

EAORC BULLETIN 1,119 – 24 November 2024

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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.

ACADEMIA.EDU – Language and the Evolution of Cognition

Lund University Cognitive Studies 41 (1995).

PETER GÄRDENFORS – Language and the Evolution of Cognition

The main purpose of this article is to discuss the kinds of mental representations that are required for language to evolve. Firstly, I distinguish between cued and detached representations. A cued representation stands for something that is present in the current external situation of the representing organism, while a detached representation may stand for objects or events that are neither present in the current situation nor triggered by some recent situation. The inner environment of an agent is defined as the collection of all detached representations of the agent. The fundamental difference between signal and a symbol is that the reference of a symbol is a detached representation, while a signal refers to a cued representation. Icons also refer to detached representations, but unlike symbols, the choice of representation is not arbitrary, since an icon in some aspects resembles the thing it represents.

A Gricean analysis shows that human linguistic communication presumes an advanced kind of inner environment in order to represent higher order intentions. Not only must we be able to represent the inner environment of other people (i.e., have a “theory of mind”), but we must also represent the other individual's representation of our inner environments. In relation to the evolution of grammar, I distinguish between three levels of grammaticality in a communication system: Systems with no grammar, compositional systems, and systems with grammatical structure. Combining this tripartition with the distinction between cued and detached representations, one obtains six kinds of communication systems. Most animal signaling systems use cued representations and no grammar, but bee's dances have a compositional grammar, while still exploiting cued representations.

The evolutionarily first communication systems using detached representations were one-word languages. Gestural communication using icons preceded vocal language using symbols. Donald's proposal of a mimetic stage is an important step in the evolution of language. Gesturing and primitive speech then developed into a protolanguage, i.e., a communication system with a compositional structure, but without grammatical items. Requirements of fast and efficient communication finally resulted in the development of arbitrary symbols and syntactic rules, at the cost of iconicity, to arrive at a language with a full grammar.

https://www.academia.edu/17498338/Language_and_the_evolution_of_cognition

ACADEMIA.EDU – Archeological Insights into Hominin Cognitive Evolution

Evolutionary Anthropology 25, 200-213 (2016).

THOMAS WYNN & FREDERICK L. COOLIDGE – Archeological Insights into Hominin Cognitive Evolution

How did the human mind evolve? How and when did we come to think in the ways we do? The last thirty years have seen an explosion in research related to the brain and cognition. This research has encompassed a range of biological and social sciences, from epigenetics and cognitive neuroscience to social and developmental psychology. Following naturally on this efflorescence has been a heightened interest in the evolution of the brain and cognition. Evolutionary scholars, including paleoanthropologists, have deployed the standard array of evolutionary methods. Ethological and experimental evidence has added significantly to our understanding of nonhuman brains and cognition, especially those of nonhuman primates. Studies of fossil brains through endocasts and sophisticated imaging techniques have revealed evolutionary changes in gross neural anatomy. Psychologists have also gotten into the game through application of reverse engineering to experimentally based descriptions of cognitive functions. For hominin evolution, there is another rich source of evidence of cognition, the archeological record. Using the methods of Paleolithic archeology and the theories and models of cognitive science, evolutionary cognitive archeology documents developments in the hominin mind that would otherwise be inaccessible.

https://www.academia.edu/67448250/Archeological_insights_into_hominin_cognitive_evolution

NEWS

NATURE BRIEFING – How human brains got so big

To cope with the demands of a bigger brain, human dopamine neurons express more genes that boost the activity of damage-reducing antioxidants than do those of primates. This might protect neurons from the oxidative damage caused by the energy-intensive process of making dopamine. Some of these protective mechanisms appear to possibly be absent in people with neurodegenerative disorders such as Parkinson's disease — suggesting new lines of research to understand the conditions.

<https://www.nature.com/articles/d41586-024-03716-4>

SAPIENS – Who Started the First Fire?

Humans' ability to control fire is among the most important technological advances in our evolutionary history. Research on Neanderthal cave sites in France is offering new insights on this old enigma.

<https://www.sapiens.org/archaeology/neanderthal-fire/>

SAPIENS – Extinguishing the Idea That Hobbits Had Fire

Research has overturned earlier claims that a diminutive human relative, *Homo floresiensis*, lit fires—but big stories die hard.

<https://www.sapiens.org/archaeology/homo-floresiensis-fire/>

SCIENCEADVISER – Chimpanzees bring their knowledge with them, building on innovations over time

Many animal species have what scientists call “culture”—a set of distinct, socially learned behaviors. But chimpanzees take that to the next level: They transmit their culture from generation to generation, improving on innovations over the years, according to a study in this week's Science.

Researchers discovered this by mapping 15 foraging behaviors across 35 chimpanzee communities, and analyzing those observations along with the animals' genetic data. It turned out that the groups that used complex tools—like a branch stripped to create a brush-like end for collecting termites—were more likely to be genetically related. That, lead author Cassandra Gunasekaram tells The New York Times, suggests that coming up with such technologies requires “some sort of

social transmission and social learning, an exchange of ideas between different places” followed by improvements over time, or even generations. One possibility is that early versions of techniques are brought to groups by females who join a group to find a mate. Their innovations subsequently grow more complex.

“This project provides the best evidence yet that wild chimp traditions really are cultural and that they can, and have, evolved cumulatively,” evolutionary anthropologist Thomas Morgan, who was not involved in the work, tells Scientific American. This kind of cumulative culture was thought to be unique to our species. “The study adds to the debate on what makes human culture different,” write Peter Richerson and Robert Boyd in a related Science Perspective.

<https://www.science.org/doi/10.1126/science.adt8896>

SCIENCE DAILY – Your child, the sophisticated language learner

Sentences contain subtle hints in their grammar that tell young children about the meaning of new words, according to new research.

<https://www.sciencedaily.com/releases/2024/11/241121225852.htm>

SCIENCE DAILY – Study reveals how cell types shape human brain networks

Researchers have uncovered how different types of brain cells work together to form large-scale functional networks in the human brain -- interconnected systems that support everything from sensory processing to complex decision-making -- paving the way for new insights into brain health and disease.

<https://www.sciencedaily.com/releases/2024/11/241121115851.htm>

SCIENCE DAILY – These wild chimpanzees play as adults to better cooperate as a group

Compared to children, adults don't play as much, but social play into adulthood is considered a universal human trait. Play has a role in building tolerance, cohesion, bonding, and cooperation. By comparison, play in adults of other species has been considered rare, and yet a new study shows that some chimpanzees, like people, continue to play often throughout their entire lives and especially before engaging in acts that require collective cooperation.

<https://www.sciencedaily.com/releases/2024/11/241121115643.htm>

SCIENCE DAILY – Oldest known alphabet unearthed in ancient Syrian city

Researchers have discovered evidence of the oldest alphabetic writing in human history. The writing was etched onto clay cylinders discovered during a dig at an ancient Syrian city.

<https://www.sciencedaily.com/releases/2024/11/241120193145.htm>

THE CONVERSATION – Fifty years after the discovery of Lucy, it's time to 'decolonise paleoanthropology'

On November 24 1974, renowned American paleoanthropologist Donald Johanson spotted “a piece of elbow with humanlike anatomy” poking out of a rocky hillside in northern Ethiopia. It was the first fossil of a partial skeleton belonging to “Lucy”, an ancient female hominin who took the story of human evolution back beyond 3 million years for the first time.

This autumn also marks the 100th anniversary of the discovery of the “Taung child”, a fossilised skull in South Africa that was key in our understanding that ancient humans first evolved in Africa – something we now take for granted.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(24\)01453-2](https://www.cell.com/current-biology/fulltext/S0960-9822(24)01453-2)

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

KATHARINE L. BALOLIA, KIERAN BAUGHAN & JASON S. MASSEY – Relative facial width, and its association with canine size and body mass among chimpanzees and bonobos: Implications for understanding facial width-to-height ratio expression among human populations

Facial width-to-height ratio (fWHR) has been widely investigated in the context of its role in visual communication, though there is a lack of consensus about how fWHR serves as a social signal. To better understand fWHR variation in a comparative context, we investigate the associations between fWHR and canine crown height (CCH) and body mass, respectively, among two chimpanzee subspecies (*Pan troglodytes schweinfurthii*, *Pan troglodytes troglodytes*) and bonobos (*Pan paniscus*). We collected landmark data from 3D surface models of 86 *Pan* cranial specimens to quantify fWHR and upper CCH, and to estimate body mass. We used Spearman's *r* and Kruskal-Wallis tests to test for significant relationships among variables, and to assess sexual dimorphism.

There is an inverse relationship between fWHR and CCH in both sexes of *Pan*, however there are interpopulation differences in the relationship between fWHR and CCH among *Pan* taxa. *Pan paniscus* have relatively wide faces and small canine crowns, and wide faces in *Pan t. schweinfurthii* males may be driven by body size constraints. *Pan troglodytes* and *Pan paniscus* show fWHR dimorphism, and *Pan paniscus* have significantly higher fWHRs than do either *Pan troglodytes* subspecies.

Our findings indicate that CCH and facial breadth may serve subtly different signaling functions among Pan taxa. Further research into the circumstances in which wide faces evolved among chimpanzees and bonobos will likely afford deeper insights into the function of relatively wide faces in the context of visual signaling among humans and our extinct hominin relatives.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.25040>

MARINA LOZANO et al – Middle Pleistocene teeth from Arbreda Cave (Serinyà, northeastern Iberian Peninsula)

We report the discovery and description of three human teeth from the Middle Paleolithic archaeological levels of Arbreda Cave (Serinyà, Catalonia, NE Iberian Peninsula).

The teeth, two molars (one right dm2 and one right M2) from Level N (older than 120 kyr) and one P3 from Level J (dated between 71 and 44 kyr), were morphologically described based on microCT images and compared with Neanderthal and Homo sapiens specimens.

The teeth belong to a minimum of three individuals: one adult and one infant from Level N and one juvenile from Level J. The premolar from Mousterian Level J, the best preserved of the three teeth, exhibits characteristics to those from our comparative sample of Homo neanderthalensis, such as the crown measurements, EDJ traits, enamel thickness and volume of the pulp cavity.

In contrast to the clear Neanderthal characteristics observed in the P3 from Level J, the high degree of dental wear and poor state of preservation precludes definitive taxonomic designations of the two teeth from Level N. However, the crown dimensions and some tissue proportions are consistent with a probable assignation to Homo neanderthalensis. The teeth from Level N come from a context of long and recurrent occupations of the cave, whereas the archaeological context of the tooth from Level J is indicative of short and seasonal occupations of the cave, which may indicate a change in the lifestyle strategies of the last Neanderthals of the Iberian Peninsula.

{“the [three] teeth belong to a minimum of three individuals” – and, I suspect, a maximum of three individuals.}

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.25037>

Animal Behaviour

PAPERS

ROSEMARY BLERSCH et al – The dynamics of dominance in a ‘despotic’ society

Dominance hierarchies are a key feature in the dynamics of animal social groups, playing a crucial role in fostering group stability. Despite often being viewed as static, persistent linear structures, hierarchies are fundamentally dynamic and can change over time due to ecological conditions, demographic changes and ontogenetic development. There are numerous methods used to construct hierarchies and quantify individual dominance rank, but methods to capture the dynamics of a hierarchy across time have only recently been developed. As such, relatively little is known about the longitudinal hierarchy dynamics in many social species, including nonhuman primates, and the timescale at which these hierarchy dynamics play out. Here we consider the longitudinal hierarchy dynamics across a 4-year period in a large group of rhesus macaques, *Macaca mulatta*. We investigated group and individual level predictors of active rank dynamics, or dynamics that arise from rank reversals. We found that, despite rhesus macaques being considered to have relatively stable hierarchies, there was significant active rank mobility in both males and females, even in the face of limited resource competition. Female rank change was not solely driven by matrilineal structure or demographic processes as females also opportunistically ascended in rank. Furthermore, we found strong links between rank certainty and hierarchy dynamics with periods of high hierarchy instability associated with low mean dominance certainty. Lastly, we found limited evidence of associations between periods of high active rank dynamics and social global network structure. This suggests more localized dynamics during hierarchy instability are at play rather than widescale network reorganization. Together, these results stress the importance of considering social context in rank dynamics, illustrate the dynamic nature of macaque dominance rank and further highlight the opportunistic nature of the species.

<https://www.sciencedirect.com/science/article/pii/S0003347224002719>

RUBÉN VERA GÓMEZ et al – Social preference persists at roosting aggregations in a cooperatively breeding bird

To understand the evolutionary pathways and mechanisms that promote and maintain animal sociality in different taxa, it is crucial to uncover whether conspecific aggregations result from true social attraction or nonsocial forcing factors (e.g. localized resource) and whether social preference is maintained in different contexts. Here, we show that, in cooperatively breeding carrion crows, *Corvus corone*, core social units persist at higher levels of aggregations (roosts). In our study population, individuals live in cohesive territorial kin groups year-round in an all-purpose territory. At night, crows from different territories may sleep communally in one of the four roosts available in the area. By radiotracking 73 individuals, we found that roosts were used mainly in winter and on cold nights in autumn and spring, suggesting a thermoregulatory function of nocturnal aggregations. Interestingly, we also discovered that members of the same social group preferentially used the same roost, showing a social cohesion that was not achieved by mere attraction to the same roosting site but was based on an active choice of joining groupmates. Therefore, our results indicate that social preference persists in different aggregation contexts in cooperative crows, revealing a further complexity of their society and suggesting a social function of

roosts. However, different social groups did not merge in a stable and predictable way at the roost level, providing weak support for a multilevel society in this population.

<https://www.sciencedirect.com/science/article/abs/pii/S0003347224002744>

VIRGINIA PALLANTE, IVAN NORSCIA & MARIE ROSENKRANTZ LINDEGAARD – Social tension in the aftermath of public conflicts: an ethological analysis in humans

In social mammals, conflicts are stressful events for the individuals involved. In the postconflict context, it is possible to detect the emotional state of the former opponents through the expression of displacement activities and aggressive behaviours, which indicate an increase in social tension. In humans, stressful events also induce a physiological response that leads to increased social tension behaviours. However, the variation of such behaviours in the postconflict context has never been investigated. Therefore, by conducting a video analysis of street fights recorded by closed-circuit television cameras, we explored the variation in behaviours associated with anxiety, aggression-related anger and other behaviours possibly related to both anxiety and anger (body postures and talking with gestures) in human opponents. We compared the expression of social tension behaviours before and after the eruption of the conflict and found that displacement activities (related to anxiety), aggressive behaviours (related to anger) and talking with gestures (possibly related to anxiety/anger) increased in the postconflict context, but body postures remained unchanged. Moreover, displacement activities and aggressive patterns showed a temporal variation, decreasing within 10 min following the conflict. Finally, the occurrence of anxiety-related behaviours was more sensitive to aggression intensity than anger-related behaviours, indicating that different social tension behaviours rely on different responses that might be separable. Our study highlights the importance of the ethological approach for evaluating postconflict social tension in humans, which shows a variation in its expression as observed in nonhuman primates. Following a similar comparative approach, we encourage further studies to explore the role of social tension in altering postconflict social dynamics.

<https://www.sciencedirect.com/science/article/pii/S000334722400280X>

AGATHE SERRES et al – Potential signature whistle production by Indo-Pacific humpback dolphins, *Sousa chinensis*, in the northern South China sea

Dolphin communication involves acoustic signals, including whistles, and the well-studied bottlenose dolphins produce individually distinctive whistles called signature whistles (SWs). The production of a potential SW by an injured Indo-Pacific humpback dolphin has been reported, but no study has attempted to validate this finding in this species. Using data collected during encounters with free-ranging Indo-Pacific humpback dolphins at two locations in the northern South China Sea, we investigated the production of SWs by these dolphins. Of the 3846 analysed whistles, 37% were identified as potential SWs (PSWs) using the SIGnature whistle IDentification method and categorized into 82 PSW types. Overall, PSWs were identified during 54% of encounters. Given the high production rate of stereotyped whistles (62% of all whistles in 90% of encounters) compared with the identified PSWs, we suggest that the SIGnature whistle IDentification method criteria cannot be fully adapted for the detection of SWs in Indo-Pacific humpback dolphins, and more research should be conducted to adapt the criteria to the species. In addition, the characteristics of PSWs differed slightly between locations, potentially because of the geographical separation of populations and habitat differences (e.g. noise levels). The present results confirm the production of stereotyped whistles, including PSWs, by Indo-Pacific humpback dolphins. Further research should be conducted to confirm whether these whistles are similar to bottlenose dolphins' SWs.

<https://www.sciencedirect.com/science/article/abs/pii/S0003347224002781>

MARTINA FRANCESCONI et al with MARINA DAVILA-ROSS – Without optimum support: effect of maternal early deprivation on play in semiwild chimpanzees, *Pan troglodytes*

In mammals, robust connection between mothers and offspring plays pivotal roles in physiological and socioemotional development. Our study investigated the consequences of early maternal deprivation on social play behaviour in immature chimpanzees, examining expected and unexpected findings. In line with the predicted hypothesis, orphaned individuals exhibited lower frequencies of social play than mother-reared chimpanzees, supporting traditional notions of the indispensable role of maternal influence in the correct expression of social behaviours. However, the absence of discernible differences in the variability and roughness of playful patterns, tested for the first time in orphan and mother-reared chimpanzees, suggests that the presence of adult models may not be fundamental for expanding and regulating immature playful behavioural repertoire. Escalation into overt aggression did not differ between orphan and mother-reared chimpanzees, challenging the idea of the crucial role of maternal investment in developing self-restrain abilities during play. Orphans engaged in shorter sessions compared with mother-reared subjects; this strategy is naturally adopted by wild and captive chimpanzees when they need to cope with the risk of escalation during play fighting. Although maternal deprivation has been linked to anxiety-related and depressive behaviours in primates, our results reveal a degree of behavioural resilience in orphans that are still able to adhere to social rules during play, particularly when having contact with their peers. Although play behaviour development can arise from the multifaceted interconnection between early experiences, social dynamics and individual propensity to interact socially, our findings support the view, emerging from a plethora of studies on many social mammals, that play has an irreplaceable role in an individual's life history.

<https://www.sciencedirect.com/science/article/pii/S0003347224002938>

CAMILLA CENNI et al – How does object play shape tool use emergence? Integrating observations and field experiments in longtailed macaques

It has long been suggested that object play facilitates the development and evolution of tool use, through enhanced perception of an object's properties and potential for manipulation. However, ecologically relevant support for this claim is scant. We examined whether a form of culturally maintained object play, named stone handling, characterized by high interindividual variation in its behavioural expression, promotes the acquisition and further expression of stone-tool use in a nonhuman primate species.

We conducted a series of field experiments in a free-ranging group of Balinese longtailed macaques, *Macaca fascicularis*, to test whether the stone-handling profiles of different individuals predicted their ability to solve a foraging task, whose solution required the functional and action-specific use of stones as tools. Frequentist network-based diffusion analysis, Bayesian multilevel regression modelling and descriptions of individuals' learning trajectories showed that the solutions to different foraging tasks required varying reliance on social and asocial learning strategies. Our results suggest that certain stone-handling profiles may increase an individual's likelihood of expressing stone-tool use. However, other trait- and state-dependent variables may also contribute to explaining individual differences in the development and expression of stone-tool use. The behavioural idiosyncrasies associated with stone handling in longtailed macaques may serve as an exaptive reservoir for the possible emergence of stone-tool use. To our knowledge, this is the first study to experimentally evaluate the role of stone-directed play in the acquisition of stone-tool use.

<https://www.sciencedirect.com/science/article/pii/S0003347224002628>

Biology Letters**PAPERS****ROZA G. KAMILOĞLU et al – Tickling induces a unique type of spontaneous laughter**

Laughing is ubiquitous in human life, yet what causes it and how it sounds is highly variable. Considering this diversity, we sought to test whether there are fundamentally different kinds of laughter. Here, we sampled spontaneous laughs ($n = 887$) from a wide range of everyday situations (e.g. comedic performances and playful pranks). Machine learning analyses showed that laughs produced during tickling are acoustically distinct from laughs triggered by other kinds of events (verbal jokes, watching something funny or witnessing someone else's misfortune). In a listening experiment ($n = 201$), participants could accurately identify tickling-induced laughter, validating that such laughter is not only acoustically but also perceptually distinct. A second listening study ($n = 210$) combined with acoustic analyses indicates that tickling-induced laughter involves less vocal control than laughter produced in other contexts. Together, our results reveal a unique acoustic and perceptual profile of laughter induced by tickling, an evolutionarily ancient play behaviour, distinguishing it clearly from laughter caused by other triggers. This study showcases the power of machine learning in uncovering patterns within complex behavioural phenomena, providing a window into the evolutionary significance of tickling-induced laughter.

<https://royalsocietypublishing.org/doi/10.1098/rsbl.2024.0543>

Current Biology**PAPERS****SOJUNG HAN et al – Deep genetic substructure within bonobos**

Establishing the genetic and geographic structure of populations is fundamental, both to understand their evolutionary past and preserve their future. Nevertheless, the patterns of genetic population structure are unknown for most endangered species. This is the case for bonobos (*Pan paniscus*), which, together with chimpanzees (*Pan troglodytes*), are humans' closest living relatives. Chimpanzees live across equatorial Africa and are classified into four subspecies, with some genetic population substructure even within subspecies. Conversely, bonobos live exclusively in the Democratic Republic of Congo and are considered a homogeneous group with low genetic diversity, despite some population structure inferred from mtDNA. Nevertheless, mtDNA aside, their genetic structure remains unknown, hampering our understanding of the species and conservation efforts. Mapping bonobo genetic diversity in space is, however, challenging because, being endangered, only non-invasive sampling is possible for wild individuals. Here, we jointly analyze the exomes and mtDNA from 20 wild-born bonobos, the whole genomes of 10 captive bonobos, and the mtDNA of 136 wild individuals. We identify three genetically distinct bonobo groups of inferred Central, Western, and Far-Western geographic origin within the bonobo range. We estimate the split time between the central and western populations to be $\sim 145,000$ years ago and genetic differentiation to be in the order of that of the closest chimpanzee subspecies. Furthermore, our estimated long-term N_e for Far-West ($\sim 3,000$) is among the lowest estimated for any great ape lineage. Our results highlight the need to attend to the bonobo substructure, both in terms of research and conservation.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(24\)01284-3](https://www.cell.com/current-biology/fulltext/S0960-9822(24)01284-3)

LIRAN SAMUNI et al with CATHERINE CROCKFORD & ROMAN M. WITTIG – Social play fosters cooperation in wild adult chimpanzees

Adult social play is a universal human trait, promoting the tolerance, bonding, cooperation, and collective action that sustain our large and complex societies. Play serves as a conduit for transmitting positive emotions, thereby stimulating psychological resilience to stressors and facilitating the positive intent and trust essential for cooperation emergence. In contrast, non-human adult social play is considered rare, and its role in cooperation remains unknown. We address this gap by studying the play behavior of 57 adult chimpanzees (*Pan troglodytes*) in Taï National Park, Côte d'Ivoire, where adult social play and collective action regularly occur. We show that adult female and male chimpanzees play more during times of increased mate competition (with males mainly playing with immatures) and with adult partners they had recent disputes with, highlighting the role of play in regulating social tension that can undermine cooperation. Chimpanzees also preferred playing with adult partners with whom they share strong affiliative bonds, aligning with the idea that play is associated with social familiarity and trust. Finally, adult chimpanzees were more likely to play before collectively defending their territory against outsiders and hunting monkeys. Those who played together were subsequently more likely to collaborate, reinforcing the notion that the positive feedback signaled via play can facilitate cooperation.⁵ Our findings demonstrate the sustained significance of adult social play throughout the chimpanzee lifespan, providing valuable insights into the evolution of adult social play and its societal functions, from diffusing tension to supporting social bonds and collective action.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(24\)01453-2](https://www.cell.com/current-biology/fulltext/S0960-9822(24)01453-2)

Evolutionary Human Sciences

PAPERS

JONATHAN R. GOODMAN et al with ROBERT A. FOLEY – Evidence that cultural groups differ in their abilities to detect fake accents

Previous research in the evolutionary and psychological sciences has suggested that markers or tags of ethnic or group membership may help to solve cooperation and coordination problems. Cheating remains, however, a problem for these views, insofar as it is possible to fake the tag. While evolutionary psychologists have suggested that humans evolved the propensity to overcome this free rider problem, it is unclear how this module might manifest at the group level. In this study, we investigate the degree to which native and non-native speakers of accents – which are candidates for tags of group membership – spoken in the UK and Ireland can detect mimicry. We find that people are, overall, better than chance at detecting mimicry, and secondly we find substantial inter-group heterogeneity, suggesting that cultural evolutionary processes drive the manifestations of cheater detection. We discuss alternative explanations and suggest avenues of further inquiry.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/evidence-that-cultural-groups-differ-in-their-abilities-to-detect-fake-accents/4A2FF9B5BA4A4B806F17C2D069219C4A>

Frontiers for Young Minds

PAPERS

ANNA ILONA ROBERTS – Do Primates Make Friends Like Humans?

Have you ever wondered what skills you need to make friends? How your brain processes the information that you need to make friends? What features of your daily life make having friends difficult? Primates are the mammals that are most similar to us in the animal kingdom. Primates face similar challenges to humans when it comes to making friends. Primates must understand the goals and intentions of others to make friends. However, the stress they experience in their environments can make understanding others' goals and intentions difficult. Stress causes primates to switch from understanding goals to understanding behavior alone, meaning they respond only to input from their senses. To overcome this challenge, primates use sounds and gestures when making friends. These are called intentional communication, and they motivate animals to figure out the goals of other animals by using their knowledge of past interactions. Knowing how primates communicate to make friends can help us to understand how humans make friends, too.

<https://kids.frontiersin.org/articles/10.3389/frym.2024.1220003>

Frontiers in Ecology and Evolution

COMMENTARIES

MARINUS A. C. HUYBREGTS et al with JOHAN J. BOLHUIS & MARTIN B.H. EVERAERT – Response: Commentary: No evidence for language syntax in songbird vocalizations

Suzuki and Matsumoto (2024), SM24 henceforth, reply to our commentary (Beckers et al., 2024) on Suzuki and Matsumoto (2022), SM22 henceforth, but mostly reiterate their original position. They do not address our main points of critique, asserting that these are based on a “misunderstanding of the definition of core-Merge”, without explaining what the misunderstanding is about. This way they are simply sidestepping criticism that we raised to their original claims. Repeats do not add up to an argument. Moreover, they continue to confuse concepts that we believe are at the heart of the problem. Here we argue that SM's use of core-Merge is incoherent and that its invocation as an explanation for the results is arbitrary

and stipulatory. Furthermore, their objection to our use of the term ‘syntax’ is terminological only. We focus on what we consider the primary issues, i.e., core-Merge, its ontology in animal call systems and its role in evolution of language.

{Reply to TOSHITAKA N. SUZUKI & YUI K. MATSUMOTO – Commentary: No evidence for language syntax in songbird vocalizations (*Frontiers in Psychology*, EAORC Bulletin 1,102), <https://www.frontiersin.org/journals/ecology-and-evolution/articles/10.3389/fevo.2024.1430848/full>,

Which was a reply to GABRIËL J.L. BECKERS et al with MARTIN B.H. EVERAERT & JOHAN J. BOLHUIS – No evidence for language syntax in songbird vocalizations (*Frontiers in Psychology*, EAORC Bulletin 1,090), <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1393895/full>,

Which was a commentary on TOSHITAKA N. SUZUKI & YUI K. MATSUMOTO – Experimental evidence for core-Merge in the vocal communication system of a wild passerine (*Nature Communications*, EAORC Bulletin 1,060), <https://www.nature.com/articles/s41467-022-33360-3>}

{I told some lecture attendees this week there is no such thing as infinite recursion. It turns out that arguing with Generativists is very much precisely that.}

<https://www.frontiersin.org/journals/ecology-and-evolution/articles/10.3389/fevo.2024.1474971/full>

Frontiers in Psychology

PAPERS

SISI LI, NAILIANG ZHONG & QINGKE GUO – How does dispositional mindfulness foster prosocial behavior? A cross-cultural study of empathy’s mediating role and cultural moderation

Despite growing recognition of dispositional mindfulness (DM) in psychological research, its cross-cultural mechanisms in promoting prosocial behavior remain unclear, particularly regarding the mediating role of different empathy dimensions. This study investigated how DM influences prosocial behavior across cultural contexts, examining both the mediating effects of different empathy dimensions and the moderating role of cultural background in Chinese and Indonesian samples. Participants included 683 university students (357 Chinese, 326 Indonesian) who completed the Mindful Attention Awareness Scale (MAAS), Interpersonal Reactivity Index (IRI), and Self-Report Altruism Scale Distinguished by the Recipient (SRAS-DR). Mediation and moderation analyses were conducted using PROCESS macro.

Chinese participants demonstrated higher DM levels than Indonesian participants. In the Chinese sample, both perspective taking (PT) and empathic concern (EC) mediated DM’s effects on prosocial behavior toward family (PBF), friends (PBFr), and strangers (PBS). However, in the Indonesian sample, PT and EC only mediated effects on PBFr. Cultural background significantly moderated DM’s indirect effect on PBS through PT, with stronger effects in the Chinese sample. Fantasy and personal distress showed no significant mediating effects in either cultural context.

This study reveals that DM enhances prosocial behavior through selective influence on different empathy dimensions, with cultural background moderating specific pathways. These findings extend our understanding of mindfulness’s cross-cultural mechanisms and provide practical implications for culturally-adapted mindfulness interventions.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1451138/full>

Heliyon

PAPERS

DAVIDE POTRICH et al – Proto-arithmetic abilities in zebrafish (*Danio rerio*)

The increasing use of zebrafish (*Danio rerio*) as a model for studying the neural bases of numerical/quantity abilities pushes toward the development of fast and reliable behavioral tasks for this species. Here, we investigated the spontaneous use of proto-arithmetic in quantity discrimination in zebrafish taking advantage of their shoaling behavior. Male fish underwent preference choice tests in which sets of live female conspecifics sequentially disappeared one by one behind one of two opaque identical panels. Fish spontaneously approached the panel occluding the larger set in a “1 vs. 2” comparison, but failed at “2 vs. 3” and “2 vs. 4”. Limited to an overall amount of three elements in the two groups, zebrafish appeared to be able to deal with additions and subtractions, also suggesting the implicit understanding of an “empty set” (zero) concept. The velocity and the sequential/simultaneous presentation of the stimuli affected the spontaneous preference towards the group with the largest quantity.

[https://www.cell.com/heliyon/fulltext/S2405-8440\(24\)16616-9](https://www.cell.com/heliyon/fulltext/S2405-8440(24)16616-9)

iScience

PAPERS

JUSTIN BRADFIELD, IAN A. DUBERY & PAUL A. STEENKAMP – A 7000-year-old multi-component arrow poison from Kruger Cave, South Africa

We present the results of a GC-MS and UHPLC-MS analysis of residue recovered from the marrow cavity of a 7000-year-old bovid femur from Kruger Cave, South Africa. The femur was filled with an unknown substance into which were embedded three bone arrowheads, indicating that the femur served as a quiver. Our results reveal the presence of digitoxin and strophanthidin, both cardiac glycosides associated with hunting poisons. These two compounds, and others identified, do not occur in the same plants and thus indicate a multi-taxa recipe. This is the oldest unequivocal complex hunting poison recipe

yet identified, notwithstanding the many chemically unsupported assertions of older examples. Furthermore, the identification of ricinoleic acid points to the possibility of ricin as a third toxin, and lends credence to the 2012 interpretation of this compound's presence on a 24 000-year-old wooden applicator at Border Cave, South Africa.

[https://www.cell.com/science/fulltext/S2589-0042\(24\)02663-4](https://www.cell.com/science/fulltext/S2589-0042(24)02663-4)

Journal of Neuroscience

PAPERS

NING MA et al – Decision-Making with Predictions of Others' Likely and Unlikely Choices in the Human Brain

For better decisions in social interactions, humans often must understand the thinking of others and predict their actions. Since such predictions are uncertain, multiple predictions may be necessary for better decision-making. However, the neural processes and computations underlying such social decision-making remain unclear. We investigated this issue by developing a behavioral paradigm and performing functional magnetic resonance imaging and computational modeling. In our task, female and male participants were required to predict others' choices in order to make their own value-based decisions, as the outcome depended on others' choices. Results showed, to make choices, the participants mostly relied on a value difference (primary) generated from the case where others would make a likely choice, but sometimes they additionally used another value difference (secondary) from the opposite case where others make an unlikely choice. We found that the activations in the posterior cingulate cortex (PCC) correlated with the primary difference while the activations in the right dorsolateral prefrontal cortex (rdlPFC) correlated with the secondary difference. Analysis of neural coupling and temporal dynamics suggested a three-step processing network, beginning with the left amygdala signals for predictions of others' choices. Modulated by these signals, the PCC and rdlPFC reflect the respective value differences for self-decisions. Finally, the medial prefrontal cortex integrated these decision signals for a final decision. Our findings elucidate the neural process of constructing value-based decisions by predicting others and illuminate their key variables with social modulations, providing insight into the differential functional roles of these brain regions in this process.

<https://www.jneurosci.org/content/44/37/e2236232024>

Mind & Language

PAPERS

LEONARD DUNG & LUKE KERSTEN – Implementing artificial consciousness

Implementationalism maintains that conventional, silicon-based artificial systems are not conscious because they fail to satisfy certain substantive constraints on computational implementation. In this article, we argue that several recently proposed substantive constraints are implausible, or at least are not well-supported, insofar as they conflate intuitions about computational implementation generally and consciousness specifically. We argue instead that the mechanistic account of computation can explain several of the intuitions driving implementationalism and non-computationalism in a manner which is consistent with artificial consciousness. Our argument provides indirect support for computationalism about consciousness and the view that conventional artificial systems can be conscious.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12532>

Nature

NEWS

Chimps tickle and wrestle in play to pave the way for teamwork

Six years of observations show that play encourages group efforts and eases tension between adult chimpanzees.

<https://www.nature.com/articles/d41586-024-03802-7>

Nature Communications

PAPERS

EDIZ SOHOGLU, LOES BECKERS & MATTHEW H. DAVIS – Convergent neural signatures of speech prediction error are a biological marker for spoken word recognition

We use MEG and fMRI to determine how predictions are combined with speech input in superior temporal cortex. We compare neural responses to words in which first syllables strongly or weakly predict second syllables (e.g., “bingo”, “snigger” versus “tango”, “meagre”). We further compare neural responses to the same second syllables when predictions mismatch with input during pseudoword perception (e.g., “snigo” and “meago”). Neural representations of second syllables are suppressed by strong predictions when predictions match sensory input but show the opposite effect when predictions mismatch. Computational simulations show that this interaction is consistent with prediction error but not alternative (sharpened signal) computations. Neural signatures of prediction error are observed 200 ms after second syllable onset and in early auditory regions (bilateral Heschl's gyrus and STG). These findings demonstrate prediction error computations during the identification of familiar spoken words and perception of unfamiliar pseudowords.

<https://www.nature.com/articles/s41467-024-53782-5>

CORRECTIONS**OWEN ALEXANDER HIGGINS et al – Author Correction: Life history and ancestry of the late Upper Palaeolithic Infant from Grotta delle Mura, Italy**

In the version of the article initially published, the affiliation of Sahra Talamo included the wrong department and has now been amended to the Department of Human Evolution, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany in the HTML and PDF versions of the article.

[Paper in *EAORC Bulletin* 1,110]

<https://www.nature.com/articles/s41467-024-54390-z>

Nature Communications Biology**PAPERS****SHILPA DANG et al – Modality-specific and modality-general representations of subjective value in frontal cortex**

Neuroeconomics theories propose that the value associated with diverse rewards or reward-predicting stimuli is encoded along a common reference scale, irrespective of their sensory properties. However, in a dynamic environment with changing stimulus-reward pairings, the brain must also represent the sensory features of rewarding stimuli. The mechanism by which the brain balances these needs—deriving a common reference scale for valuation while maintaining sensitivity to sensory contexts—remains unclear. To investigate this, we conducted an fMRI study with human participants engaged in a dynamic foraging task, which required integrating the reward history of auditory or visual choice options and updating the subjective value for each sensory modality. Univariate fMRI analysis revealed modality-specific value representations in the orbitofrontal cortex (OFC) and modality-general value representations in the ventromedial prefrontal cortex (vmPFC), confirmed by an exploratory multivariate pattern classification approach. Crucially, modality-specific value representations were absent when the task involved instruction-based rather than value-based choices. Effective connectivity analysis showed that modality-specific value representations emerged from selective bidirectional interactions across the auditory and visual sensory cortices, the corresponding OFC clusters, and the vmPFC. These results illustrate how the brain enables a valuation process that is sensitive to the sensory context of rewarding stimuli.

<https://www.nature.com/articles/s42003-024-07253-8>

Nature Human Behaviour**PAPERS****GÖKBERK ALAGÖZ et al – The shared genetic architecture and evolution of human language and musical rhythm**

This study aimed to test theoretical predictions over biological underpinnings of previously documented phenotypic correlations between human language-related and musical rhythm traits. Here, after identifying significant genetic correlations between rhythm, dyslexia and various language-related traits, we adapted multivariate methods to capture genetic signals common to genome-wide association studies of rhythm (N = 606,825) and dyslexia (N = 1,138,870). The results revealed 16 pleiotropic loci ($P < 5 \times 10^{-8}$) jointly associated with rhythm impairment and dyslexia, and intricate shared genetic and neurobiological architectures. The joint genetic signal was enriched for foetal and adult brain cell-specific regulatory regions, highlighting complex cellular composition in their shared underpinnings. Local genetic correlation with a key white matter tract (the left superior longitudinal fasciculus-I) substantiated hypotheses about auditory–motor connectivity as a genetically influenced, evolutionarily relevant neural endophenotype common to rhythm and language processing. Overall, we provide empirical evidence of multiple aspects of shared biology linking language and musical rhythm, contributing novel insight into the evolutionary relationships between human musicality and linguistic communication traits.

<https://www.nature.com/articles/s41562-024-02051-y>

Nature Reviews Molecular Cell Biology**ARTICLES****RYAN SINCLAIR PATERSON, PALESA PETUNIA MADUPE & ENRICO CAPPELLINI – Paleoproteomics sheds light on million-year-old fossils**

It is now well established that ancient proteins endure, and remain informative, much longer than DNA. Accordingly, sequencing of ancient proteins is currently the only viable methodology for retrieving the genetic data required to resolve evolutionary relations between vertebrate species that disappeared millions of years ago.

<https://www.nature.com/articles/s41580-024-00803-2>

Nature Scientific Reports**PAPERS****ETHAN KUTLU et al – Linguistic diversity shapes flexible speech perception in school age children**

Every day, listeners encounter a wide range of acoustic signals. Successfully solving this variability problem allows them to interpret these signals accurately. While this mechanism tends to be less effortful for adults, children need to learn stable

categories in the face of such variability. It is unknown to what extent general maturation or diversity of the input plays a role in shaping different speech categorization profiles that children can employ. Here, we tested school-aged children's speech categorization with a continuous speech categorization task called the Visual Analogue Scaling (VAS) task. We measured the linguistic diversity in each child's social environment through a social network analysis. We found that increased linguistic diversity led to more flexible and gradient speech categorization. On the other hand, less diverse linguistic input led to more categorical speech categorization. We argue that these findings have implications for speech perception as well as linguistic diversity research.

<https://www.nature.com/articles/s41598-024-80430-1>

SIMONA AFFINITO et al – Exploring the cognitive underpinnings of early hominin stone tool use through an experimental EEG approach

Technological innovation has been crucial in the evolution of our lineage, with tool use and production linked to complex cognitive processes. While previous research has examined the cognitive demands of early stone toolmaking, the neurocognitive aspects of early hominin tool use remain largely underexplored. This study relies on electroencephalography to investigate brain activation patterns associated with two distinct early hominin tool-using behaviors: forceful hammerstone percussion, practiced by both humans and non-human primates and linked to the earliest proposed stone tool industries, and precise flake cutting, an exclusive hominin behavior typically associated with the Oldowan. Our results show increased engagement of the frontoparietal regions during both tasks. Furthermore, we observed significantly increased beta power in the frontal and centroparietal areas when manipulating a cutting flake compared to a hammerstone, and increased beta activity over contralateral frontal areas during the aiming (planning) stage of the tool-using process. This original empirical evidence suggests that certain fundamental brain changes during early hominin evolution may be linked to precise stone tool use. These results offer new insights into the complex interplay between technology and human brain evolution and encourage further research on the neurocognitive underpinnings of hominin tool use.

<https://www.nature.com/articles/s41598-024-77452-0>

YU KAIGAIISHI & SHINYA YAMAMOTO – Higher eigenvector centrality in grooming network is linked to better inhibitory control task performance but not other cognitive tasks in free-ranging Japanese macaques

The Social Intelligence Hypothesis predicts that complex social environments promote higher cognitive capacities. This hypothesis is often tested by comparing species or conspecific groups with varying group sizes or social structures. However, individual social environments differ not only among species or groups but also within the same group. We examined the relationship between social centrality and cognitive ability in wild Japanese macaques (*Macaca fuscata*). We created a grooming network using data from 196 adult macaques and calculated social centrality for each individual. We then tested the macaques with a cognitive test battery to assess their abilities in social, physical, and inhibitory control domains. Our findings revealed that social centrality was uniquely associated with inhibitory control performance, particularly in the behavioral inhibition task, but not with other cognitive domains. This suggests that inhibitory control, a key component of executive functions, plays a pivotal role in the social lives of wild Japanese macaques.

<https://www.nature.com/articles/s41598-024-77912-7>

CELESTINE ADELMANT et al with ALICE M. I. AUERSPERG – Goffin's cockatoos use object mass but not balance cues when making object transport decisions

Utilising weight cues can improve the efficiency of foraging behaviours by providing information on nutritional value, material strength, and tool functionality. Attending to weight cues may also facilitate the optimisation of object transport. Though some animals' ability to assess weight cues has been determined, research into whether they can apply weight assessment during practical decision making is limited. In this study, we investigate whether Goffin's cockatoos (*Cacatua goffiniana*) account for relative weight and unequal versus equal weight distribution when making object transport decisions, and whether sensitivity to these cues varies depending on transport mode. We conducted a series of binary choice experiments in which birds could choose to transport one of two identical, non-functional, equally rewarded objects differing only in overall weight (experiment 1) or weight balance (experiment 2) over a short distance. We found that in experiment 1, Goffin's cockatoos preferred to transport light objects over heavy objects and seemed to rely more on weight cues to inform decisions over time, whereas in experiment 2, weight balance cues were ignored. Contrary to our predictions, Goffin's cockatoos did not show increased preference for lighter or more balanced objects when employing higher energy transport modes (flight) compared to lower energy modes (walking). We suggest that this may be due to an insufficient difference in physical effort between transport modes due to the short distance travelled. These findings provide the first evidence of weight cues being considered to optimise object transport in birds.

<https://www.nature.com/articles/s41598-024-76104-7>

New Scientist**NEWS****AI models work together faster when they speak their own language**

Letting AI models communicate with each other in their internal mathematical language, rather than translating back and forth to English, could accelerate their task-solving abilities.

<https://www.newscientist.com/article/2455173-ai-models-work-together-faster-when-they-speak-their-own-language/>

There's a new twist on the famous invisible gorilla psychology study

A classic study found that people can fail to notice a gorilla when they are focusing on something else, but new experiments suggest this "inattentional blindness" might not tell the whole story.

<https://www.newscientist.com/article/2455806-theres-a-new-twist-on-the-famous-invisible-gorilla-psychology-study/>

12,000-year-old stones may be oldest example of wheel-like tools

Dozens of perforated pebbles from an archaeological site in Israel may be early examples of spindle whorls, a rotating tool used in textile making that was a step towards inventing the wheel.

<https://www.newscientist.com/article/2456238-12000-year-old-stones-may-be-oldest-example-of-wheel-like-tools/>

ARTICLES**MIRIAM FRANKEL – The universe could vanish at any moment – why hasn't it?**

A cataclysmic quantum fluctuation could wipe out everything at any moment. The fact that we're still here is revealing hidden cosmic realities.

<https://www.newscientist.com/article/mg26435180-800-the-universe-could-vanish-at-any-moment-why-hasnt-it/>

PeerJ**PAPERS****JULIO RODRIGUEZ-LARIOS et al – Common neural mechanisms supporting time judgements in humans and monkeys**

There has been an increasing interest in identifying the biological underpinnings of human time perception, for which purpose research in non-human primates (NHP) is common. Although previous work, based on behaviour, suggests that similar mechanisms support time perception across species, the neural correlates of time estimation in humans and NHP have not been directly compared. In this study, we assess whether brain evoked responses during a time categorization task are similar across species. Specifically, we assess putative differences in post-interval evoked potentials as a function of perceived duration in human EEG (N = 24) and local field potential (LFP) and spike recordings in pre-supplementary motor area (pre-SMA) of one monkey. Event-related potentials (ERPs) differed significantly after the presentation of the temporal interval between "short" and "long" perceived durations in both species, even when the objective duration of the stimuli was the same. Interestingly, the polarity of the reported ERPs was reversed for incorrect trials (i.e., the ERP of a "long" stimulus looked like the ERP of a "short" stimulus when a time categorization error was made). Hence, our results show that post-interval potentials reflect the perceived (rather than the objective) duration of the presented time interval in both NHP and humans. In addition, firing rates in monkey's pre-SMA also differed significantly between short and long perceived durations and were reversed in incorrect trials. Together, our results show that common neural mechanisms support time categorization in NHP and humans, thereby suggesting that NHP are a good model for investigating human time perception.

<https://peerj.com/articles/18477/>

PLoS Biology**ARTICLES****RACHEL A. HARRISON – Social learning is triggered by environmental cues in immigrant birds**

After dispersal, what cues trigger social learning in immigrants? A new study in wild-caught great tits in PLOS Biology suggests that changes in the physical environment, rather than the social environment, are key in prompting social learning by immigrants.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002904>

PAPERS**LANXIN JI et al – Trajectories of human brain functional connectome maturation across the birth transition**

Understanding the sequence and timing of brain functional network development at the beginning of human life is critically important from both normative and clinical perspectives. Yet, we presently lack rigorous examination of the longitudinal emergence of human brain functional networks over the birth transition. Leveraging a large, longitudinal perinatal functional magnetic resonance imaging (fMRI) data set, this study models developmental trajectories of brain functional networks spanning 25 to 55 weeks of post-conceptual gestational age (GA). The final sample includes 126 fetal scans (GA = 31.36 ± 3.83 weeks) and 58 infant scans (GA = 48.17 ± 3.73 weeks) from 140 unique subjects. In this study, we document the

developmental changes of resting-state functional connectivity (RSFC) over the birth transition, evident at both network and graph levels. We observe that growth patterns are regionally specific, with some areas showing minimal RSFC changes, while others exhibit a dramatic increase at birth. Examples with birth-triggered dramatic change include RSFC within the subcortical network, within the superior frontal network, within the occipital-cerebellum joint network, as well as the cross-hemisphere RSFC between the bilateral sensorimotor networks and between the bilateral temporal network. Our graph analysis further emphasized the subcortical network as the only region of the brain exhibiting a significant increase in local efficiency around birth, while a concomitant gradual increase was found in global efficiency in sensorimotor and parietal-frontal regions throughout the fetal to neonatal period. This work unveils fundamental aspects of early brain development and lays the foundation for future work on the influence of environmental factors on this process.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002909>

CORRECTIONS

ELOÏSE C. DÉAUX et al – Correction: Dog–human vocal interactions match dogs’ sensory-motor tuning

The following information is missing from the Funding statement: This work, carried out within the Institute of Convergence ILCB (ANR-16-CONV-0002), has benefited from support from the French government (France 2030), managed by the French National Agency for Research (ANR) and the Excellence Initiative of Aix-Marseille University (A*MIDEX).

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002923>

PLoS One

PAPERS

GEORGIA SANDARS, JAKE S. BROOKER & ZANNA CLAY – ChimpanSEE, ChimpanDO: Grooming and play contagion in chimpanzees

Behavioural contagion—the onset of a species-typical behaviour soon after witnessing it in a conspecific—forms the foundation of behavioural synchrony and cohesive group living in social animals. Although past research has mostly focused on negative emotions or neutral contexts, the sharing of positive emotions in particular may be key for social affiliation. We investigated the contagion of two socially affiliative interactive behaviours, grooming and play, in chimpanzees. We collected naturalistic observations of N = 41 sanctuary-living chimpanzees at Chimfunshi Wildlife Orphanage, conducting focal follows of individuals following observations of a grooming or play bout, compared with matched controls. We then tested whether the presence and latency of behavioural contagion was influenced by age, sex, rank, and social closeness. Our results offer evidence for the presence of grooming and play contagion in sanctuary-living chimpanzees. Grooming contagion appeared to be influenced by social closeness, whilst play contagion was more pronounced in younger individuals. These findings emphasise that contagion is not restricted to negatively valenced or self-directed behaviours, and that the predictors of contagious behaviour are highly specific to the behaviour and species in question. Examining the factors that influence this foundational social process contributes to theories of affective state matching and is key for understanding social bonding and group dynamics.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0312467>

WILL WHITHAM et al – Predator gaze captures both human and chimpanzee attention

Primates can rapidly detect potential predators and modify their behavior based on the level of risk. The gaze direction of predators is one feature that primates can use to assess risk levels: recognition of a predator’s direct stare indicates to prey that it has been detected and the level of risk is relatively high. Predation has likely shaped visual attention in primates to quickly assess the level of risk but we know little about the constellation of low-level (e.g., contrast, color) and higher-order (e.g., category membership, perceived threat) visual features that primates use to do so. We therefore presented human and chimpanzee (*Pan troglodytes*) participants with photographs of potential predators (lions) and prey (impala) while we recorded their overt attention with an eye-tracker. The gaze of the predators and prey was either directed or averted. We found that both humans and chimpanzees visually fixated the eyes of predators more than those of prey. In addition, they directed the most attention toward the eyes of directed (rather than averted) predators. Humans, but not chimpanzees, gazed at the eyes of the predators and prey more than other features. Importantly, low-level visual features of the predators and prey did not provide a good explanation of the observed gaze patterns.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0311673>

OLE FREDRIK UNHAMMER et al – Reconcilable differences: Using retrospective photogrammetry to bridge the divide between analogue and digital site data collected during long-term excavation projects

Over the last 30 years, high-resolution site documentation has rapidly developed, with analogue drawings and film photography being replaced with high-precision digital recordings. Today, most archaeological field data sets are produced using digital tools that store spatial and visual information in various digital formats directly, i.e., born-digital. A fully digital workflow makes the process of combining, comparing, and integrating field datasets quicker, easier, and potentially more analytically powerful. However, at sites where both analogue and born-digital data sets have been produced, additional procedural digitization steps are required before full data interoperability is achieved. In cases where the archaeological sites have a long excavation history, multiple generations of analogue and digital site documentation techniques have often been

used, making it particularly challenging to physically reconstruct an excavated site based on its archival material. The Middle Stone Age site of Blombos Cave, South Africa, is a prime example of this type of challenging situation. This site features a more than 3-meter-deep and well-preserved archaeological sequence dated to between 300 and 100 000 years ago. Since it was initially excavated in 1991, multiple archaeological campaigns have been carried out (>15), and the excavations are still ongoing. The field documentation from Blombos Cave has, over the years, produced varied but rich datasets that have never been integrated into a single, coherent, and accessible archive. In this paper we evaluate the changes in excavation protocol at Blombos Cave over time, and we use this knowledge to digitally integrate and map the various stages of excavation within a three-dimensional framework using digital photogrammetry and archival photographs. The archaeological and analytical value of this approach is exemplified through multiple case studies, in which we demonstrate how and why the merging of old and new archaeological field data can lead to new results, specifically by offering more complete mapping and more accurate and analytically dynamic visualisations. The research history at Blombos Cave is not unique or site-specific. Our approach would be applicable to a wide variety of sites and contexts where long-running excavations have produced a mix of analogue and digital field data.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0310741>

XUECHAO ZHANG & SHICHANG LU – The effect of survival pressure-based defector reward behavior on cooperation in spatial prisoner’s dilemma games

Research has shown that rewarding behavior can greatly facilitate the occurrence of cooperation in social dilemmas. Yet rewards entail costs, making the reward itself an altruistic behavior. The reasons for adopting rewarding behaviors then become an interesting matter, so we propose a game model in which defectors are pressured by survival to adopt rewarding behaviors. Research suggests that defector reward strategies can be used as a transition strategy for defectors to alleviate survival stress and promote cooperation in the spatial prisoner’s dilemma. A small survival pressure threshold will make it altogether easier for defectors to adopt a strategy that rewards defection and thus tempts the emergence of cooperators in their neighborhood. In addition, the effect of the payment cost α and the reward amount β of the rewarding behavior on the evolution of the system will be limited by the temptation b of the defector, and the effect of each parameter on the promotion of cooperation in the system is not linear. That is, when α is fixed, b and β can still optimize the level of cooperation in a given combination. The same holds for α and β when b is fixed.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0311612>

CORRECTIONS

MICHAEL P. RICHARDS et al with JEAN-JACQUES HUBLIN – Correction: Strontium isotope evidence for Neanderthal and modern human mobility at the upper and middle palaeolithic site of Fumane Cave (Italy)

The affiliation for the sixth author is incorrect. The correct affiliation is not indicated. Marco Peresani is not affiliated with #6 but with: Department of Humanities, Section of Prehistoric and Anthropological Sciences, Ferrara University, 44100 Ferrara, Italy.

[Original paper in EAORC Bulletin 950.]

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0314425>

Proceedings of the Royal Society B

PAPERS

BARBARA POMIECHOWSKA et al – The nature of label-induced categories: preverbal infants represent surface features and category symbols

Humans categorize objects not only based on perceptual features (e.g. red, rounded), but also function (e.g. used to transport people). Category membership can be communicated via labelling (e.g. ‘apple’, ‘vehicle’). While it is well established that even preverbal infants rely on labels to learn categories, it remains unclear what is the nature of those categories: whether they simply contain sets of visual features diagnostic of category membership, or whether they additionally contain abstract category markers or symbols (e.g. linguistic in the form of category labels or non-linguistic). To address this question, we first used labelling to teach two novel object categories, each composed of unfamiliar visually unrelated objects, to adults and nine-month-olds. Then, we assessed categorization in an electroencephalography category-oddball task. Both adults and infants displayed stronger neural responses to the infrequent category, which, in the absence of visual features shared by all category members, indicates that the categories they set up contained feature-independent category markers. Well before language production starts, labels help infants to discover categories without relying on perceptual similarities across objects and build category representations with summary elements that may be critical for the development of abstract thought.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2024.1433>

Science

ARTICLES

PETER J. RICHERSON & ROBERT T. BOYD – Culture in humans and other animals

The past four decades have been a golden age for the use of interspecies comparisons to study culture and cultural evolution. Human dependence on cultural adaptations and the ability to cumulatively evolve extremely complex technology and social institutions are not matched quantitatively by any nonhuman species, but most of the qualitative features of human culture have been documented in other species (1). It is interesting to compare these systems with human culture to see whether they obey some general principles and to explain why they differ. On page 920 of this issue, Gunasekaram et al. report that chimpanzees—the closest living relative to humans—exhibit cumulative culture (2). By combining population genetics with observations of tool use, their study suggests an association between population interchanges and the emergence and sharing of complex tool sets among chimpanzees. The study adds to the debate on what makes human culture different.

<https://www.science.org/doi/10.1126/science.adt8896>

PAPERS

CASSANDRA GUNASEKARAM et al with ANDREW WHITEN & CAREL P. VAN SCHAIK – Population connectivity shapes the distribution and complexity of chimpanzee cumulative culture

Although cumulative culture is a hallmark of hominin evolution, its origins can be traced back to our common ancestor with chimpanzees. Here, we investigated the evolutionary origins of chimpanzee cumulative culture and why it remained incipient. To trace cultural transmission among the four chimpanzee subspecies, we compared population networks based on genetic markers of recent migration and shared cultural traits. We show that limited levels of group connectivity favored the emergence of a few instances of cumulative culture in chimpanzees. As in humans, cultural complexification likely happened in steps, with transmission between populations, incremental changes, and repurposing of technologies. We propose that divergence in social patterns led to increased mobility between groups in the genus *Homo*, resulting in irreversible dependence on cultural exchange and complexification.

<https://www.science.org/doi/10.1126/science.adk3381>

Science Advances

PAPERS

MATTHEW A. ADELEYE et al – Landscape burning facilitated Aboriginal migration into Lutruwita/Tasmania 41,600 years ago

The establishment of Tasmanian Palawa/Pakana communities ~40 thousand years ago (ka) was achieved by the earliest and farthest human migrations from Africa and necessitated migration into high-latitude Southern Hemisphere environments. The scarcity of high-resolution paleoecological records during this period, however, limits our understanding of the environmental effects of this pivotal event, particularly the importance of using fire as a tool for habitat modification. We use two paleoecological records from the Bass Strait islands to identify the initiation of anthropogenic landscape transformation associated with ancestral Palawa/Pakana land use. People were living on the Tasmanian/Lutruwitan peninsula by ~41.6 ka using fire to penetrate and manipulate forests, an approach possibly used in the first migrations across the last glacial landscape of Sahul.

<https://www.science.org/doi/10.1126/sciadv.adp6579>

Trends in Neurosciences

ARTICLES

YONGLING LIN & MARCO K. WITTMANN – Multiple predictions of others' actions in the human brain

The success of our actions often depends on what others are doing. How does the brain discern predictions of others' actions when situations are ambiguous? Recent work by Ma and colleagues suggests that the brain solves this problem by entertaining multiple predictions of others' actions, ranked by their likelihood.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(24\)00218-2](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(24)00218-2)

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