EAORC BULLETIN 1,150 – 29 June 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 Pleistocene Record of Making Symbols

In: T. Wynn, K.A. Overmann & F.L. Coolidge (eds.), The Oxford Handbook of Cognitive Archaeology, Oxford University Press, 485-504. (2004).

ERELLA HOVERS & ANNA BELFER-COHEN – A Pleistocene Record of Making Symbols

Symbol making involves active agency, as it is, by definition, intentional and aims to deliver messages, worldviews, and social contents to designated audiences. As archaeology can specify only elements of behavior that are expressed as material objects, it must focus on material objects and their contexts. Accordingly, this chapter does not aim to elucidate the symbolic

content of objects. Whether the role of objects is perceived as a clear dichotomy between utilitarian and symbolic or as a "mixed bag," in the practice of prehistoric archaeology it is the context of artifacts that is often enlisted to provide telltale signs about their role in the behavioral system. Employing archaeological tools (material culture, chronology, and context), the chapter addresses (1) the epistemology of understanding prehistoric symbols by reviewing criteria that are prevalent in the research to assess whether an object may have acted as a symbolic manifestation and (2) the diachronic shift from a cognitive capacity to comprehend and make symbolic objects to a broader, evolved, symbolic behavioral system. Its review of the Pleistocene symbolic record of the Levant suggests that the trajectories of change parallel patterns (though not necessarily the same chronology) observed in neighboring regions. The analysis suggests that rather than changes in the neurological infrastructure per se, the coevolution of symbolic behavior and social complexity is driven by changes in social cognition as a major adaptive tool in hominin cultural evolution.
https://www.academia.edu/95835031/Hovers_E_and_Belfer_Cohen_A_2023_A_Pleistocene_Record_of_Making_Symbols_in_Wynn_T_Overmann_K_A_Coolidge_F_L_Eds_The_Oxford_Handbook_of_Cognitive_Archaeology_Oxford_University_Press_pp_485_504_https_doi_org_10_1093_oxfordhb_9780192895950_013_23

ACADEMIA.EDU – New thinking: the evolution of human cognition

Philosophical Transactions of the Royal Society B 367, 2091-2096 (2012).

CECILIA HEYES – New thinking: the evolution of human cognition

Humans are animals that specialize in thinking and knowing, and our extraordinary cognitive abilities have transformed every aspect of our lives. In contrast to our chimpanzee cousins and Stone Age ancestors, we are complex political, economic, scientific and artistic creatures, living in a vast range of habitats, many of which are our own creation. Research on the evolution of human cognition asks what types of thinking make us such peculiar animals, and how they have been generated by evolutionary processes. New research in this field looks deeper into the evolutionary history of human cognition, and adopts a more multi-disciplinary approach than earlier 'Evolutionary Psychology'. It is informed by comparisons between humans and a range of primate and non-primate species, and integrates findings from anthropology, archaeology, economics, evolutionary biology, neuroscience, philosophy and psychology. Using these methods, recent research reveals profound commonalities, as well striking differences, between human and non-human minds, and suggests that the evolution of human cognition has been much more gradual and incremental than previously assumed. It accords crucial roles to cultural evolution, techno-social co-evolution and gene – culture co-evolution. These have produced domain-general developmental processes with extraordinary power—power that makes human cognition, and human lives, unique.
https://www.academia.edu/3004370/New_thinking_about_the_evolution_of_human_cognition

NEWS

NATURE BRIEFING – Scientists role-play as Stone Age canoeists

Researchers have re-enacted how Stone Age people might have canoed from Taiwan to the southernmost islands of Japan to settle there more than 30,000 years ago. The team built a 7.5-metre-long canoe by hollowing out the trunk of a Japanese cedar tree with palaeolithic tools. Five paddlers then set off from Wushibi, on the east coast of Taiwan, and used the sun and stars as navigation aids. Some 45 hours and 225 kilometres later, they landed on Yonaguni Island. Evolutionary anthropologist and Stone Age role-player Yosuke Kaifu hopes that this study will highlight how an ancient Asian civilization "did a great thing with limited technology".
https://www.nature.com/articles/d41586-025-02008-9

NEWS FROM SCIENCE – Killer whales groom each other—with pieces of kelp

In a newly discovered form of social tool use, orcas scratch each other's backs with seaweed.
https://www.science.org/content/article/killer-whales-groom-each-other-pieces-kelp

NEWS FROM SCIENCE – Stone Age farmers' households passed from mother to daughter

Moms and daughters were at the center of the family in ancient Çatalhöyük, ancient DNA and archaeological evidence suggest.
https://www.science.org/content/article/stone-age-farmers-households-passed-mother-daughter

NEWS FROM SCIENCE – A mammoth boomerang returns new clues about early human toolmaking

New dates for a throwing weapon found in Poland reveal it as one of the earliest of its kind.
{If it doesn't come back, is it a boomerang?}
https://www.science.org/content/article/mammoth-boomerang-returns-new-clues-about-early-human-toolmaking

SCIENCEADVISER – Your culture shapes how you literally see the world

It's not just beauty that's in the eye of the beholder: How people see may be fundamentally shaped by the environments they're raised in. Just take a look at the grid of line segments above ***{click on link to see grid}***, which is known as the Coffer illusion. What do you see?

Given the geographic breakdown of ScienceAdviser readers, I'm willing to bet you see a series of rectangles. But when researchers showed this optical illusion to people living in rural Himba villages in Namibia, 96% saw circles first, and about half then noticed the rectangles. Meanwhile, 97% of U.S. and the U.K. participants saw rectangles, and struggled to see circles even when prompted. People in a semi-urban Namibian town fell between the two extremes.

The authors of the work, which has yet to be peer-reviewed, say the results highlight the risk of mislabeling things as universal human features when in fact they are side effects of the researchers' own culture—a culture that is unusual by global and historical standards. "If you're trying to get a full picture of the world, you want to have some people in the room who see circles where you only see rectangles," says study co-author Michael Muthukrishna.

https://www.science.org/content/article/culture-literally-changes-how-we-see-world

THE CONVERSATION – Why evolution can explain human testicle size but not our unique chins

Why human testicles are so different to chimpanzees' and gorillas'.

https://theconversation.com/why-evolution-can-explain-human-testicle-size-but-not-our-unique-chins-259419

PUBLICATIONS

Biology Letters

PAPERS

LEWIS G. HALSEY AND DAVID GEARY – The nurture of nature: why physical and psychological differences between the sexes are greater in healthier, wealthier societies

Men and women differ morphologically, physiologically, cognitively, psychologically and behaviourally, and many of these differences are getting larger. We propose a synthesis of two disparate yet related mechanisms in combination with sexual selection theory to explain this divergence of the sexes. In large part through sexual selection, males and females have evolved many trait differences, some subtle, others stark. In stressful environments (e.g. frequent nutritional shortfalls, disease risk), those differences are attenuated because in the sex where the trait is greater (such as height in men, or various forms of memory in women) the effects of those stressors are more apparent. Societies exposed to these stressors have more restrictive social mores and harsher criminal punishments for norm violations, restricting the behavioural expression of individuals and hence sex-based preferences (e.g. working with people vs. things). It follows that reduction in ecological threats (e.g. pestilence) and out-group social threats (e.g. warfare) leads to a lessening of in-group social restrictions resulting in more self-referential cognitions, emotions and motivations, and through this a fuller expression of individual and thus sex differences in various psychological domains. In this scenario, increases in bodily sex differences, such as height, are predicted to be associated with increases in psychological and behavioural sex differences (e.g. facets of personality). Our model integrates evolutionary and biological processes with social customs and mores—that is, combines nature and nurture—into a cohesive framework to explain historical and cross-cultural variation in the magnitude of many sex differences.

https://royalsocietypublishing.org/doi/10.1098/rsbl.2025.0187

Current Biology

ARTICLES

DOROTHY MUNKENBECK FRAGASZY & PATRICIA IZAR – Animal behavior: Capuchin gang abducts infant howler monkeys

Apparently for their own enjoyment, young white-faced capuchin monkeys abducted dependent infant howler monkeys and kept them for days. This new tradition is the first identified in primates incorporating forcible abduction of another species.

https://www.cell.com/current-biology/abstract/S0960-9822(25)00546-9

MICHAEL N. WEISS et al – Manufacture and use of allogrooming tools by wild killer whales

The manufacture and use of tools, while widespread in terrestrial animals1, has been less frequently reported in marine taxa2. In cetaceans, clear examples of tool use are largely restricted to foraging contexts, with no reports of cetaceans fashioning tools by modifying objects. Here, we report evidence of the widespread manufacture and use of allogrooming tools in a population of resident killer whales (Orcinus orca ater).

https://www.cell.com/current-biology/fulltext/S0960-9822(25)00450-6

PAPERS

MARTHA M. ROBBINS et al with TRACY L. KIVELL – Gorillas are arboreal apes

There is debate over the importance of the arboreal niche in hominid evolution. Gorillas are considered to be primarily terrestrial, which influences interpretations of their anatomy, evolution, and the inferences drawn from ape and human fossils. This perception of gorilla terrestriality stems from their large body size, their highly terrestrial herbaceous diet, and results of the only study of gorilla terrestriality versus arboreality, that of the Virunga mountain gorillas (Gorilla beringei beringei). However, Virunga gorillas live in an ecological extreme and their behavior may not be representative of all gorillas. Here, we investigate arboreality in frugivorous populations: the mountain gorillas (G. b. beringei) of Bwindi Impenetrable National Park, Uganda, and western gorillas (Gorilla gorilla gorilla) of Loango National Park, Gabon. Although arboreality is negatively correlated with body size, both Bwindi and Loango gorillas are more arboreal than Virunga gorillas (adult females 21% and 34%, respectively, versus 7% for Virunga gorillas; adult males 18.1% and 18.6%, respectively, versus 2% for Virunga gorillas). Moreover, increased frugivory is not the only driver of arboreality; nearly half of Loango gorilla fruit-eating was on the ground and adults of both populations spent most of their arboreal feeding time consuming nonfruit items such as tree leaves (Bwindi: 63%; Loango: 70%). These results demonstrate that gorillas are more arboreal than previously reported and that arboreality is not always driven by fruit consumption nor limited by body size. These findings have important implications for understanding ecomorphology in extant and fossil great apes.
https://www.cell.com/current-biology/fulltext/S0960-9822(25)00590-1

ALISON M. ASHBURY et al with CAROLINE SCHUPPLI – Wild orangutans maintain sleep homeostasis through napping, counterbalancing socio-ecological factors that interfere with their sleep

Sleep is a vital physiological process that lab-based studies of model species, including humans, have shown is homeostatically regulated—i.e., pressure to sleep builds during wakefulness and dissipates during sleep. However, how wild animals maintain sleep homeostasis and how socio-ecological pressures interfere with their sleep remain understudied. Here, we investigated sleep homeostasis and the factors that influence sleep duration among wild Sumatran orangutans (Pongo abelii), leveraging a comprehensive long-term dataset of their behavior, sociality, and ecology. We quantified sleep in 53 adult individuals using the time that an individual spent in a sleeping nest—i.e., its sleep period—as an indicator of time spent sleeping. We found that, after shorter nighttime sleep periods, orangutans' next-day cumulative nap period duration was longer and that shorter nap periods were associated with a higher number of naps on the same day. We also found that orangutans had shorter sleep periods (night and day) when they associated with more conspecifics. Orangutans also had shorter nighttime sleep periods when they traveled farther the day before, and they had longer cumulative nap periods on days when (1) they ate fewer calories, (2) the ambient temperature was cooler, and (3) it rained. Our results suggest that multiple factors shape wild orangutans' sleep behavior and that orangutans compensate for lost sleep via daytime napping. This supports the hypothesis that social and ecological pressures interfere with sleep among wild animals and that they must balance the costs and benefits of sleep with those of other critical activities.
https://www.cell.com/current-biology/fulltext/S0960-9822(25)00669-4

eLife

PAPERS

AGUSTIN FUENTES et al with LEE R BERGER – Meaning-making behavior in a small-brained hominin, Homo naledi, from the late Pleistocene: contexts and evolutionary implications

This paper discusses the cognitive implications of potential intentional burial, wall engraving creation, and fire as light source use behaviors by relatively small-brained Homo naledi hominins. The discussion presented in the paper is valuable theoretically in its healthy questioning of prior assumptions concerning the socio-biological constraints of hominin meaning-making behavior. The discussion also contributes practically given that these behaviors have been ascribed to Homo naledi in two associated papers. Still, the present paper does not fully engage with the extent to which the strength of evidence supporting the H. naledi behavior conclusions across the two associated papers remains actively questioned, and thus the inferences here may be considered incomplete. The ultimate assessment of this work will vary among individual readers depending on how they view this debate, at least until further evidence leading to a broader consensus is published.
https://elifesciences.org/reviewed-preprints/89125

Evolutionary Anthropology

PAPERS

ALEX TSOMPANIDIS et al with SIMON BARON-COHEN & ROBIN I. M. DUNBAR – The Placental Steroid Hypothesis of Human Brain Evolution

The evolution of the human brain has long been framed in terms of sexual selection, with an emphasis on consistent but small on-average volumetric differences between males and females. In this review, we present new molecular, genetic and clinical findings regarding neurodevelopment, cortical expansion and the production of sex steroid hormones, such as testosterone and oestradiol, by the placenta during pregnancy. We discuss converging evidence that on-average sex differences are relevant for human evolution but are characterised by significant overlap between the sexes and more

adaptations in female, rather than male, physiology. We also consider recent accounts and modelling of evolutionary pressures in large social groups, regarding competition and fertility. Finally, we bring these findings together and present a novel hypothesis for understanding human brain development and evolution, which emphasises the role of sex steroid hormones, their prenatal production by the placenta and their roles in regulating physiology, fertility and cognition.
https://onlinelibrary.wiley.com/doi/full/10.1002/evan.70003

CORRECTION

Correction to "Targeting the Hunting Hypothesis: Review of Evidence From the Hadza"

This article corrects the following:
O'Connell, J. F., K. Hawkes, and N. B. Jones, "Targeting the Hunting Hypothesis: Review of Evidence From the Hadza," Evolutionary Anthropology: Issues, News, and Reviews 34 (2025): e70002, http://doi.org/10.1002/evan.70002.
In the published version of this article, the departmental affiliations of authors were incorrect.
The correct affiliations are as follows:
James F. O'Connell and Kristen Hawkes are in the Department of Anthropology, University of Utah, Salt Lake City, Utah, USA.
Nicholas Blurton Jones is affiliated with the Departments of Anthropology and Psychiatry and the Graduate School of Education and Information Studies, University of California, Los Angeles, California, USA.
We apologize for this error.
https://onlinelibrary.wiley.com/doi/full/10.1002/evan.70004

Frontiers in Psychiatry

PAPERS

JOANA ROSSELLÓ, ALEXANDRE CELMA-MIRALLES & MAURICIO DIAS MARTINS – Visual recursion without recursive language? a case study of a minimally verbal autistic child

The human faculty to generate an infinite set of structured expressions in language, present in most cultures and normal ontogeny, is the most substantial evidence of the human capacity for recursion. In contrast, strong evidence of this capacity in other domains has been sparse, inviting the speculation that recursion is primarily linguistic and co-opted into other domains. Here, we present a case report of a minimally verbal 11-y.o. autistic child with poor language comprehension whose speech rarely exceeds two-word commands despite remarkable hyperlexia (i.e., mechanical reading in Spanish, Catalan, and English) and a visually-based, mainly nominal lexicon acquired through reading. Importantly, medium-range scores in visual tasks and hyperlexia suggest that he can detect complex visual patterns despite low fluid intelligence. Against this background, we tested whether this child could represent recursive hierarchical embedding in vision, despite no evidence of it in language. We found that 1) his accuracy was above chance and 2) it was not significantly different from that of typically developing children. Accordingly, we suggest that a core capacity of recursion, interfacing with a sensory modality and a visuospatial conceptual system, is sufficient to process recursive patterns in vision. In contrast, linguistic recursion may require more complex sensorimotor and conceptual-intentional machinery.
{An alternative conclusion would be that recursion is a general mechanism of comprehension, not individually specific to vision or language; and there is some other mechanism limiting language production.}
https://www.frontiersin.org/journals/psychiatry/articles/10.3389/fpsyt.2025.1540985/full

Frontiers in Psychology

PAPERS

HAOHAN MENG, XIAOYU LI & JINHUA SUN – Large language models prompt engineering as a method for embodied cognitive linguistic representation: a case study of political metaphors in Trump's discourse

Embodied-Cognitive Linguistics inherits and further develops the core concepts of Cognitive Linguistics, maintaining a focus on embodied cognition and conceptual metaphors. It emphasizes that language is not merely a cognitive phenomenon but also a product of human social interactions and economic conditions. From this perspective, metaphors extend beyond their simple linguistic representation and become essential structures of human cognitive expression. Political metaphors, in particular, are instrumental in shaping public ideology and emotional engagement, a phenomenon clearly demonstrated in the political speeches of Donald Trump. With rapid advancements in large language models (LLMs) technology, traditional approaches to metaphor identification are undergoing significant transformation. By leveraging the advanced text parsing and generation capabilities of LLMs, new opportunities emerge for the automatic detection and nuanced analysis of political metaphors. This study employs a critical metaphor analysis (CMA) framework, integrated with a chain-of-thought-based prompt engineering (PE) technique, utilizing the ChatGPT-4.0 Python environment to identify and examine metaphors in Trump's speeches. The results reveal that Trump strategically employs metaphors derived from diverse source domains—such as Movement and Direction, Illness and Health and Force—to resonate emotionally with his audience. Methodologically, while LLMs demonstrate considerable strengths in analyzing political discourse, challenges remain in areas such as semantic differentiation and expression. Future research will focus on optimizing these models, conducting comparative analyses with traditional methods, and exploring their applicability in cross-cultural contexts, with the goal of providing more precise and effective tools for both natural language processing (NLP) and political linguistics research.

https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1591408/full

JUN ZOU, CAROL FULLER & LINYAO WANG – The interplay between cultural models and metaphor understanding: a cross-cultural cognitive perspective

In cross-cultural communication, accurate metaphor comprehension enhances mutual understanding and facilitates effective cooperation among individuals from diverse cultural backgrounds. This paper adopts a cross-cultural cognitive perspective and employs grounded theory as the methodological framework to analyze how cultural models influence metaphor understanding. Through a coding analysis of 148 domestic and international texts, the study constructs a four-element model comprising thinking patterns, cognitive frameworks, language communication, and social consensus. Thinking patterns shape cognitive frameworks, which are articulated and transmitted through language communication, ultimately contributing to the formation of social consensus within cultural groups. These four interrelated elements work together to support deeper and more accurate metaphor comprehension in intercultural contexts. By integrating theory with empirical analysis, this study offers a novel conceptual framework for future research on metaphor in cross-cultural communication.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1539784/full

iScience

PAPERS

ASHLEY HARRELL & MARGARET L. TRAEGER – Evidence of spillovers from (non)cooperative human-bot to human-human interactions

It is well-documented that cooperation spills over among humans: people's cooperative choices are influenced by their (non)cooperative alters, even in downstream interactions with new partners. We ask: do (non)cooperative interactions with bots spill over to subsequent interactions with humans–and if so, how? Across two pre-registered experiments (combined N = 83,411 decisions by 4,171 participants told they are interacting with a bot or human), we demonstrate that human-bot interactions do spill over to human-human ones, and in two ways. First, interacting with a bot reduces cooperation not only during the initial interaction; it also reduces downstream cooperation toward a new human partner. Additionally, bots' (like human partners') behavior matters: interactions with bots playing tit-for-tat promote cooperation, and interactions with noncooperative bots reduce cooperation, toward downstream human partners. The implementation of bots in previously human-only spaces alters human cooperation, not just toward bots, but toward other humans as well.
https://www.cell.com/iscience/fulltext/S2589-0042(25)01267-2

LIDA KANARI et al with HENRY MARKRAM – Of mice and men: Dendritic architecture differentiates human from mouse neuronal networks

The organizational principles that distinguish the human brain from other species have been a long-standing enigma in neuroscience. Focusing on the uniquely evolved human cortical layers 2 and 3, we computationally reconstruct the cortical architecture for mice and humans. Human neurons form highly complex networks demonstrated by their increased number and simplex dimension compared to mice. This is surprising because human pyramidal cells are much sparser. The number and size of neurons cannot account for this increased network complexity, suggesting that another morphological property is a key determinant of network connectivity. The topological comparison of the dendritic structure reveals higher perisomatic density in human pyramidal cells. We quantitatively show that this neuronal structural property directly impacts network complexity, including the formation of a rich subnetwork structure. Therefore, greater dendritic complexity, a defining attribute of human pyramidal cells, may provide the human cortex with enhanced computational capacity and cognitive flexibility.
https://www.cell.com/iscience/fulltext/S2589-0042(25)01189-7

FEDERICA AMICI et al with KATJA LIEBAL – Experience with animals, religion, and social integration predict anthropomorphism across five countries

Conservation efforts are largely dependent on the amount of public concern for wildlife protection. One of the factors that best predict willingness to support conservation projects is anthropomorphism. Here, we administered questionnaires to a cross-cultural sample (N = 741), including adult participants from Brazil, Indonesia, Malaysia, Mexico, and Spain, to investigate the drivers of inter-individual variation in anthropomorphism. Anthropomorphism increased when participants had more "urban" experience with animals, lower social integration, higher allocentric tendencies, and lower formal education. Participants with higher exposure to monkeys were also less likely to attribute them the ability to feel pain, while considering them accountable for their actions. Religions emphasizing human similarity and inter-connection of all living beings predicted higher anthropomorphism, with the specific taxa and traits considered modulating these effects. Overall, this work contributes to better understanding the factors that explain variation in anthropomorphism and that might promote interest in other species and foster conservation efforts.
https://www.cell.com/iscience/fulltext/S2589-0042(25)00954-X

Journal of Linguistics

PAPERS

KARLOS ARREGI & ASIA PIETRASZKO – The relation between head movement and periphrasis

In this paper, we investigate the relation between head movement and the synthesis-periphrasis distinction in the verbal domain. We use the term synthesis to refer to verbal expressions in which the lexical verb bears all the verbal inflection in a clause (e.g. rode in English). In contrast, a periphrastic verbal expression additionally contains an auxiliary verb (specifically, be or have), and verbal inflection is distributed between the lexical verb and the auxiliary (e.g. had ridden). We argue for two crosslinguistic generalizations: AfTonomy and *V-Aux. According to AfTonomy, affixal Ts vary as to whether they are in a head movement relation with a verb. *V-Aux states that in periphrasis, the lexical verb and the auxiliary cannot be related by head movement. Existing analyses of periphrasis can account for one or the other generalization, but not for both. We further argue that this tension between the two generalizations is resolved if we adopt the hypothesis that both head movement and periphrasis are tied to selection. More specifically, we propose that head movement is parasitic on a selectional relation (following Svenonius 1994, Julien 2002, Matushansky 2006, Pietraszko 2017, Preminger 2019) and that auxiliaries are merged as specifiers selected by functional heads such as T (Pietraszko 2017, 2023).
https://www.cambridge.org/core/journals/journal-of-linguistics/article/relation-between-head-movement-and-periphrasis/EDBE7941E387E18A77C8357E09F08456

CORRECTIONS

RICHARD HUDSON et al with GRAEME TROUSDALE – The syntactic constraint on English auxiliary contraction – CORRIGENDUM

The authors regret the inclusion of two errors in the above article. The two errors concern the inclusion of HVC on page 29, which currently read as follows:
1. In short, the historical development of AC and the HVC may have been partly motivated by Haspelmath's 'expectation sensitivity', the speaker's desire to guide the hearer through the syntactic structure (Haspelmath 2023).
2. On the other hand, the FVC also has a cost for the speaker because AC has a second function: signalling informality. When the valent is missing, the speaker has to use the full form of the auxiliary, despite its associations with formal writing.
In both these sentences this should say 'the FVC' instead of 'HVC'. The authors apologize for these errors and wish to correct them through this notice.
https://www.cambridge.org/core/journals/journal-of-linguistics/article/syntactic-constraint-on-english-auxiliary-contraction-corrigendum/EA9918732858C665BC9F55D5C72CFB77

ORIGINAL PAPER: RICHARD HUDSON et al with GRAEME TROUSDALE – The syntactic constraint on English auxiliary contraction {EAORC Bulletin 1,138}
https://www.cambridge.org/core/journals/journal-of-linguistics/article/syntactic-constraint-on-english-auxiliary-contraction/B082449AA4A20838000218A6CC9C3AD2

Language and Cognition

PAPERS

TALLY MCCORMICK MILLER, FELIX BLANKENBURG & FRIEDEMANN PULVERMÜLLER – Language, but not music, shapes tactile perception

Prior research indicates that language stimuli, when co-presented with sensory inputs, can enhance perceptual discrimination. However, whether this facilitation is unique to spoken language as opposed to non-verbal auditory stimuli, such as musical patterns, remains unclear. To address this question, we used difficult-to-discriminate tactile stimulus patterns and paired them repeatedly either with specific verbal, language-like labels or with matched musical sequences. Crucially, we implemented a within-subject learning design with well-matched stimuli counterbalanced across subjects. This approach involved pairing specific tactile patterns with either linguistic labels or matched sequences of musical tones and exposing all subjects to both conditions. Participants' discrimination ability of the tactile patterns presented in isolation was evaluated both before and after associative learning. Results demonstrated that after 5 days of learning, only the tactile pattern sets associated with language stimuli – not those paired with musical sequences – showed significant improvement in discrimination. These results indicate that spoken language may indeed have an advantage over other forms of auditory input in facilitating perceptual discrimination. We discuss the underlying mechanisms of this observed perceptual advantage.
https://www.cambridge.org/core/journals/language-and-cognition/article/language-but-not-music-shapes-tactile-perception/E8413988F5DD5FF44CEEEE31771A0BFE

MADS NIELSEN, RIKKE VANG CHRISTENSEN & ELISABETH ENGBERG-PEDERSEN – Attribution of subjective experience to geometric figures in narratives by autistic children and children with developmental language disorder

Narratives from autistic children, children with developmental language disorder (DLD) and typically developing children were compared for attributions of intentionality in descriptions of two animations, one inviting descriptions of social events like fighting, another one inviting descriptions of physical events like orbiting planets. The analysis was based on a semantic and syntactic classification of clauses in terms of whether the verbs require their arguments to refer to beings with subjective

experience, that is, intentionality attribution as a first step in the understanding of others as beings with mental states and processes. The autistic children did not have difficulties attributing intentionality to geometric figures. Moreover, the children with DLD made more intentionality attributions in their descriptions of the physical animation than the typically developing peers. Both diagnostic groups reported fewer relevant events than the typically developing children, which is interpreted as difficulties with narrative macrostructure. The results are discussed in relation to earlier studies and with respect to what they tell us about intentionality attribution and narrative structure in autism.
https://www.cambridge.org/core/journals/language-and-cognition/article/attribution-of-subjective-experience-to-geometric-figures-in-narratives-by-autistic-children-and-children-with-developmental-language-disorder/9D1F85D0C48B639BCE607287879A0B25

Mind & Language

PAPERS

ALNICA VISSER – The cognitive role of concept variability
I present and defend concept variability, the view that concepts can admit of indefinitely many variations and changes in their representational contents without thereby losing their identity. I argue that the variability of concepts is central to their role in enabling cognition, and thus that a concept's content variability is, despite philosophical orthodoxy to the contrary, a feature of our cognitive architecture and not a bug.
https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12546

MAJID D. BENI – Agency as a functional kind
This article seeks to define the genuine (functional) kind of agency by identifying its essential property. In the context of this article, the essential property, also termed super-explanatory, is the ability of an agent to make counterfactual models of outcomes of its actions. This article adopts a naturalist approach, informed by advancements in computational neuroscience, to define the functional kind of agency. The offered definition is deliberately flexible and inclusive, encompassing manifestations of agency in both natural and artificial domains.
https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12563

Nature

NEWS

These scientists re-enacted Stone-Age voyage to Japan's remotest islands
Experiment shows how dugout canoes could have crossed treacherous straits from Taiwan to the Ryukyu Islands.
https://www.nature.com/articles/d41586-025-02008-9

First ever skull from 'Denisovan' reveals what ancient people looked like
Ancient proteins and calcified dental plaque identify heavy-browed fossil from China as a Denisovan.
https://www.nature.com/articles/d41586-025-01899-y

Nature Communications

PAPERS

ANNA SZÉCSÉNYI-NAGY et al with DAVID REICH – Ancient DNA reveals diverse community organizations in the 5th millennium BCE Carpathian Basin
Little is known about the genetic connection system and community organization of Late Neolithic and Early Copper Age populations of the Carpathian Basin. Here, we present a comprehensive genetic investigation of these populations, leveraging whole genome data from 125 individuals. Using population genetics, kinship analyses and the study of networks of identity-by-descent haplotype segment sharing, we elucidate the social and genetic dynamics of these communities between 4800–3900 calibrated years BCE. Despite changes in settlement patterns, burial practices, and material culture, we document a high degree of genetic continuity. While one set of individuals from a large community cemetery is genetically diverse, another site is more homogenous and closed, with numerous consanguineous relationships and evidence of patrilineality and patrilocality. In this work, we document important differences in kinship systems in contemporaneous Early Copper Age communities using similar material culture and living only about 100 km apart.
https://www.nature.com/articles/s41467-025-60368-2

Nature Computational Science

ARTICLES

TED UNDERWOOD – The impact of language models on the humanities and vice versa
Many humanists are skeptical of language models and concerned about their effects on universities. However, researchers with a background in the humanities are also actively engaging with artificial intelligence — seeking not only to adopt language models as tools, but to steer them toward a more flexible, contextual representation of written culture.

https://www.nature.com/articles/s43588-025-00819-4

Nature Human Behaviour

CORRECTIONS

ELÉONORE ROLLAND et al with CATHERINE CROCKFORD & ROMAN M. WITTIG – Publisher Correction: Evidence of organized but not disorganized attachment in wild Western chimpanzee offspring (Pan troglodytes verus)

Correction to: Nature Human Behaviour https://doi.org/10.1038/s41562-025-02176-8, published online 12 May 2025.
In the version of the article initially published, the x axis of the top graph in Fig. 2 showed scaled age and has now been corrected to show age in months in the HTML and PDF versions of the article.
https://www.nature.com/articles/s41562-025-02263-w

ORIGINAL ARTICLE: ELÉONORE ROLLAND et al with CATHERINE CROCKFORD & ROMAN M. WITTIG – Evidence of organized but not disorganized attachment in wild Western chimpanzee offspring (Pan troglodytes verus) {EAORC BULLETIN 1,144}.
https://www.nature.com/articles/s41562-025-02176-8

Nature Scientific Reports

PAPERS

SASHA L. WINKLER et al with ERICA A. CARTMILL – Bonobos tend to behave optimistically after hearing laughter

Emotions mediate a wide range of cognitive functions, including memory, attention, and decision making. Studies of emotion in non-human animals have typically focused on negative emotions—like fear—that have clear behavioral correlates (e.g., freezing or retreating). To address this one-sided treatment of affect, we used a cognitive bias test to ask whether vocalizations associated with positive affect lead apes to expect positive future outcomes. All great apes produce laughter-like vocalizations during play that likely evolved from a shared ancestral form of laughter. We primed bonobos with conspecific laughter and then asked whether they were more likely to treat an ambiguous stimulus as if it were positive. Subjects (n = 4) were first trained to approach rewarded (black) stimuli and skip unrewarded (white) stimuli. We then presented occasional ambiguous (grey) stimuli. Bonobos approached ambiguous stimuli to search for rewards more often after hearing laughter. Our results suggest that hearing laughter induces positive emotions and may thus bias bonobos' decision making, including foraging or search behavior. While only apes produce human-like laughter, several other non-human animals have contagious play vocalizations. These vocalizations may lead other animals to anticipate positive outcomes, revealing commonalities in the role of positive emotion in behavior and cognition across species.
https://www.nature.com/articles/s41598-025-02594-8

Neuron

PAPERS

KEITH B. HENGEN & WOODROW L. SHEW – Is criticality a unified setpoint of brain function?

Brains face selective pressure to optimize computation, broadly defined. This is achieved by mechanisms including development, plasticity, and homeostasis. Is there a universal optimum around which the healthy brain tunes itself, across time and individuals? The criticality hypothesis posits such a setpoint. Criticality is a state imbued with internally generated, multiscale, marginally stable dynamics that maximize the features of information processing. Experimental support emerged two decades ago and has accumulated at an accelerating pace despite disagreement. Here, we lay out the logic of criticality as a general computational endpoint and review experimental evidence. We perform a meta-analysis of 140 datasets published between 2003 and 2024. We find that a long-standing controversy is the product of a methodological choice with no bearing on underlying dynamics. Our results suggest that a new generation of research can leverage criticality—as a unifying principle of brain function—to accelerate understanding of behavior, cognition, and disease.
https://www.cell.com/neuron/fulltext/S0896-6273(25)00391-5

New Scientist

NEWS

Our big brains may have evolved because of placental sex hormones

Unlike other primates, humans are exposed to high levels of placental sex hormones in the womb, which may have shaped our evolutionary brain development.
https://www.newscientist.com/article/2484993-our-big-brains-may-have-evolved-because-of-placental-sex-hormones/

ARTICLES

COLIN BARRAS – The invention of language

There's an argument rumbling about why our ancestors evolved language. And surprisingly, one of the possible explanations has nothing to do with communication.

{Another "Complex tool-making led to complex cognition, and then a miracle happened and we began using the cognitive complexity to talk to each other" – a partial explanation masquerading as the whole explanation. Thank you, I already have the tee-shirt.}
https://www.newscientist.com/article/2484046-ancient-humans-only-evolved-language-once-but-why/

ROWAN HOOPER & PENNY SARCHET – The first Denisovan skull
An ancient skull discovered in China has been confirmed to belong to a Denisovan. It's been tough to study this mysterious human ancestor, as we've only ever found a finger and jaw bone - so this new discovery could reshape our understanding of them. Listen on Apple, Spotify or other podcast apps.
https://www.newscientist.com/podcasts/

MICHAEL MARSHALL – Why you should assume that even the simplest animals are conscious
There is mounting evidence that even surprisingly simple animals, like invertebrates, have a level of consciousness - but not in the way you might think.
https://www.newscientist.com/article/2483940-why-you-should-assume-that-even-the-simplest-animals-are-conscious/

Philosophical Transactions of the Royal Society B

PAPERS

MICHAEL J. SHEEHAN & SARA E. MILLER – Linking individual fitness to the evolution of cognition
It is well supported that the present diversity of animal cognitive abilities is the result of evolutionary processes, driven at least in part by natural selection. However, the evolutionary dynamics that link individual traits to fitness to macroevolutionary patterns of variation in cognition are much less clear. Is cognitive evolution fast or slow? Does selection tend to act on existing genetic variation or is adaptive cognitive evolution mutation limited? Is there a consistent pattern to the mode and tempo of cognitive evolution across groups or does it vary depending on different social and ecological pressures? Answering these questions will allow us to understand the connections between heritable variation in cognition in extant populations and the divergence in cognitive abilities across species. We review what is currently known about cognition and individual variation in fitness and discuss how fitness observed in current populations may be linked with patterns of natural selection. We provide a brief overview of relevant concepts from the population genomics literature and suggest a research agenda that integrates behavioural ecological approaches with comparative and population genomics data to uncover the patterns of cognition evolution.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2024.0122

SUSAN D. HEALY – Demonstrating the reproductive consequences of cognition: learning from experience
Reproductive success and its consequences for fitness are key to determining how natural selection shapes cognitive abilities, and thus how and why cognition might change over evolutionary time. However, demonstrating reproductive costs or benefits owing to variation in cognitive ability is hugely challenging, in part because traits such as body size and condition make the largest contribution to reproductive success. Our ability to discriminate a role for 'being smart' in fitness is then already limited. Additionally, most animals have many ways to solve problems, only some of which will depend on their cognitive abilities. However, specific instances in key parts of animal's life may depend heavily on their cognitive abilities, and without them the animal will not survive or reproduce. Retrieving food stores is one example and nest building might be another. For food-storing, spatial ability is key, while for nest building the pertinent ability is learning what works. The importance of animals learning from previous experience may be very common but is rarely considered explicitly in cognitive terms. Work on fitness consequences of cognition should develop from the presentation of discrete tasks testing specific abilities to encompass how learning from experience influences behavioural evolution more broadly.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2024.0115

JOAH ROBERT MADDEN et al – How does cognition determine an individual's fitness? A systematic review of the links between cognition, behaviour and fitness in non-human animals
Recent efforts to understand the evolution of cognition have adopted a within-species approach where cognitive performance, and its effects on behaviour, is correlated with fitness benefits and, if related, is assumed to be selected for. We reviewed 45 studies taking this approach, involving 26 species and describing 211 relationships between behavioural measures of cognition and fitness, to explore broader patterns underlying the evolution of cognition. First, we explored patterns in the strength and direction of selection. We found generally weak support for a relationship between cognition and fitness, with >70% of raw published relationships being statistically non-significant, with an even smaller likelihood once co-variates were accounted for. Where significant relationships were found, they were predominantly, but not exclusively, positive, with individuals exhibiting faster learning or more accurate memory also displaying greater (proxy) fitness. Second, we tested how selection might act under different circumstances. A relationship with fitness was more likely when general, rather than specific cognitive entities were considered, and when the fitness measure corresponded to survival rather than reproductive output. Consequently, the study of within-species cognitive evolution remains in its early stages, with evidence

that is both incomplete and inconclusive. However, it potentially offers a powerful opportunity to explore the structure of cognition, trade-offs, constraints and the way that it links to behaviours.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2024.0118

MAURICIO GONZÁLEZ-FORERO & AIDA GÓMEZ-ROBLES – Why did the human brain size evolve? A way forward
Why the human brain size evolved has been a major evolutionary puzzle since Darwin, but addressing it has been challenging. A key reason is the lack of research tools to infer the causes of a unique event for which experiments are not possible. We suggest that analogous problems have been successfully addressed in other disciplines using what has been recently termed simulation-based inference. Following that approach, we outline a strategy to address why the human brain size evolved: hypotheses are expressed in mechanistic models that yield quantitative predictions for evolutionary and developmental trajectories of brain and body sizes, the predicted trajectories are compared with data, and models are chosen by their ability to explain the data. We discuss a recently published model that makes quantitative predictions for evolutionary and developmental trajectories of brain and body sizes for six hominin species, and compare the model predictions with data, finding that the model recovers many aspects of hominin evolution and development. Counter-intuitively, the human brain size evolves in this model as a spandrel or by-product of selection for something else, namely, fertility-determinant traits. Our analysis indicates that simulation-based inference offers a way forward to infer why the human brain size evolved.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2024.0114

VINAY TEJA POTHARLANKA et al – Proximate mechanisms underlying the coevolution of diet quality and relative brain size in primates
Multiple primate species, including humans, have evolved brains that are surprisingly large relative to their body sizes. Studies of this variation have focused on either proximate (how) or ultimate (why) explanations by correlating species-average brain sizes with, e.g. the rate of genetic changes or certain socioecological variables, respectively. Here, we combined proximate and ultimate perspectives to identify genes that modulated the coevolutionary relationship between diet quality and relative brain size in primates. For n = 50 species, we estimated selection pressure (i.e. root-to-tip dN/dS) for approximately 8K genes and collected brain size, body size and diet quality data. We first used this novel dataset to build on previous studies and bolster findings that neurogenesis-related genes facilitate evolutionary changes in brain size. We then applied phylogenetic partial correlation analysis (to identify genes correlated with both brain size and diet quality) and phylogenetic path analysis (to compare different causal models). We found dozens of genes that may have facilitated the coevolution of diet quality and brain size in primates and show that these genes are involved in neurodevelopment and energy metabolism. This is likely to reflect that higher-quality diets provide more energy to grow and maintain metabolically expensive brains. Our novel approach provides new insight into the drivers of primate brain size evolution.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2024.0126

NATALIE SCHWOB et al – Tolerant and despotic macaques show divergent temperament but similar theory of mind
The social intelligence hypothesis proposes that the demands of social life shape the evolution of cognition, but different aspects of social interactions may be relevant. To test how competitive versus cooperative interactions shape social cognition, we assessed multiple metrics of social cognition in Barbary macaques (Macaca sylvanus, n = 40) and rhesus macaques (Macaca mulatta, n = 60). These closely related species have similar social organization, but diverge in social styles: Barbary macaques are more tolerant, whereas rhesus macaques are more despotic. Monkeys completed a battery of experimental tasks measuring gaze-following (co-orienting with others), knowledge attribution (representing others' underlying knowledge states), goal attribution (interpreting others' actions in terms of underlying intentional goals) and temperament (boldness in response to exploring novelty). While the rhesus macaques were more willing to approach a novel object than were Barbary macaques, both species showed similar success in each social task. However, individual Barbary macaques were more likely to show greater overall proficiency across all social measures combined than were individual rhesus monkeys. Overall, these results indicate that similar social cognitive capacities may evolve in distinct social contexts, and suggest socio-cognitive skills may be relevant for both competitive and cooperative interactions in primates.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2024.0121

LUCA G. HAHN et al – The coevolution of cognition and sociality
Cognition serves to resolve uncertainty. Living in social groups is widely seen as a source of uncertainty driving cognitive evolution, but sociality can also mitigate sources of uncertainty, reducing the need for cognition. Moreover, social systems are not simply external selection pressures but rather arise from the decisions individuals make regarding who to interact with and how to behave. Thus, an understanding of how and why cognition evolves requires careful consideration of the coevolutionary feedback loop between cognition and sociality. Here, we adopt ideas from information theory to evaluate how potential sources of uncertainty differ across species and social systems. Whereas cognitive research often focuses on identifying human-like abilities in other animals, we instead emphasize that animals need to make adaptive decisions to navigate socio-ecological trade-offs. These decisions can be viewed as feedback loops between perceiving and acting on information, which shape individuals' immediate social interactions and scale up to generate the structure of societies.

Emerging group-level characteristics such as social structure, communication networks and culture in turn produce the context in which decisions are made and so shape selection on the underlying cognitive processes. Thus, minds shape societies and societies shape minds.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2024.0110

JOHAN LIND & ANNA JON-AND – Sequences and animal intelligence
Here, we explore some cognitive mechanisms that support and constrain sequential abilities in non-human animals (hereafter animals). By examining limits in memory for stimulus sequences and how behaviour sequences can be learned, we highlight the combinatorial costs that arise as sequences get increasingly longer, which may hinder the development of cognitive abilities that require faithful representation of sequences, like language. We discuss a trace memory model as a framework for understanding how animals represent stimulus sequences and suggest that animals represent sequences as unstructured collections of decaying memory traces rather than representing order faithfully. The implications of this model challenge traditional interpretations of declarative and rule-based learning in animals. In addition, we explore associative learning models that can account for how animals acquire behaviour sequences without precise memory of stimulus sequences. Current models have proven powerful in accounting for complex behaviour sequences. We end by asking what the value is of anthropocentric models in the study of animal intelligence, if other models provide more accurate predictions of animal behaviour.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2024.0116

ARNON LOTEM & JOSEPH Y. HALPERN – Evolution of diverse (and advanced) cognitive abilities through adaptive fine-tuning of learning and chunking mechanisms
The evolution of cognition is frequently discussed as the evolution of cognitive abilities or the evolution of some neuronal structures in the brain. However, since such traits or abilities are often highly complex, understanding their evolution requires explaining how they could have gradually evolved through selection acting on heritable variations in simpler cognitive mechanisms. With this in mind, making use of a previously proposed theory, here, we show how the evolution of cognitive abilities can be captured by the fine-tuning of basic learning mechanisms and, in particular, chunking mechanisms. We use the term chunking broadly for all types of non-elemental learning, claiming that the process by which elements are combined into chunks and associated with other chunks, or elements, is critical for what the brain can do, and that it must be fine-tuned to ecological conditions. We discuss the relevance of this approach to studies in animal cognition, using examples from animal foraging and decision-making, problem-solving and cognitive flexibility. Finally, we explain how even the apparent human–animal gap in sequence learning ability can be explained in terms of different fine-tunings of a similar chunking process.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2024.0117

ROBERT BARTON & LOUISE BARRETT – Embodied cognitive evolution and the limits of convergence
Comparative psychology seems to be perpetually bogged down in intractable debates about which species have what cognitive capacities, which criteria to use and whether or not the capacities are domain general. The problem arises from lack of conceptual clarity about how to define, measure and compare cognitive capacities. In turn, conceptual vagueness arises from the use of anthropocentric folk-psychological concepts given apparent scientific legitimacy by framing them in cognitivist, computational terms. This 'cognitivist gambit' assumes that cognitive processes necessarily involve representations that are independent of the sensory-motor specializations associated with different body plans and ecological niches. We argue instead that sensory-motor adaptations are not inconvenient confounding variables that should be controlled to isolate cognition, but intrinsic aspects of cognitive evolution. This perspective implies that, because bodies and their sensory-motor control are highly divergent across the tree of life, comparative psychology should pay more attention to phylogenetic constraint and divergent cognitive evolution. It also implies that boiling down neuro-cognitive evolution to brain size or numbers of neurons will fail to capture the richness and complexity of the interrelationships between nervous systems, cognition, behaviour and ecology. If correct, this perspective suggests a need to reconsider the ontological basis of comparative psychology.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2024.0255

PLoS One

PAPERS

EMILY M. NEER et al – Pitch characteristics of real-world infant-directed speech vary with pragmatic context, perceived adult gender, and infant gender
Children's everyday language environments can be full of rich and diverse input, especially adult speech. Prosodic modifications when adults speak to infants are observed cross-culturally and are believed to enhance infant learning and emotion. However, factors such as what and why adults are speaking as well as speaker gender can affect the prosody of adults' speech. This study asks whether prosodic modifications to infant-directed speech depend on perceived adult speaker gender, assigned infant gender, and the perceived pragmatic function of an utterance. We examined 3,607 adult speech clips from daylong home audio recordings of 60 North American, English-speaking, 3- to 20-month-old infants (28 female). Adult

speakers used significantly more imperatives and questions and sang more frequently to infants than other adults. While infant-directed speech tended to have greater mean pitch and pitch modulation than adult-directed speech overall, these patterns were modulated, sometimes in complex ways, by pragmatic function, perceived adult gender, and infant gender. For example, we found that female-sounding adult speakers exhibited greater IDS-ADS mean pitch differences than male-sounding adult speakers when providing information or engaging in conversational niceties. An additional example is that male-sounding adults used higher pitch when singing to male infants compared to female infants. These findings invite further research on how individual, demographic, and situational factors affect speech to infants and possibly infant learning. The study's pragmatic context tags are added to an existing open dataset of infant- and adult-directed speech.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0326569

FLÓRA SAMU et al – Cooperation is not rewarded by friendship, but generous and selfish students repel each other in social networks

Humans cooperate across various contexts, despite the individual costs involved. Cooperation and prosocial behavior may persist because these costs are offset by reputation and other social benefits. Specifically, cooperators and prosocial individuals may receive more friendship nominations and be less likely to face exclusion or avoidance. We test whether such beneficial network dynamics are present in a unique dataset of twenty primary school classes in northern Italy. Cooperation and social preferences of 420 students in grades 4 and 5 were measured with incentivized social dilemma games, and the social network of the entire classroom was traced on two subsequent occasions. We modeled the dynamics of friendship and negative ties with Stochastic Actor-Oriented Models, and conducted a meta-analysis of the results. Our key finding is that, while we do not observe evidence of homophily based on social preferences in friendship nominations - and being prosocial does not lead to receiving more friendship nominations, individuals are significantly more likely to direct negative tie nominations toward peers who made different offers in the dictator game. These results suggest that social network dynamics support cooperation not by rewarding prosocial behavior with friendship, but through repulsion between prosocial and selfish students.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0326564

SAHRA TALAMO et al with JEAN-JACQUES HUBLIN & PONTUS SKOGLUND – Boomerang and bones: Refining the chronology of the Early Upper Paleolithic at Obłazowa Cave, Poland

Beginning with the Early Aurignacian, Homo sapiens demonstrated an enhanced symbolic capacity, expanding artistic expressions from body decoration to portable art and aesthetically refined tools. These artistic endeavors, often intertwined with utilitarian purposes, have sparked debates regarding their symbolic versus functional roles. Among these remarkable artifacts is a complete mammoth tusk boomerang from Layer VIII of Obłazowa Cave, Poland, found in association with a human phalanx. Determining its precise chronology and cultural context is critical for understanding the emergence and variability of symbolic behaviors among early Homo sapiens groups in Europe. This study refines the chronology of the Early Upper Paleolithic occupation of Layer VIII at Obłazowa Cave through radiocarbon dating of several bones and the human fossil found near the ivory boomerang. Bayesian modeling places the site's main occupation phase between 42,810–38,550 cal BP (95,4% probability). The mammoth-ivory boomerang, calibrated to 42,290–39,280 cal BP with a 95.4% probability, emerges as one of Europe's oldest known examples of this complex tool, exemplifying technological and symbolic innovation at Obłazowa Cave. This multi-disciplinary research underscores the importance of integrating advanced methodologies to explore cultural practices during the Upper Paleolithic. The findings not only deepen our understanding of Homo sapiens' adaptive strategies but also highlight the nuanced interplay of technology, symbolism, and environmental interaction during the earliest phases of human dispersals in Central Europe.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0324911

Royal Society Open Science

PAPERS

SHUK CHING LEE & GILAD FELDMAN – Revisiting the link between true-self and morality: Replication and extension Registered Report of Newman, Bloom, and Knobe (2014) Studies 1 and 2

Newman et al. 2014 Value judgments and the true self. Personal. Soc. Psychol. Bull. 40, 203–216. (doi:10.1177/0146167213508791) demonstrated that behaviours that are more aligned with moral values are perceived as more strongly reflecting a person's 'true-self', suggesting that morality plays an important role in how people perceive others' essential self. In this Registered Report, we conducted a close replication of Newman et al. 2014 Value judgments and the true self. Personal. Soc. Psychol. Bull. 40, 203–216. (doi:10.1177/0146167213508791)'s Studies 1 and 2 with an online US American sample recruited from Amazon Mechanical Turk using CloudResearch (N = 803). We found support for Study 1's findings that morally positive changes in others are perceived as more reflective of true-self than morally negative changes, in both the forced-choice (original: η^2p = 0.39, 95% CI [0.25, 0.51]; replication: η^2p = 0.20, 95% CI [0.16, 0.23]) and the continuous scale (original: η^2p = 0.33, 95% CI [0.19, 0.45]; replication: η^2p = 0.22, 95% CI [0.15, 0.25]) measures. We found support for Study 2's findings that changes more aligned with observers' political moral views are perceived as more reflective of true-self (original: η^2p = 0.04, 95% CI [0.00, 0.11]; replication: η^2p = 0.35, 95% CI [0.29, 0.41]). Extending the replication, we examined associations between true-self attributions and perceived social norms and found that social norms

were positively associated with true-self attributions (Study 1: most rs ranged from 0.07 to 0.21; Study 2: rs = 0.10 to 0.30). Materials, data and analysis code are available on https://doi.org/10.17605/OSF.IO/9FVTQ. This Registered Report has been officially endorsed by Peer Community in Registered Reports: https://doi.org/10.24072/pci.rr.100372.
https://royalsocietypublishing.org/doi/10.1098/rsos.250908

COEN G. WILSON et al – Skill and efficiency in Acheulian giant core reduction
The beginning of the Chibanian age (0.774–0.129 Ma) is characterized by a proliferation of giant core (GC) reduction strategies across the Acheulian world, which were used to produce standardized large flake blanks for shaping large cutting tools (LCTs), such as handaxes and cleavers. Archaeological analyses of GCs have revealed that flaking strategies were often tailored to the lithological and morphological properties of boulders, while experimental research has demonstrated challenges in managing and exploiting their volumes. These insights emphasize the importance of technological skill in reducing GCs efficiently to maximize the production of standardized blanks. However, examining skill in Acheulian contexts has focused on shaping LCTs almost exclusively, while the early phases of these manufacturing chains, including raw material acquisition and blank production, have received less attention. Here, we document the role of technological skill in reducing giant quartzite cores to manufacture large flake blanks through a set of actualistic experiments that contrast expert, intermediate and novice performances. Our results show that knapping expertise is correlated with increased efficiency in exploiting core volume and creating blanks with morphometric features that are ideal for shaping LCTs. We further argue that economizing LCT shaping processes through front-loading time investment in blank production probably involved expert cognition and may have had social implications for skill development in the deep past.
https://royalsocietypublishing.org/doi/10.1098/rsos.250695

Science

ARTICLES

BENJAMIN S. ARBUCKLE – Genomic insights into social life in Neolithic Anatolia
Ancient populations present in Anatolia, modern Türkiye, during the Neolithic period (~8000 to 6000 BCE) were defined by the emergence of early farming technologies and settlements constructed of mudbrick houses. Previous research has shown that these Anatolian farming communities expanded westward around 6500 BCE, colonizing much of the European continent (1). The assumption was that the Neolithic communities in Anatolia were male dominated and replaced more “primitive” forager populations as they moved west. On pages 1386 and 1385 of this issue, Yüncü et al. (2) and Koptekin et al. (3), respectively, describe paleogenomic evidence from ancient populations that challenges these assumptions and provides intimate new details of social life in the Neolithic period. Both studies reflect the advances of paleogenomics in addressing socially nuanced questions and dispute traditional narratives of human history.
https://www.science.org/doi/10.1126/science.ady6939

PAPERS

EREN YÜNCÜ et mul – Female lineages and changing kinship patterns in Neolithic Çatalhöyük
Çatalhöyük is a Neolithic settlement in Anatolia and a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site. Occupied for 1000 years (9000 to 8000 BCE), it is renowned for its size, apparent egalitarian social structure, and subfloor burials, where children and adults were buried within houses during their use. It is also known for its large corpus of female figurines, which were long debated as possible representatives of a “Mother Goddess” cult and signs of a matriarchal society.
In this work, we studied social organization at Çatalhöyük, fusing rich archaeological data with a paleogenomic dataset of 131 individuals buried in 35 houses. We focused on identifying genetic ties between individuals buried together inside the same buildings.
Comparing genetic ties within and between buildings, we found that the maternal lineage had a key role in connecting Çatalhöyük household members, as represented by burials within each building. We estimated that 70 to 100% of the time, female offspring remained connected to buildings, whereas adult male offspring may have moved away. We also discovered preferential treatment of female infant and child burials, with five times more grave goods offered to females than to males. Our data further show how social organization patterns changed over time in Çatalhöyük. In the early phases of the settlement, individuals buried together within houses frequently represented extended family members. Through time, the genetic composition of house burials became less homogeneous. In later periods, we found groups of neonates who were genetically unrelated but buried in the same house. Meanwhile, their mothers appear to have had similar diets. This implies that genetic relatedness became less central to social organization over time, which could be explained by fostering and adoption-like mechanisms becoming widespread, which is also observed today in various societies. Despite this shift, female-centered practices continued at Çatalhöyük through the occupation.
Our results reveal the malleable nature of social organization in Neolithic villages, with the composition of households possibly changing within a few dozen generations. We also found the first direct indication of female-centered practices in Neolithic Southwest Asia, a question of frequent debate. This female focus identified in Çatalhöyük is in sharp contrast to patterns observed in later European Neolithic sites, which have their origins in Anatolia. Many of these European societies show evidence of patrilocality—where males stay within their natal community upon attaining adulthood and females move

out—and elaborate burial treatments that are frequently associated with males. The Çatalhöyük evidence now shows that such male-centered practices were not an inherent characteristic of early agricultural societies.
https://www.science.org/doi/10.1126/science.adr2915

DILEK KOPTEKIN et mul – Out-of-Anatolia: Cultural and genetic interactions during the Neolithic expansion in the Aegean

Neolithic farming cultures first developed in the Fertile Crescent around 10,000 years ago and later spread into Europe through the Aegean. How the Neolithic lifeways emerged in the Aegean, and particularly West Anatolia, has remained unknown, obscured by a lack of human ancient DNA from pre-Neolithic times.

We studied population and cultural history of the Aegean using 30 new paleogenomes, including a 10,000-year-old individual from West Anatolia, combined with 408 published genomes. We also compiled a digitalized material culture that included 54 cultural traits from 16 sites from around 9000 years ago and joined this with 104 genomes from the same sites. This allowed us to reconstruct mobility and cultural change during the Neolithic transition in the Aegean.

We found at least 6000 years of genetic continuity in West Anatolia during the early Holocene, before the arrival of farming villages there. During this time, West Anatolians were in cultural exchange with their eastern neighbors from the Fertile Crescent, exploring sedentary lifeways. But these West Anatolians did not genetically mix with their neighbors in this early phase.

Things changed around 9000 years ago, when full-scale farming settlements began spreading across the Aegean. Our paleogenomic data show that this did not occur because of waves of migrant farmers from the east creating farming colonies in the Aegean and replacing local foragers. Rather, the transition unfolded as a fusion: Incoming groups of eastern origin joined together and genetically mixed with the descendants of the local foragers in the newly established villages. This was likely a complex process of coexistence and mutual innovation as well as eventual mixing. It further gave rise to the now-famous “Anatolian Farmer” genetic profile, which subsequently spread across the Aegean Sea and later throughout Europe. In this case, admixture with locals appears more limited and sporadic.

We further performed a comparative study of cultural and genetic data, asking whether cultural similarities among the 16 Neolithic settlements may be explained by their genetic similarities, which would be expected if culture was shaped by large-scale mobility and admixture history. We found that cultural similarities among villages could simply be explained by their geographic proximity, whereas their population genetic similarities did not have any explanatory power, implying that ideas mixed faster than people in this region.

The spread of Neolithic cultures in West Eurasia involved distinct mechanisms, from pure cultural adoption to mobility and admixture between incoming farmers and local foragers to rapid migration and spread. Further, cultural similarities among settlements were not shaped by large-scale mobility (as reflected in genetic data) but rather through background mobility. Our results thus challenge the widespread assumption that cultural entities frequently correspond to genetically homogeneous populations, supporting the archaeological adage, “pots don’t equal people.” Our study presents a fresh look at mechanisms of cultural change during one of humanity’s most transformative periods.
https://www.science.org/doi/10.1126/science.adr3326

Science Advances

PAPERS

ELIZABETH C. VELLIKY et al with FRANCESCO D’ERRICO & CHRISTOPHER S. HENSHILWOOD – Unveiling the multifunctional use of ochre in the Middle Stone Age: Specialized ochre retouchers from Blombos Cave

Ochre, an iron-rich pigment, is widely associated with symbolic communication, but its functional applications in the Middle Stone Age (MSA) remain poorly understood. Experimental and ethnographic evidence suggests ochre being useful for hide tanning, hafting adhesives, and skin protection, although direct archeological evidence is scarce. We address this gap by presenting ochre tools from Blombos Cave, South Africa, found in Still Bay to pre–Still Bay layers dated 90 to 70,000 years ago. Seven ochre pieces were deliberately modified into lithic retouchers, showing clear use-wear patterns and evidence of intentional shaping. Targeted experiments confirm that some were used for pressure flaking and were rejuvenated to maintain function. These findings provide direct evidence of ochre being used to retouch lithic artifacts during the MSA, highlighting its role in technological systems of this period. The results emphasize the multifunctionality of ochre and suggest that such curated tools may have held personal, cultural, or technological significance within early modern human communities.
https://www.science.org/doi/10.1126/sciadv.ads2797

YOUSUKE KAIFU et al with AKIRA GOTO – Paleolithic seafaring in East Asia: An experimental test of the dugout canoe hypothesis

Archeological evidence indicates that full-scale expansion of Homo sapiens across the oceans began about 50,000 years ago in the Western Pacific, yet how this was achieved remains unclear. The Ryukyu Islands in southwestern Japan, where archaeological sites suddenly appeared 35,000 to 30,000 years ago, are of particular interest in this regard because of the apparent difficulty in crossing the surrounding waters. In this study, we test if a non-sailing dugout canoe can be produced with Upper Paleolithic tools, and if it can cross the 110-kilometer-wide strait at the western entrance of the Ryukyus, where

one of the world's strongest ocean currents intervenes. Our 7.5-meter-long dugout, manufactured with edge-ground stone axes, was speedy and durable enough to cross this strait. This supports the early development of functional boats, such as dugouts, while our experiment also highlighted that this type of sea travel was possible only for experienced paddlers with advanced navigational skills.
https://www.science.org/doi/10.1126/sciadv.adv5507

YU-LIN K. CHANG et al – Traversing the Kuroshio: Paleolithic migration across one of the world's strongest ocean currents

The maritime migration to the South Ryukyu Islands of southwestern Japan, which occurred approximately 30,000 years ago, was one of the most difficult sea crossings accomplished by the Late Pleistocene Homo sapiens. This study performs numerical simulations to investigate the conditions that were needed to cross between Taiwan and Yonaguni Island, where one of the world's strongest ocean currents, the Kuroshio, remains active. We combined simulations based on three ocean models with data from an actual experimental voyage conducted in 2019. The results showed that travel across this sea would have been possible on both the modern and Late Pleistocene oceans if a dugout canoe was used with a suitable departure place and paddling strategy. Recognizing the Kuroshio, paddling to counteract this current, and using high-level navigation were crucial to success. This suggests that the Paleolithic maritime expansion in the Western Pacific involved both advanced technologies and strategic challenges.
https://www.science.org/doi/10.1126/sciadv.adv5508

JUMPEI MATSUMOTO et al – Three-dimensional markerless motion capture of multiple freely behaving monkeys toward automated characterization of social behavior

Given their high sociality and close evolutionary distance to humans, monkeys are an essential animal model for unraveling the biological mechanisms underlying human social behavior and elucidating the pathogenesis of diseases exhibiting abnormal social behavior. However, behavioral analysis of naturally behaving monkeys requires manual counting of various behaviors, which has been a bottleneck due to problems in throughput and objectivity. Here, we developed a three-dimensional markerless motion capture system that used multi-view data for robust tracking of individual monkeys and accurate reconstruction of the three-dimensional poses of multiple monkeys living in groups. Validation analysis in two monkey groups revealed that the system enabled the characterization of individual social dispositions and relationships through automated detection of eight basic social events. Analyses of social looking demonstrated its potential for investigating adaptive behaviors in a social group. These results suggest that this motion capture system will greatly enhance our ability to analyze primate social behavior.
https://www.science.org/doi/10.1126/sciadv.adn1355

FRANZISKA WEGDELL et al with KLAUS ZUBERBÜHLER & CAREL P. VAN SCHAIK – The evolution of infant-directed communication: Comparing vocal input across all great apes

Human language is unique among communication systems since many elements are learned and transmitted across generations. Previous research suggests that this process is best predicted by infant-directed communication, i.e., a mode of communication directed by caregivers to children. Despite its importance for language, whether infant-directed communication is unique to humans or rooted more deeply in the primate lineage remains unclear. To assess this, we investigated directed and surrounding vocal communication in human infants and infants of wild nonhuman great apes. Our findings reveal that human infants receive dramatically more infant-directed communication than nonhuman great ape infants. These data suggest that the earliest hominins likely relied more on surrounding communication to become communicatively competent, while infant-directed vocal communication became considerably more prominent with human language.
https://www.science.org/doi/10.1126/sciadv.adt7718

FRANCESCO POLI et al – Volatility-driven learning in human infants

Adapting to change is a fundamental feature of human learning, yet its developmental origins remain elusive. We developed an experimental and computational approach to track infants' adaptive learning processes via pupil size, an indicator of tonic and phasic noradrenergic activity. We found that 8-month-old infants' tonic pupil size mirrored trial-by-trial fluctuations in environmental volatility, while phasic pupil responses revealed that infants used this information to dynamically optimize their learning. This adaptive strategy resulted in successful task performance, as evidenced by anticipatory looking toward correct target locations. The ability to estimate volatility varied significantly across infants, and these individual differences were related to infant temperament, indicating early links between cognitive adaptation and emotional responsivity. These findings demonstrate that infants actively adapt to environmental change, and that early differences in this capacity may have profound implications for long-term cognitive and psychosocial development.
https://www.science.org/doi/10.1126/sciadv.adu2014

Trends in Cognitive Sciences

PAPERS

CAROLINE F. ROWLAND et al – Constructing language: a framework for explaining acquisition

Explaining how children build a language system is a central goal of research in language acquisition, with broad implications for language evolution, adult language processing, and artificial intelligence (AI). Here, we propose a constructivist framework for future theory-building in language acquisition. We describe four components of constructivism, drawing on wide-ranging evidence to argue that theories based on these components will be well suited to explaining developmental change. We show how adopting a constructivist framework both provides plausible answers to old questions (e.g., how children build linguistic representations from their input) and generates new questions (e.g., how children adapt to the affordances provided by different cultures and languages).
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00142-1

JOHN B. MUEGGE, HYOJU KIM & BOB MCMURRAY – Decoupling speech processing from time

Accurate processing of speech requires that listeners map temporally unfolding input to words. A long-held set of principles describes this process: lexical items are activated immediately and incrementally as speech arrives, perceptual and lexical representations rapidly decay to make room for new information; and lexical entries are temporally structured. In this framework; speech processing is tightly coupled to the temporally unfolding input. However, recent work challenges this: low-level auditory and higher-level lexical representations do not decay and are instead retained over long durations, speech perception may require encapsulated memory buffers, lexical representations are not strictly temporally structured, and listeners can substantially delay lexical access in some circumstances. These findings suggest that current theories and models of word recognition need to be reconceptualized.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(25)00144-5

COMMENTARIES

IVO JACOBS, TOMAS PERSSON & PETER GÄRDENFORS – Model-based animal cognition slips through the sequence bottleneck

In a recent article in TiCS, Lind and Jon-And argued that the sequence memory of animals constitutes a cognitive bottleneck, the 'sequence bottleneck', and that mental simulations require faithful representation of sequential information. They therefore concluded that animals cannot perform mental simulations, and that behavioral and neurobiological studies suggesting otherwise are best interpreted as results of associative learning. Through examples of predictive maps, cognitive control, and active sleep, we illustrate the overwhelming evidence that mammals and birds make model-based simulations, which suggests the sequence bottleneck to be more limited in scope than proposed by Lind and Jon-And.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(25)00155-X

ORIGINAL PAPER: JOHAN LIND & ANNA JON-AND – A sequence bottleneck for animal intelligence and language? {EAORC Bulletin 1,117}

https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00269-9

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