mid-level speech and contextual word embeddings from a multimodal speech-to-text model (Whisper). We developed encoding models that linearly map these embeddings onto brain activity during speech production and comprehension. Remarkably, this model accurately predicts neural activity at each level of the language processing hierarchy across hours of new conversations not used in training the model. The internal processing hierarchy in the model is

aligned with the cortical hierarchy for speech and language processing, where sensory and motor regions better align with the model's speech embeddings, and higher-level language areas better align with the model's language embeddings. The Whisper model captures the temporal sequence of language-to-speech encoding before word articulation (speech production) and speech-to-language encoding post articulation (speech comprehension). The embeddings learned by this model outperform symbolic models in capturing neural activity supporting natural speech and language. These findings support a paradigm shift towards unified computational models that capture the entire processing hierarchy for speech comprehension and production in real-world conversations.
https://www.nature.com/articles/s41562-025-02105-9

## Nature Medicine

### PAPERS

**MARÍA J. PALMA-MARTÍNEZ et al – Evolution, genetic diversity, and health**
Human genetic diversity in today's world has been shaped by evolutionary history, demographic shifts and environmental exposures, influencing complex traits, disease susceptibility and drug responses. Capturing this diversity is essential for advancing precision medicine and promoting equitable healthcare. Despite the great progress achieved with initiatives such as the human Pangenome and large biobanks that aim for a better representation of human diversity, important challenges remain. In this Perspective, we discuss the importance of diversity in clinical genomics through an evolutionary lens. We highlight progress and challenges and outline key clinical applications of diverse genetic data. We argue that diversifying both datasets and methodologies—integrating ancestral and environmental factors—is crucial for fully understanding the genetic basis of human health and disease.
https://www.nature.com/articles/s41591-025-03558-1

## New Scientist

### NEWS

**Ancient hunters may have used throwing spears 300,000 years ago**
Preserved wooden spears from hundreds of thousands of years ago seem to have been suitable for throwing, not just close-range attacks.
https://www.newscientist.com/article/2469565-ancient-hunters-may-have-used-throwing-spears-300000-years-ago/

**People in industrial societies get more sleep than hunter-gatherers**
Individuals in industrialised societies seem to sleep for longer than people in non-industrialised ones, but their circadian rhythms are more out of sync.
https://www.newscientist.com/article/2469899-people-in-industrial-societies-get-more-sleep-than-hunter-gatherers/

**Stone tools help monkeys thrive in hostile habitats**
Golden-bellied capuchins are usually found in humid forests, but some populations appear to have adapted to life in drier habitats with the help of stone tools.
https://www.newscientist.com/article/2470260-stone-tools-help-monkeys-thrive-in-hostile-habitats/

## Proceedings of the Royal Society B

### PAPERS

**WILLIAM JOHN O'HEARN et al – Increased female competition for males with enhanced foraging skills in Guinea baboons**
Recognizing skilful group members is crucial for making optimal social choices. Whether and how nonhuman animals attribute skill to others is still debated. Using a lever-operated food box, we enhanced the foraging skill of a single male (the specialist) in one zoo-housed and two wild groups of Guinea baboon (Papio papio). We measured group members' behavioural responses before, during and after our manipulation to reveal whether they focused on the outcome of the male's actions or changed their assessment of his long-term value. During the manipulation, females in the specialist's unit, but not the wider group, competed over access to the specialist—increasing their grooming of him 10-fold and aggression near him fourfold. Both behaviours were predicted by the amount each female ate from the food box and returned to baseline within 2 weeks of its removal. This behavioural pattern supports an outcome-based assessment where females responded to male-provided benefits (utility) rather than attributing competence (value). By contrast, males from the wider party ate prodigiously from the reward but did not change their behaviour towards the specialist at all—revealing different social strategies corresponding to the social stratification of the Guinea baboon's multi-level society.
https://royalsocietypublishing.org/doi/abs/10.1098/rspb.2024.2925

## Royal Society Open Science

### PAPERS

**JAKE S. BROOKER et al with FRANS B. M. DE WAAL & ZANNA CLAY – Bonobos and chimpanzees overlap in sexual behaviour patterns during social tension**

Sexual behaviour during tense social situations is extensively documented in various animals. Bonobos, our closest living relatives alongside chimpanzees, habitually perform genital contacts during social tension, which is thought to enhance cooperation and conflict management. While chimpanzees also engage in genital contacts during these contexts, the two sister species have yet to be compared systematically, which may have led to inaccurate assumptions. To address this, we directly compared genital and non-genital affiliation among sanctuary-living bonobos and chimpanzees during two socially tense contexts—post-conflict and pre-feeding. Following conflicts, we observed triadic affiliation between bystander–victim pairs and reconciliation between aggressor–victim pairs. Additionally, we experimentally induced a pre-feeding context to examine affiliative contact between group members. During post-conflict contexts, bonobos used genital contacts more than chimpanzees. However, both species used genital contacts comparably during pre-feeding affiliation, although female bonobos and male chimpanzees were most likely to initiate them. In addition, we found group-level variation indicating an influence of demographic factors. Our results indicate that chimpanzees and bonobos overlap significantly in their use of genital contacts during periods of social tension. Given similar evidence in humans, our results support the notion that this was a trait probably also present in our last common ancestor.
https://royalsocietypublishing.org/doi/full/10.1098/rsos.242031

**NICOLE J. LAHIFF et al with ZANNA CLAY, JARED P. TAGLIALATELA, SIMON W. TOWNSEND & KATIE E. SLOCOMBE – Conspecific alarm calls, but not food-associated calls, elicit affect-based and object-based mental representations in a bonobo (Pan paniscus)**

Non-human vocalizations carrying information regarding external events have been likened to referential words and are thus integral for exploring the origins of linguistic reference. Previous research suggests receivers decode this referential information and some studies have indicated that such calls can, like in humans, evoke mental representations of the referent in receivers. However, the nature of these representations remains ambiguous. Specifically, whether calls elicit affect-based representations (e.g. signaller fear after alarm calls) or object-based representations (e.g. threats encountered by signallers after alarm calls), or both, in listeners remains untested. To investigate this, we conducted a match-to-sample task with a language-competent bonobo (Kanzi) asking him to match playbacks of conspecific alarm and food-associated calls to lexigrams representing either affect-based (‘scare’, ‘surprise’) or object-based (‘snake’, ‘food’) content. Kanzi matched alarm calls to ‘scare’ and ‘snake’ lexigrams at above chance levels regardless of caller familiarity but did not match food-associated calls to either ‘surprise’ or ‘food’ targets. We propose environmental cues are required to interpret food-associated calls that occur across a variety of contexts. These findings suggest bonobo alarm calls evoke object- and affect-based representations for Kanzi, indicating the mechanisms underlying the perception of non-human vocalizations may be more similar to those in language than previously thought.
https://royalsocietypublishing.org/doi/full/10.1098/rsos.241901

## Science Advances

### PAPERS

**ERIC A. HANUSHEK et al – Age and cognitive skills: Use it or lose it**

Cross-sectional age-skill profiles suggest that cognitive skills start declining by age 30 if not earlier. If accurate, such age-driven skill losses pose a major threat to the human capital of societies with rapidly aging populations. We estimate actual age-skill profiles from individual changes in literacy and numeracy skills at different ages. We use the unique German longitudinal component of the Programme of the International Assessment of Adult Competencies (PIAAC-L) that retested a large representative sample of adults after 3.5 years. Our empirical approach separates age from cohort effects and corrects for measurement error from reversion to the mean. Two main results emerge. First, average skills increase strongly into the forties before decreasing slightly in literacy and more strongly in numeracy. Second, skills decline at older ages only for those with below-average skill usage. White-collar and higher-educated workers with above-average usage show increasing skills even beyond their forties. Women have larger skill losses at older age, particularly in numeracy.
https://www.science.org/doi/10.1126/sciadv.ads1560

## Trends in Cognitive Sciences

### PAPERS

**LUCA D. KOLIBIUS, SHEENA A. JOSSELYN & SIMON HANSLMAYR – On the origin of memory neurons in the human hippocampus**

The hippocampus is essential for episodic memory, yet its coding mechanism remains debated. In humans, two main theories have been proposed: one suggests that concept neurons represent specific elements of an episode, while another posits a conjunctive code, where index neurons code the entire episode. Here, we integrate new findings of index neurons in humans and other animals with the concept-specific memory framework, proposing that concept neurons evolve from index neurons

through overlapping memories. This process is supported by engram literature, which posits that neurons are allocated to a memory trace based on excitability and that reactivation induces excitability. By integrating these insights, we connect two historically disparate fields of neuroscience: engram research and human single neuron episodic memory research.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00031-2

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