

EAORC BULLETIN 1,121 – 8 December 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 – Neandertals: Unique from Humans, or Uniquely Human?

Kroeber Anthropological Society 103:1, 93-107 (2013).

COLIN P.T. BAILLIE – Neandertals: Unique from Humans, or Uniquely Human?

Since the discovery of the Neandertal holotype from the Neander Valley in 1856, the position of Neandertals within the *Homo* lineage has been contested by paleoanthropologists. Neandertals represent a member of the genus *Homo*, characterized by a set of traits that have been identified from the skeletal remains of specimens that represent both sexes and a range of chronological ages. The temporal and geographical range of Neandertals is subject to debate because a number of traits typically assigned to Neandertals appear by 600,000 years Before Present (B.P.) in specimens from locations in Western Asia and Europe (Harvati 2010). However, the entire collection of “classic” Neandertal characteristics was not present until approximately 100,000 years B.P., and continued to exist until 30,000 years B.P. (Harvati 2010). The “classic” Neandertal cranium typically exhibits a long and low cranial vault, an occipital bun, a prominent supraorbital ridge, as well as a mandible that lacks a chin. The postcranial remains are characterized by a “hyperpolar” form, including a large thorax region coupled with long clavicles and comparably short limb bones (Weaver 2003:6928). For the purposes of my

investigation, I focus on the hypodigm from Europe that can be conclusively categorized as “classic” Neandertals in the Upper Pleistocene.

[https://www.academia.edu/3625956/Neandertals Unique from Humans or Uniquely Human](https://www.academia.edu/3625956/Neandertals_Unique_from_Humans_or_Uniquely_Human)

NEWS

JOHN TEMPLETON FOUNDATION – The Paradox of Our Collapsing Compassion

Humans are empathic creatures, capable of feeling the emotions of others. But in one of the many mysteries of being human, our compassion drops as the number of people impacted climbs. If our compassion were a line graph, the line would plateau and even begin to dip as the scale of need increased. Our ability to empathetically engage simply doesn't scale. This psychological phenomenon is known as the “compassion collapse” or “compassion fade,” and it goes against both common sense and humanitarian interests: shouldn't we feel more compassion and be quicker to act as suffering increases? But we don't. What's the explanation for this paradox?

<https://www.templeton.org/news/the-paradox-of-our-collapsing-compassion>

SAPIENS – It's Time to Replace “Prehistory” With “Deep History”

A team of archaeologists working in Southeast Asia is pushing toward a deeper understanding of history that amplifies Indigenous and local perspectives to challenge traditional archaeological timelines.

<https://www.sapiens.org/archaeology/prehistory-deep-history-southeast-asia/>

SCIENCEADVISER – Footprints capture a hominin close encounter

On a day 1.5 million years ago, three individuals of our genus Homo walked along a muddy lakeshore not far from what is now Lake Turkana in Kenya. Hours before or after they passed, another member of the human family, likely the smaller-brained, big-jawed Paranthropus, hurried along the same shoreline. These early hominins would have seen giant cranes, ancient horses—and possibly, each other, according to a new study of their intermingled footprints, published Thursday in Science. The prints are “beautifully preserved,” says paleoanthropologist Louise Leakey, who led the team that found the prints. “You can see the toes skidding into the mud, almost like they were made the other day.”

The tracks may illuminate the hip and knee anatomy and gait of Paranthropus, which have been a mystery, other researchers say. And the prints provide the strongest evidence yet that two genera of hominins, each with their own distinct upright stride, were in the same place on the same day. “Today there is just one of us,” says paleoanthropologist Jeremy de Silva. “But we now know for sure that in the past, two different [hominins] shared a landscape, and that they would have seen each other. Did they interact? What did they think of each other? It's wonderful to imagine.”

<https://www.science.org/content/article/ancient-footprints-capture-coexistence-two-kinds-human-ancestor>

SCIENCE DAILY – Early North Americans made needles from fur-bearers

Paleoindians at Wyoming's LaPrele mammoth site made needles from the bones of fur-bearers, likely to create garments from the animals' furs to keep warm in a cool climate.

<https://www.sciencedaily.com/releases/2024/11/241127165731.htm>

SCIENCE DAILY – Mammoth as key food source for ancient Americans

Scientists have uncovered the first direct evidence that ancient Americans relied primarily on mammoth and other large animals for food. Their research sheds new light on both the rapid expansion of humans throughout the Americas and the extinction of large ice age mammals.

<https://www.sciencedaily.com/releases/2024/12/241204145021.htm>

SCIENCE DAILY – Male African elephants develop distinct personality traits as they age

Male African elephants have distinct personality traits, but also adapt their behavior to suit the social context, according to a new study.

<https://www.sciencedaily.com/releases/2024/12/241204145018.htm>

SCIENCE DAILY – How did humans and dogs become friends? Connections in the Americas began 12kya

A new study sheds light on how long humans in the Americas have had relationships with the ancestors of today's dogs -- and asks an 'existential question': What is a dog?

<https://www.sciencedaily.com/releases/2024/12/241204145004.htm>

SCIENCE DAILY – How neighborhood enhances cooperation

Helping out your neighbor or minding your own business? A challenging choice with different benefits for each decision. Game theory provides guidance in making such choices -- from a theoretical perspective. Novel findings reveal new network structures that enhance cooperation throughout a system. These insights have potential applications also in biology.
<https://www.sciencedaily.com/releases/2024/12/241206111938.htm>

SCIENCENEWS – Dietary evidence bolsters Clovis hunters' reputation as mammoth killers

A chemical analysis provides direct proof that the ancient North Americans ate mammoths.
<https://www.sciencenews.org/article/dietary-clovis-hunters-mammoth-killers>

SCIENCE.ORG NEWS – Ancient footprints capture coexistence of two kinds of human ancestor

About 1.5 million years ago, early members of our genus Homo walked along a lakeshore in Africa within hours of another kind of hominin, likely Paranthropus.
<https://www.science.org/content/article/ancient-footprints-capture-coexistence-two-kinds-human-ancestor>

PUBLICATIONS**American Journal of Biological Anthropology****PAPERS****KAREN R. SWAN et al – Restructuring of Femoral Cortical Bone During Growth and Locomotor Development of Wild Chimpanzees (*Pan troglodytes verus*)**

Chimpanzees are altricial in terms of their locomotor development and transition from being carried to engaging in suspensory and arboreal locomotor behaviors to eventually relying on terrestrial quadrupedalism as their main form of locomotion. Here, we consider the mechanical implications of femoral cortical bone restructuring during growth and locomotor development in wild chimpanzees.

Cortical bone structure was examined in an ontogenetic sample of wild chimpanzees from a single subspecies (*P. t. verus*) spanning in age from 2 weeks to 12.6 years. Diaphyseal cross-sections were extracted from micro-CT scans of the femur at 35%, 50%, and 65% of total intermetaphyseal length and variation in cortical bone structure was assessed based on bending rigidity (I_{max}/I_{min} , I_x/I_y), relative medullary area, and cortical bone porosity.

Diaphyseal shape is relatively circular with a high amount of cortical bone porosity and a large relative medullary area during early infancy. Distinct shifts in cortical bone structure occurred for each studied parameter with the biggest changes occurring within the first 5 years. Values appear to stabilize as quadrupedal walking increases in frequency and is established as the main form of locomotion.

Collectively, the results suggest a degree of integration in which cortical bone restructures in response to rapid changes in locomotion in addition to nonmechanical influences such as hormonal, and growth factors, without compromising function and structural integrity. The extent of influence of each factor varies throughout growth and highlights the need for caution in functional interpretations of cortical bone geometry.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.25045>

OBITUARIES**WILLIAM R. LEONARD & DENNIS H. O'ROURKE – In Memoriam: Michael H. Crawford (1939–2024)**

This article was first published in the American Journal of Human Biology. The articles are identical except for minor stylistic and spelling differences in keeping with each journal's style. Either citation can be used when citing this article.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.25044>

BioSystems**PAPERS****CLÉMENCE ORTEGA DOUVILLE – Reality and imagination intertwined: A sensorimotor paradox interpretation**

As a hypothesis on the origins of mind and language, the evolutionary theory of the sensorimotor paradox suggests that capacities for imagination, self-representation and abstraction would operate from a dissociation in what is known as the forward model. In some studies, sensory perception is understood as a system of prediction and confirmation (feedforward and feedback processes) that would share common yet distinct and overlapping neural networks with mental imagery. The latter would then mostly operate through internal feedback processes. The hypothesis of our theory is that dissociation and parallelism between those processes would make it less likely for imaginary prediction to match and simultaneously coincide with any sensory feedback, contradicting the stimulus/response pattern. The gap between the two and the effort required to maintain this gap, born from the development of bipedal stance and a radical change to our relation to our own hands, would be the very structural foundation to our capacity to elaborate abstract thoughts, by partially blocking and inhibiting motor action. Mental imagery would structurally be dissociated from perception, though maintaining an intricately related

interdependence. Moreover, the content of the images would be subordinate to their function as emotional regulators, prioritising consistency with some global, conditional and socially learnt body-image. As a higher-level and proto-aesthetic function, we can speculate that the action and instrumentalisation of dissociating imagination from perception would become the actual prediction and their coordination, the expected feedback.

<https://www.sciencedirect.com/science/article/pii/S0303264724002351>

Current Biology

PAPERS

QIANLI YANG et al – A language model of problem solving in humans and macaque monkeys

Human intelligence is characterized by the remarkable ability to solve complex problems by planning a sequence of actions that takes us from an initial state to a desired goal state. Quantifying and comparing problem-solving capabilities across species and finding their evolutionary roots are critical for understanding how the brain carries out this intricate process. We introduce the Language of Problem Solving (LoPS) model as a novel quantitative framework that investigates the structure of problem-solving behavior through a language model. We applied the model to an adapted classic Pac-Man game as a cross-species behavioral paradigm to test both humans and macaque monkeys. The LoPS model extracted the latent structure, or grammar, embedded in the agents' gameplay, revealing the non-Markovian temporal dependency structure of their problem-solving behavior and the hierarchical structures of problem solving in both species. The complexity of LoPS grammar correlated with individuals' game performance and reflected the difference in problem-solving capacity between humans and monkeys. Both species evolved their LoPS grammars during learning, progressing from simpler to more complex ones, suggesting that the structure of problem solving is not fixed but evolves to support more sophisticated and efficient problem solving. Our study provides insights into how humans and monkeys break down problem solving into compositional units and navigate complex tasks, deepening our understanding of human intelligence and its evolution and establishing a foundation for future investigations of the neural mechanisms of problem solving.

[https://www.cell.com/current-biology/abstract/S0960-9822\(24\)01501-X](https://www.cell.com/current-biology/abstract/S0960-9822(24)01501-X)

eLife

PAPERS

JOHANNES J FAHRENFORT et al – Criterion placement threatens the construct validity of neural measures of consciousness

How consciousness arises from brain activity has been a topic of intense scientific research for decades. But how does one identify the neural basis of something that is intrinsically personal and subjective? A hallmark approach has been to ask observers to judge stimuli as 'seen' (conscious) and 'unseen' (unconscious) and use post hoc sorting of neural measurements based these judgments. Unfortunately, cognitive and response biases are known to strongly affect how observers place their criterion for judging stimuli as 'seen' vs. 'unseen', thereby confounding neural measures of consciousness. Surprisingly however, the effect of conservative and liberal criterion placement on neural measures of unconscious and conscious processing has never been explicitly investigated. Here we use simulations and electrophysiological brain measurements to show that conservative criterion placement has an unintuitive consequence: rather than selectively providing a cautious estimate of conscious processing, it inflates effect sizes in neural measures of both conscious and unconscious processing, while liberal criterion placement does the reverse. After showing this in simulation, we performed decoding analyses on two electroencephalography studies that employ common subjective indicators of conscious awareness, in which we experimentally manipulated the response criterion. The results confirm that the predicted confounding effects of criterion placement on neural measures of unconscious and conscious processing occur in empirical data, while further showing that the most widely used subjective scale, the Perceptual Awareness Scale (PAS), does not guard against criterion confounds. Follow-up simulations explicate how the experimental context determines whether the relative confounding effect of criterion placement is larger in neural measures of either conscious or unconscious processing. We conclude that criterion placement threatens the construct validity of neural measures of conscious and unconscious processing.

<https://elifesciences.org/reviewed-preprints/102335>

Evolutionary Anthropology

REVIEWS

MEGAN WILKINSON – Big brains and the human superorganism

Review of 'Big brains and the human superorganism: Why special brains appear in hominids and other social Animals' by Dr. Niccolo Leo Caldararo, Lexington Books (2017).

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22044>

MARCELO R. SÁNCHEZ-VILLAGRA – Distinct entanglements—Human–nonhuman animal interactions and the Atlantic Divide

Review of 'The Tame and the Wild' by Marcy Norton, Harvard University Press (2024).

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22047>

Evolutionary Human Sciences

PAPERS

SERGEY GAVRILETS et al – Co-evolution of behaviour and beliefs in social dilemmas: estimating material, social, cognitive and cultural determinants

Understanding and predicting human cooperative behaviour and belief dynamics remains a major challenge both from the scientific and practical perspectives. Because of the complexity and multiplicity of material, social and cognitive factors involved, both empirical and theoretical work tends to focus only on some snippets of the puzzle. Recently, a mathematical theory has been proposed that integrates material, social and cognitive aspects of behaviour and beliefs dynamics to explain how people make decisions in social dilemmas within heterogeneous groups. Here we apply this theory in two countries, China and Spain, through four long-term behavioural experiments utilising the Common Pool Resources game and the Collective Risk game. Our results show that material considerations carry the smallest weight in decision-making, while personal norms tend to be the most important factor. Empirical and normative expectations have intermediate weight in decision-making. Cognitive dissonance, social projection, logic constraints and cultural background play important roles in both decision-making and beliefs dynamics. At the individual level, we observe differences in the weights that people assign to factors involved in the decision-making and belief updating process. We identify different types of prosociality and rule-following associated with cultural differences, various channels for the effects of messaging, and culturally dependent interactions between sensitivity to messaging and conformity. Our results can put policy and information design on firmer ground, highlighting the need for interventions tailored to the situation at hand and to individual characteristics. Overall, this work demonstrates the theoretical and practical power of the theory in providing a more comprehensive understanding of human behaviour and beliefs.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/coevolution-of-behaviour-and-beliefs-in-social-dilemmas-estimating-material-social-cognitive-and-cultural-determinants/30F73458822A8B6E49F44348DAED9D7E>

MASON L. MANNING, BILL THOMPSON & THOMAS J. H. MORGAN – Norm reinforcement, not conformity or environmental factors, is predicted to sustain cultural variation

The maintenance of cross-cultural variation and arbitrary traditions in human populations is a key question in cultural evolution. Conformist transmission, the tendency to follow the majority, was previously considered central to this phenomenon. However, recent theory indicates that cognitive biases can greatly reduce its ability to maintain traditions. Therefore, we expanded prior models to investigate two other ways that cultural variation can be sustained: payoff-biased transmission and norm reinforcement. Our findings predict that both payoff-biased transmission and reinforcement can enhance conformist transmission's ability to maintain traditions. However, payoff-biased transmission can only sustain cultural variation if it is functionally related to environmental factors. In contrast, norm reinforcement readily generates and maintains arbitrary cultural variation. Furthermore, reinforcement results in path-dependent cultural dynamics, meaning that historical traditions influence current practices, even though group behaviours have changed. We conclude that environmental variation probably plays a role in functional cultural traditions, but arbitrary cultural variation is more plausibly due to the reinforcement of norm compliance.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/norm-reinforcement-not-conformity-or-environmental-factors-is-predicted-to-sustain-cultural-variation/5D2250267B8A49D22E981EC5810F55C1>

Frontiers in Psychology

PAPERS

DEREK E. MONTGOMERY, VIRGINIA TOMPKINS & XIN FENG – The theory of mind construct in adulthood: perspective taking in relation to language and executive function

There are conflicting proposals about the underlying structure of the theory of mind (ToM) construct. The lack of clarity impedes attempts to understand relationships between ToM and other cognitive abilities. This study investigated the nature of the ToM construct and its relation to cognitive variables by administering a battery of ToM measurements along with measurements of executive function and general vocabulary to 207 (Mage = 19.26) adult participants. Associations between ToM tasks were statistically significant after controlling for covariates, but, for the most part, very weak in magnitude. The strongest relationship was between the Strange Stories and Higher-Order False Belief measurements. Previous theoretical analysis proposes those instruments are conceptually linked by a perspective taking requirement that entails representing another's mental state. Results from a factor analysis suggested an underlying ToM structure—a protagonist perspective factor. The Strange Stories, Higher-Order False Belief, and Frith-Happé Animation tasks loaded onto the factor. Its defining feature is the ascription of mental states to predict and explain protagonists' actions that take place within a narrative structure. It is related more strongly to vocabulary than executive function and it provides grounds for future research on the role of narrative processing in ToM reasoning.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1435685/full>

iScience

PAPERS

LATANÉ BULLOCK et al – Supplementary motor area in speech initiation: a large-scale intracranial EEG evaluation of stereotyped word articulation

Speech production engages a distributed network of cortical and subcortical brain regions. The supplementary motor area (SMA) has long been thought to be a key hub in coordinating across these regions to initiate voluntary movements, including speech. We analyzed direct intracranial recordings from 115 epilepsy patients as they articulated a single word in a subset of trials from a picture naming task. We aimed to characterize the temporal dynamics of SMA relative to other cortical regions. SMA and preSMA were among the first regions to activate after cue onset, peaked in activity before articulation onset, and were the earliest regions to predict trial-to-trial response time. Neural activity at single electrodes in SMA and preSMA was closely associated with speech initiation; activity began at a highly predictable time after stimulus onset and extended until speech onset for any given trial. Our results support the idea that SMA is a key node in the speech initiation network.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)02758-5](https://www.cell.com/iscience/fulltext/S2589-0042(24)02758-5)

YORAM BONNEH & CHRISTOPHER W. TYLER – The Canonical Deep Neural Network as a Model for Human Symmetry Processing

A key property of our environment is the mirror symmetry of many objects, although symmetry is an abstract global property with no definable shape template, making symmetry identification a challenge for standard template-matching algorithms. We therefore ask whether Deep Neural Networks (DNNs) trained on typical natural environmental images develop a selectivity for symmetry similar to that of the human brain. We tested a DNN trained on such typical natural images with object-free random-dot images of 1, 2 and 4 symmetry axes. There was no significant coding for symmetry in the earliest DNN layers. The strongest discriminability occurred in the first fully-connected layer, FC6, plausibly analogous to human Lateral Occipital Complex (LOC), matching many structural properties of human symmetry processing. These results support the homology between the feedforward DNN trained on natural images and the global processing of the extended visual hierarchy as it has evolved in the human brain.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)02767-6](https://www.cell.com/iscience/fulltext/S2589-0042(24)02767-6)

ESHA HALDAR, PADMINI SUBRAMANYA & AUGUSTE M.P. VON BAYERN – Automatic Imitation of Intransitive actions in macaws

Automatic imitation is the involuntary tendency of humans to copy others' actions even when counterproductive. We examined automatic imitation of intransitive actions in blue-throated macaws (*Ara glaucogularis*), employing a stimulus-response-compatibility task. After training seven macaws to perform two different actions with legs and wings upon specific hand commands, the subjects were divided into a compatible and incompatible group. We rewarded the subjects for performing the same action as the conspecific model in the compatible group and the opposite action in the incompatible group. Involuntarily imitating the demonstrated actions, the incompatible group made more errors than the compatible group and took longer to eventually respond correctly. The study provides evidence for automatic imitation of intransitive actions in non-human animals— parrots, suggesting that arbitrary action imitation facilitated by a mirror-neuron system in parrot brain may be adaptive in the ever-changing complex social environment of parrots and possibly drive cultural evolution.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)02741-X](https://www.cell.com/iscience/fulltext/S2589-0042(24)02741-X)

JUHA M. LAHNAKOSKI et al – Embodied emotions in ancient Neo-Assyrian texts revealed by bodily mapping of emotional semantics

Emotions are associated with subjective emotion-specific bodily sensations. Here, we utilized this relationship and computational linguistic methods to map a representation of emotions in ancient texts. We analyzed Neo-Assyrian texts from 934–612 BCE to discern consistent relationships between linguistic expressions related to both emotions and bodily sensations. We then computed statistical regularities between emotion terms and words referring to body parts and back-projected the resulting emotion-body part relationships on a body template, yielding bodily sensation maps for the emotions. We found consistent embodied patterns for 18 distinct emotions. Hierarchical clustering revealed four main clusters of bodily emotion categories, two clusters of mainly positive emotions, one large cluster of mainly negative emotions, and one of empathy and schadenfreude. These results reveal the historical use of embodied language pertaining to human emotions. Our data-driven tool could enable future comparisons of textual embodiment patterns across different languages and cultures across time.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)02590-2](https://www.cell.com/iscience/fulltext/S2589-0042(24)02590-2)

PAULINA KUKOFKA et al with CAROLINE SCHUPPLI – The development of social attention in orangutans: comparing peering behavior in wild and zoo-housed individuals

Social learning plays an essential role in all cultural processes, but the factors underlying its evolution remain poorly understood. To understand how socio-ecological conditions affect social learning, we compared peering behavior (i.e., close-range observation of conspecifics' activities) in wild and zoo-housed Sumatran orangutans. Using long-term data describing

over 3000 peering events (performed by 65 individuals across settings), we found similar age trajectories of peering in both settings. Moreover, immatures universally preferred to peer at older individuals and in learning-intense contexts. However, zoo-housed immatures peered more frequently, and preferably at non-mother individuals, even when social opportunities were controlled for. Therefore, whilst similarities across settings suggest that the tendency to attend to social information has hard-wired components, the differences indicate that it is also influenced by social opportunities and the necessity to learn. Our comparative approach thus provides evidence that socio-ecological factors and genetic predispositions underlie the dynamics and evolution of culture.

[https://www.cell.com/iscience/fulltext/S2589-0042\(24\)02769-X](https://www.cell.com/iscience/fulltext/S2589-0042(24)02769-X)

Journal of Anthropological Archaeology

PAPERS

IAN WATTS – Blood symbolism at the root of symbolic culture? African hunter-gatherer perspectives

At ~160 ka, near the end of our African speciation, archaeologists identify a change from sporadic to habitual use of red ochre, interpreted as 'blood-red colorant' for decorating performers' bodies during group rituals, with habitual ritual considered pre-requisite to symbolic culture's 'shared fictions' (Dapschaskas et al. 2022). This article considers the proposed motivations for such behaviour, and asks whether cross-cultural data on African hunter-gatherer ritual uses of red substances and associated beliefs can further constrain the interpretation of the archaeological finding. The comparative survey fills a basic knowledge gap. The survey's interpretation relies upon proposed relations of relevance bridging the past and present, foremost being predictions of symbolic culture derived from evolutionary models of group ritual. The main symbolic theme encountered is a metaphoric relationship between women's reproduction and men's hunting, expressed as a form of 'blood' symbolism. This is consistent with a long theoretical tradition within social anthropology, and the neo-Darwinian re-casting of that tradition by the Female Cosmetic Coalitions hypothesis, which arguably predicted the timing of habitual ochre use thirty years ago. Models aside, this article hopefully demonstrates that if evolutionary and social anthropology are to jointly address how we became a symbolic species, they will have to attend more closely to African hunter-gatherer voices.

<https://www.sciencedirect.com/science/article/pii/S0278416524000588>

Journal of the Royal Society Interface

PAPERS

TAO WEN, YU-WANG CHEN & RENAUD LAMBIOTTE – Collective effect of self-learning and social learning on language dynamics: a naming game approach in social networks

Linguistic rules form the cornerstone of human communication, enabling people to understand and interact with one another effectively. However, there are always irregular exceptions to regular rules, with one of the most notable being the past tense of verbs in English. In this work, a naming game approach is developed to investigate the collective effect of social behaviours on language dynamics, which encompasses social learning, self-learning with preference and forgetting due to memory constraints. Two features that pertain to individuals' influential ability and affinity are introduced to assess an individual's role of social influence and discount the information they communicate in the Bayesian inference-based social learning model. Our findings suggest that network heterogeneity and community structure significantly impact language dynamics, as evidenced in synthetic and real-world networks. Furthermore, self-learning significantly enhances the process of language regularization, while forgetting has a relatively minor impact. The results highlight the substantial influence of network structure and social behaviours on the transition of opinions, from consensus to polarization, demonstrating its importance in language dynamics. This work sheds new light on how individual learners adopt language rules through the lenses of complexity science and decision science, advancing our understanding of language dynamics.

<https://royalsocietypublishing.org/doi/10.1098/rsif.2024.0406>

ROOPE O. KAARONEN et al – A global cross-cultural analysis of string figures reveals evidence of deep transmission and innovation

Few cultural practices beyond language are as widespread as string figure games. Their global distribution and potential to yield insights into cultural transmission and cognition have long been noted. Yet, it remains unknown how or when this behaviour originated and to what extent shared motifs are signals of repeated innovations or deep cultural transmission. Here, we combined a global cross-cultural inventory of string figures with a novel methodology based on knot theory, which enables the unequivocal numerical coding of string figures. We performed a computational analysis of a sample of 826 figures from 92 societies around the world. Across these societies, we found 83 recurring string figure designs, some of which are regionally restricted while others display a global distribution. The cognitively opaque nature of string figure designs and their clear geographic distribution reveal processes of cultural transmission, innovation, and convergent evolution. Most strikingly, the global distribution of some figures raises the possibility of shared ancient origins.

<https://royalsocietypublishing.org/doi/10.1098/rsif.2024.0673>

Language and Cognition

PAPERS

ERCENUR ÜNAL, EZGI MAMUS & ASLI ÖZYÜREK – Multimodal encoding of motion events in speech, gesture and cognition

How people communicate about motion events and how this is shaped by language typology are mostly studied with a focus on linguistic encoding in speech. Yet, human communication typically involves an interactional exchange of multimodal signals, such as hand gestures that have different affordances for representing event components. Here, we review recent empirical evidence on multimodal encoding of motion in speech and gesture to gain a deeper understanding of whether and how language typology shapes linguistic expressions in different modalities, and how this changes across different sensory modalities of input and interacts with other aspects of cognition. Empirical evidence strongly suggests that Talmy's typology of event integration predicts multimodal event descriptions in speech and gesture and visual attention to event components prior to producing these descriptions. Furthermore, variability within the event itself, such as type and modality of stimuli, may override the influence of language typology, especially for expression of manner.

<https://www.cambridge.org/core/journals/language-and-cognition/article/multimodal-encoding-of-motion-events-in-speech-gesture-and-cognition/B1413E5A9161212E177C26759BFF1DDE>

EFSTATHIA SOROLI – How language influences spatial thinking, categorization of motion events, and gaze behavior: a cross-linguistic comparison

According to Talmy, in verb-framed languages (e.g., French), the core schema of an event (Path) is lexicalized, leaving the co-event (Manner) in the periphery of the sentence or optional; in satellite-framed languages (e.g., English), the core schema is jointly expressed with the co-event in construals that lexicalize Manner and express Path peripherally. Some studies suggest that such differences are only surface differences that cannot influence the cognitive processing of events, while others support that they can constrain both verbal and non-verbal processing. This study investigates whether such typological differences, together with other factors, influence visual processing and decision-making. English and French participants were tested in three eye-tracking tasks involving varied Manner–Path configurations and language to different degrees. Participants had to process a target motion event and choose the variant that looked most like the target (non-verbal categorization), then describe the events (production), and perform a similarity judgment after hearing a target sentence (verbal categorization). The results show massive cross-linguistic differences in production and additional partial language effects in visualization and similarity judgment patterns – highly dependent on the salience and nature of events and the degree of language involvement. The findings support a non-modular approach to language–thought relations and a fine-grained vision of the classic lexicalization/conflation theory.

<https://www.cambridge.org/core/journals/language-and-cognition/article/how-language-influences-spatial-thinking-categorization-of-motion-events-and-gaze-behavior-a-crosslinguistic-comparison/D5D6FCC7D91D98DD3D56AA3EB28F0BBE>

THERESA MATZINGER et al with PRZEMYSŁAW ŻYWCZYŃSKI & SŁAWOMIR WACEWICZ – Inherent linguistic preference outcompetes incidental alignment in cooperative partner choice

An important quality to assess in others is their cooperativeness. We hypothesized that people use linguistic markers in their partners' speech as a proxy of their cooperativeness in other tasks: specifically, we predicted that participants would prefer syntactically similar conversation partners as cooperation partners in a monetary game. We found that, indeed, participants preferably selected syntactically similar conversation partners as cooperation partners, but only when the participants could communicate using their naturally preferred constructions. In contrast, when participants were forced to communicate using dispreferred constructions, they rather cooperated with those partners that matched their natural preference than with those that matched their overt linguistic use. This pattern of results was likely driven by participants valuing representational alignment (i.e., being aligned on both linguistic features and their mental representations) more than incidental behavioral alignment (i.e., superficial convergence on similar linguistic features during interaction). This is because representational alignment is a potential indicator of group membership and may be associated with in-group benefits such as reputation, reciprocity and normative behavior. Those benefits may outweigh the benefits of simple behavioral alignment, which could be a potential indicator of others' willingness to cooperate. This has important implications for communication in intercultural settings where members of diverse linguistic groups negotiate cooperative actions.

<https://www.cambridge.org/core/journals/language-and-cognition/article/inherent-linguistic-preference-outcompetes-incidental-alignment-in-cooperative-partner-choice/5308285B5D188854B398B1A60A2CB872>

PRZEMYSŁAW ŻYWCZYŃSKI et al with SŁAWOMIR WACEWICZ & PETER GÄRDENFORS – Praxis, demonstration and pantomime: a motion capture investigation of differences in action performances

A commonly held assumption is that demonstration and pantomime differ from ordinary action in that the movements are slowed down and exaggerated to be better understood by intended receivers. This claim has, however, been based on meagre empirical support. This article provides direct evidence that the different functional demands of demonstration and pantomime result in motion characteristics that differ from those for praxic action. In the experiment, participants were dressed in motion capture suits and asked to (1) perform an action, (2) demonstrate this action so that somebody else could learn how to perform it, (3) pantomime this action without using the object so that somebody else could learn how to

perform it, and (4) pantomime this action without using the object so that somebody else could distinguish it from another action. The results confirm that actors slow down and exaggerate their movements in demonstrations and pantomimes when compared to ordinary actions.

<https://www.cambridge.org/core/journals/language-and-cognition/article/praxis-demonstration-and-pantomime-a-motion-capture-investigation-of-differences-in-action-performances/F3BC1FC80945EFAB141C24D6A3267D4D>

XINYAN KOU & JILL HOHENSTEIN – Manner, result, and intention: implications for event typology from a cognitive account of verb semantics based on fulfilment types

Verb semantics has been widely approached as a dichotomy of manner and result. However, from a cognitive perspective, manner and result are often linked by intention, as captured by the ‘fulfilment type’ property formulated in the Realisation event domain in Talmy’s event integration theory. The four ‘fulfilment types’ (intrinsic-, moot-, implied-, and attained-fulfilment) indicate different degrees of result certainty in verbs. This study investigates whether manner/result complementarity is cognitively less dichotomous and more nuanced, as the four fulfilment types in verbs could indicate more than two mental representations of verbs. Through two psycholinguistic experiments, we examine whether fulfilment types influence the cognitive salience of manner and result in novel verb meaning interpretation (Experiment 1) and the semantic relatedness between English verbs with different fulfilment types (Experiment 2). Our results demonstrate that manner and result in the mental lexicon act less like a dichotomy but more like a cline. This blur between manner and result verb statuses has consequences for a language’s typological stance in the Realisation domain and implications for how Talmyan event research should be extended beyond well-studied Motion.

<https://www.cambridge.org/core/journals/language-and-cognition/article/manner-result-and-intention-implications-for-event-typology-from-a-cognitive-account-of-verb-semantics-based-on-fulfilment-types/9F2F4568923638D3D8271426A04C35BC>

Nature

REVIEWS

ALAN C. LOVE – Great power and great responsibility: how consciousness changes the world

A vivid account of the evolution of minds will fill readers with wonder — and challenge how they think about their moral responsibility to protect the planet.

Review of ‘Living on Earth: Life, Consciousness and the Making of the Natural World’ by Peter Godfrey-Smith, William Collins (2024).

<https://www.nature.com/articles/d41586-024-03916-y>

Nature Communications Biology

PAPERS

ANDREU SÁNCHEZ-MEGÍAS et al – Wild chimpanzees remember and revisit concealed, underground army ant nest locations throughout multiple years

Chimpanzees use spatiotemporal cognition for fruit foraging by remembering tree locations and fruiting seasons. However, the spatiotemporal cognition behind exploiting other foods has rarely been studied. Here, we investigate whether chimpanzees use memory to exploit concealed, underground army ant nests. We analyse 679 chimpanzee visits to four nests recorded during five years (2018–2022) using camera traps in a savanna habitat. We explore if chimpanzees intentionally revisit nests, study how they detect ants, and assess ant availability and chimpanzee ant consumption. Nests are concealed, scarce, and intermittently reoccupied, yet chimpanzees eat ants frequently. We find that out of 34 identified chimpanzees who visit the nests, 23 revisit at least one. Chimpanzees visit nest sites significantly more often than similar sites without nests. Individuals revisit significantly sooner and inspect significantly longer nests where they have more recently encountered ants. The apes use sight, smell, taste, touch, and probing tools, to detect ants inside nests. We provide the first evidence suggesting that chimpanzees use spatial and episodic-like memory to exploit concealed social insects throughout multiple years. Our results expand our understanding of the cognitive strategies behind chimpanzee insectivory, suggesting it may have played an important role in the evolution of primate spatiotemporal cognition.

<https://www.nature.com/articles/s42003-024-07206-1>

Nature NPJ Science of Learning

PAPERS

ANDREY VYSHEDSKIY et al – Three mechanisms of language comprehension are revealed through cluster analysis of individuals with language deficits

Analysis of linguistic abilities that are concurrently impaired in individuals with language deficits allows identification of a shared underlying mechanism. If any two linguistic abilities are mediated by the same underlying mechanism, then both abilities will be absent if this mechanism is broken. Clustering techniques automatically arrange these abilities according to their co-occurrence and therefore group together abilities mediated by the same mechanism. This study builds upon the discovery of three distinct mechanisms of language comprehension in 31,845 autistic individuals¹. The current clustering

analysis of a more diverse group of individuals with language impairments resulted in the three mechanisms identical to those found previously: (1) the most-basic command-language-comprehension-mechanism; (2) the intermediate modifier-language-comprehension-mechanism mediating comprehension of color, size, and number modifiers; and (3) the most-advanced syntactic-language-comprehension-mechanism. This discovery calls for mapping of the three empirically-defined language-comprehension-mechanisms in the context of cognitive neuroscience, which is the main goal of this study.

<https://www.nature.com/articles/s41539-024-00284-0>

Nature Scientific Reports

PAPERS

MICHELE M. MULHOLLAND et al with WILLIAM D. HOPKINS – Long term impacts of early social environment on chimpanzee white matter

Early adverse rearing conditions are known to have deleterious consequences on social behavior, cognition, and brain development of both human and nonhuman primates. We analyzed archival diffusion tensor imaging (DTI) data from mother- (MR) or nursery-reared (NR) chimpanzees and used support vector machine learning to determine whether we could retrospectively classify chimpanzees as MR or NR based on white matter fractional anisotropy (FA) decades after their rearing experiences. A significant proportion of chimpanzees were correctly classified as MR and NR based on white matter fractional anisotropy (76.32%; $p = 0.004$). Voxel-based morphometry revealed that MR chimpanzees had increased FA in the splenium/isthmus of the corpus colosum and premotor cortex, while NR chimpanzees had increased FA in the thalamic region, cuneus, and lateral genu of the corpus colosum ($p < 0.01$). A subset of the NR chimpanzees participated in early social interventions, but unlike gray matter, these interventions do not explain misclassification based on white matter. These findings suggest that nursery rearing has long-term effects on both gray and white matter, but that early interventions may ameliorate the effects on gray matter only. Future research should investigate the effectiveness and relative contributions of combined social, cognitive, and nutritional interventions on brain development in nonhuman primates.

<https://www.nature.com/articles/s41598-024-81238-9>

IRIS W. HUNG & NATALIE T. FAUST – Beauty growth-mindset promotes prosocial and altruistic behavior

The effects of beauty on judgment and behavior are well-established and somewhat “unidirectional” (i.e., it seems that only beautiful people reap social benefits). In particular, a person’s beauty does not seem to have any effect on his/her own prosocial behavior. In the current research, we focus on how people relate themselves to beauty, namely beauty mindset, and how it may shape prosocial and altruistic behavior. We present 10 experiments ($N = 4,449$). Participants who hold a beauty growth-mindset (i.e., believing that beauty is improvable) donated more money to charity (vs. fixed-mindset), were more likely to get vaccinated against COVID-19 after exposure to an intervention focusing on herd-protection (vs. self-protection), and showed increased intention to engage in other forms of prosocial and altruistic behavior. Empirically, these effects are mediated by a self-perception of the ability to exert impact on others. The present research serves as a starting point for investigating how beauty growth-mindset brings profound societal effects such as promoting prosociality.

<https://www.nature.com/articles/s41598-024-82134-y>

New Scientist

NEWS

Ancient footprints show how early human species lived side by side

Footprints preserved on the shore of Lake Turkana in Kenya seem to be from two ancient human species, showing they lived there at the same time about 1.5 million years ago.

<https://www.newscientist.com/article/2458237-ancient-footprints-show-how-early-human-species-lived-side-by-side/>

PeerJ

PAPERS

DERRY TAYLOR et al with MARINA DAVILA-ROSS & KLAUS ZUBERBÜHLER – The motivation to inform others: a field experiment with wild chimpanzees

Accumulating evidence indicates that some ape species produce more alarm behaviors to potential dangers when in the presence of uninformed conspecifics. However, since previous studies presented naturalistic stimuli, the influence of prior experience could not be controlled for.

To examine this, we investigated whether apes (wild chimpanzees of the Budongo Forest, Uganda) would communicate differently about a novel danger (an unusually large spider) depending on whether they were with an uninformed conspecific. We tested nine adult males, four of which were exposed to the danger twice alone (Non-Social group), while the remaining five were exposed to the danger first alone and then in the presence of conspecifics (Social group).

We found that both alarm calling and gaze marking (i.e., persistent gaze after stimulus detection) were more persistent in the Social than Non-Social group, although the effect of condition only reached statistical significance for gaze marking, nonetheless suggesting that chimpanzees tailored their warning behavior to the presence of others, even if they were already familiar with the potential threat.

<https://peerj.com/articles/18498/>

ELLIOT HOWARD-SPINK et al with DORA BIRO – Nonadjacent dependencies and sequential structure of chimpanzee action during a natural tool-use task

Many of the complex behaviours of humans involve the production of nonadjacent dependencies between sequence elements, which in part can be generated through the hierarchical organization of sequences. To understand how these structural properties of human behaviours evolved, we can gain valuable insight from studying the sequential behaviours of nonhuman animals. Among the behaviours of nonhuman apes, tool use has been hypothesised to be a domain of behaviour which likely involves hierarchical organization, and may therefore possess nonadjacent dependencies between sequential actions. However thus far, evidence supporting hierarchical organization of great-ape tool use comes from methodologies which have been criticised in their objectivity. Additionally, the extent to which nonadjacent dependencies appear in primate action sequences during tool use has not been formally investigated. We used estimations of mutual information (MI)—a measure of dependency strength between sequence elements—to evaluate both the extent to which wild chimpanzees produce nonadjacent dependencies during a naturalistic tool-use task (nut cracking), as well as how sequences of actions are likely organized during tool use. Half of adult chimpanzees produced nonadjacent dependencies at significantly greater sequential distances than comparable, nonhierarchical Markov models once repeated actions had been accounted for. Additionally, for the majority of chimpanzees, MI decay with increasing sequential distance included a power-law relationship, which is a key indicator that the action sequences produced by chimpanzees likely entail some degree of hierarchical organization. Our analysis offered the greatest support for a system of organization where short subroutines of actions (2–8 actions long) are hierarchically arranged into longer sequences—a finding which is consistent with previous qualitative descriptions of ape tool-use behaviours. Interindividual variability was detected within our analysis in both the maximum distance dependencies were detected, and the most likely structuring mechanism for sequential action organization. We discuss these results in light of possible interindividual variation in the systems of action organization used by chimpanzees during tool use, in addition to methodological considerations for applications of MI estimations to sequential behaviours. Moreover, we discuss our main findings alongside hypotheses for the coevolution of complex syntax in language and tool-action across hominin evolutionary history.

<https://peerj.com/articles/18484/>

PLoS One

PAPERS

SHUMAILA KHAN et al – An automated approach to identify sarcasm in low-resource language

Sarcasm detection has emerged due to its applicability in natural language processing (NLP) but lacks substantial exploration in low-resource languages like Urdu, Arabic, Pashto, and Roman-Urdu. While fewer studies identifying sarcasm have focused on low-resource languages, most of the work is in English. This research addresses the gap by exploring the efficacy of diverse machine learning (ML) algorithms in identifying sarcasm in Urdu. The scarcity of annotated datasets for low-resource language becomes a challenge. To overcome the challenge, we curated and released a comparatively large dataset named Urdu Sarcastic Tweets (UST) Dataset, comprising user-generated comments from (former Twitter). Automatic sarcasm detection in text involves using computational methods to determine if a given statement is intended to be sarcastic. However, this task is challenging due to the influence of the user's behavior and attitude and their expression of emotions. To address this challenge, we employ various baseline ML classifiers to evaluate their effectiveness in detecting sarcasm in low-resource languages. The primary models evaluated in this study are support vector machine (SVM), decision tree (DT), K-Nearest Neighbor Classifier (K-NN), linear regression (LR), random forest (RF), Naïve Bayes (NB), and XGBoost. Our study's assessment involved validating the performance of these ML classifiers on two distinct datasets—the Tanz-Indicator and the UST dataset. The SVM classifier consistently outperformed other ML models with an accuracy of 0.85 across various experimental setups. This research underscores the importance of tailored sarcasm detection approaches to accommodate specific linguistic characteristics in low-resource languages, paving the way for future investigations. By providing open access to the UST dataset, we encourage its use as a benchmark for sarcasm detection research in similar linguistic contexts.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0307186>

MATTHEW SHARDLOW & PIOTR PRZYBYŁA – Deanthropomorphising NLP: Can a language model be conscious?

This work is intended as a voice in the discussion over previous claims that a pretrained large language model (LLM) based on the Transformer model architecture can be sentient. Such claims have been made concerning the LaMDA model and also concerning the current wave of LLM-powered chatbots, such as ChatGPT. This claim, if confirmed, would have serious ramifications in the Natural Language Processing (NLP) community due to wide-spread use of similar models. However, here we take the position that such a large language model cannot be conscious, and that LaMDA in particular exhibits no advances over other similar models that would qualify it. We justify this by analysing the Transformer architecture through Integrated Information Theory of consciousness. We see the claims of sentience as part of a wider tendency to use anthropomorphic language in NLP reporting. Regardless of the veracity of the claims, we consider this an opportune moment to take stock of progress in language modelling and consider the ethical implications of the task. In order to make this work helpful for readers outside the NLP community, we also present the necessary background in language modelling.

{I wish there were more differentiation in these NLP papers between “conscious of” and “conscious that I am me”. The first (non-reflexive consciousness?) seems to be a common thing in nature, evident in most tool-using animals, of which there are many; the second (reflexive consciousness?) is rare, although probably not limited to Homo sapiens. As far as I know, there is no evidence yet that an NLP model has reached the first stage.}

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0307521>

SHANE FRESNOZA et al – Partially dissociative role of the left inferior frontal gyrus and left dorsolateral prefrontal cortex in reasoning

Reasoning is the ability to formulate inferences or conclusions from available information. The two major types, deductive and inductive, are thought to rely on distinct cognitive mechanisms and recruit separate brain areas. Neuroimaging studies yield mixed results; some found the left inferior frontal gyrus (IFG) activations for deductive reasoning and the left dorsolateral prefrontal cortex (DLPFC) for inductive reasoning. This assumption was put to the test in the present study. In two double-blinded, sham-controlled experiments, high-definition transcranial direct current stimulation (HD-tDCS) was used to systematically explore the left IFG's and DLPFC's causal role in deductive and inductive reasoning. Participants with no formal training in logic judged deductive and inductive arguments before and after 10 minutes of anodal, cathodal, or sham tDCS of the left IFG (Experiment 1, n = 20) or left DLPFC (Experiment 2, n = 21). Left IFG anodal tDCS impairs reaction times (RTs) for easy categorical ($p < .001$) and propositional ($p = .025$) deductive arguments and the accuracy for easy inductive propositional arguments ($p = .003$). Meanwhile, regardless of the active stimulation conditions, left DLPFC tDCS shortens RTs (anodal: $p < .001$, cathodal: $p = .014$) and increases accuracy (anodal: $p = .029$, cathodal: $p = .001$) for difficult categorical inductive arguments, but decreases accuracy (anodal: $p = .027$, cathodal: $p < .001$) for difficult propositional inductive arguments. The overall results showed a partial dissociation of the left frontal lobe areas subserving the two types of reasoning and argument difficulty-dependent stimulation effects. This study extends knowledge of the neural basis of reasoning and hopefully inspires interventions that could augment reasoning impairments associated with normal aging and brain lesions.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0312919>

PNAS

ARTICLES

SANDEEP RAVINDRAN – Profile of Susan Goldin-Meadow

No usable summary available.

<https://www.pnas.org/doi/abs/10.1073/pnas.2421379121>

PAPERS

NEVA M. CORRIGAN, ARIEL ROKEM & PATRICIA K. KUHL – COVID-19 lockdown effects on adolescent brain structure suggest accelerated maturation that is more pronounced in females than in males

Adolescence is a period of substantial social-emotional development, accompanied by dramatic changes to brain structure and function. Social isolation due to lockdowns that were imposed because of the COVID-19 pandemic had a detrimental impact on adolescent mental health, with the mental health of females more affected than males. We assessed the impact of the COVID-19 pandemic lockdowns on adolescent brain structure with a focus on sex differences. We collected MRI structural data longitudinally from adolescents prior to and after the pandemic lockdowns. The pre-COVID data were used to create a normative model of cortical thickness change with age during typical adolescent development. Cortical thickness values in the post-COVID data were compared to this normative model. The analysis revealed accelerated cortical thinning in the post-COVID brain, which was more widespread throughout the brain and greater in magnitude in females than in males. When measured in terms of equivalent years of development, the mean acceleration was found to be 4.2 y in females and 1.4 y in males. Accelerated brain maturation as a result of chronic stress or adversity during development has been well documented. These findings suggest that the lifestyle disruptions associated with the COVID-19 pandemic lockdowns caused changes in brain biology and had a more severe impact on the female than the male brain.

<https://www.pnas.org/doi/10.1073/pnas.2403200121>

COMMENTARIES

CORDELIA FINE et al – Uncertainty of adolescent brain maturation sex difference claims

In their article, Corrigan et al. claim that COVID-19 pandemic lockdown measures gave rise to “unusually accelerated brain maturation in adolescents” and that this acceleration was “much more pronounced” in females than males. Arguing this “indicate[s] greater vulnerability of the female brain, as compared to the male brain, to the lifestyle changes resulting from pandemic lockdowns,” they draw links between accelerated maturation, reduced social interaction, and poorer mental health outcomes in females.

However, the approach taken by the authors, which divided and contrasted pre- and postpandemic samples by sex category, does not offer direct support for any of these claims or interpretations. The authors make no direct statistical comparison of the sexes. They offer no measure of the proposed mechanism of reduced social interaction (despite lockdown experiences

being diverse), the speculated outcome (increased mental health risk), nor any measure of association of either with accelerated brain maturation.

<https://www.pnas.org/doi/full/10.1073/pnas.2420724121>

GINA RIPPON – Impression management in research reporting: When effects are not really as pronounced as claimed

I would like to express several concerns about a paper recently published in PNAS. My focus is on the matter of “impression management,” the extent to which the narrative of any paper is appropriately cautious about the true significance of the findings being reported and that there is no evidence of ambiguity or potential for misunderstanding. A set of guidelines concerning this issue has recently been published. Unfortunately, this paper contains several examples that illustrate the need for such guidelines.

<https://www.pnas.org/doi/full/10.1073/pnas.2421013121>

NEVA M. CORRIGAN, ARIEL ROKEM & PATRICIA K. KUHL – Reply to Fine et al. and Rippon: Significant sex differences in accelerated cortical thinning associated with the COVID-19 lockdowns

Letters by Rippon and Fine et al. express thoughts about the description of the methodology, the robustness of the inferences, and the focus on sex differences in our recent paper.

...

The authors of both letters state that no direct comparison was made of the statistical significance of the sex difference in cortical thinning. What we had originally tested and reported in our paper about sex differences focused on the number of brain regions showing statistically significant accelerated cortical thinning (30 regions for females vs. 2 regions for males), and sex differences in the magnitude of modeled “brain age acceleration” (4.2 y for females vs. 1.4 y for males), with confidence intervals. Effect sizes were greater than 0.5 for 29 regions in the female brain but only 4 regions in the male brain. We have now performed additional statistical tests and report their results here. To test for a sex difference in the model-assigned z-scores (data in figure 4), we performed a two-way mixed effects ANOVA with brain region as a within-subject factor and sex as a between-subject factor and found a significant main effect of sex ($P = 0.034$). We also performed a two-tailed t test of sex difference in brain age acceleration (data in figure 5) and this also revealed a significant sex difference ($P = 0.046$).

<https://www.pnas.org/doi/full/10.1073/pnas.2421468121>

Proceedings of the Royal Society B

PAPERS

GEORGE BRILL, MARTA MIRAZON-LAHR & MARK DYBLE – Extensive locomotor versatility across a global sample of hunter-gatherer societies

Studies of hunter-gatherer locomotion inform a wide range of academic fields, from human behavioural ecology and hominin evolution to sports science and evolutionary health. Despite celebrated ethnographic examples of hunter-gatherer locomotor proficiency in running, climbing, swimming and diving, there has been limited systematic analysis of cross-cultural variation in hunter-gatherer locomotor versatility. We conducted a systematic cross-cultural analysis of hunter-gatherer locomotion, coding locomotor behaviour from over 900 ethnographic documents. Our results indicated that high levels of locomotor versatility are common among hunter-gatherers, and that proficiency of running, climbing, swimming and diving is found in societies across the geographical and ecological breadth of the sample. Each locomotor modality was found to be relevant not only to food acquisition but also in leisure, ritual and violent conflict. Our results also indicated the prevalence of both male and female engagement within each locomotor modality, with climbing being the only modality to possess a notable bias towards male engagement in a substantial proportion of societies. The widespread habituality and functional significance of diverse locomotor proficiency in hunter-gatherers suggests that locomotor versatility represents a dimension of human adaptive lability, playing a major role in the ability of hunter-gatherers to thrive in almost every global ecology.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2024.2553>

B. J. R. VAN DER VLEUTEN et al – Context-dependent rhythmicity in chimpanzee displays

Rhythm is an important component of human language and music production. Rhythms such as isochrony (intervals spaced equally in time) are also present in vocalizations of certain non-human species, including several birds and mammals. This study aimed to identify rhythmic patterns with music-based methods within the display behaviour of chimpanzees (*Pan troglodytes*), humans' closest living relatives. Behavioural observations were conducted on individuals from two zoo-housed colonies. We found isochronous rhythms in vocal (e.g. pants, grunts and hoots) as well as in motoric (e.g. swaying and stomping) behavioural sequences. Among individuals, variation was found in the duration between onsets of behavioural elements, resulting in individual-specific tempi. Despite this variation in individual tempi, display sequences were consistently structured with stable, isochronous rhythms. Overall, directed displays targeted at specific individuals were less isochronous than undirected displays. The presence of rhythmic patterns across two independent colonies of chimpanzees suggests that underlying mechanisms for rhythm production may be shared between humans and non-human primates. This shared mechanism indicates that the cognitive requirements for rhythm production potentially preceded human music and language evolution.

Royal Society Open Science

PAPERS

A. E. HUGHES, H. R. STATHAM & A. D. F. CLARKE – The effect of target scarcity on visual foraging

Previous studies have investigated the effect of target prevalence in combination with the effect of explicit target value on human visual foraging strategies, though the conclusions have been mixed. Some find that individuals have a bias towards high-value targets even when these targets are scarcer, while other studies find that this bias disappears when those targets are scarcer. In this study, we tested for a bias for scarce targets using standard feature versus conjunction visual foraging tasks, without an explicit value being given. Based on the idea of commodity theory and implicit value, we hypothesized that participants would show a scarcity bias. The bias was investigated using a Bayesian statistical model which has been developed for predicting target-by-target foraging behaviours. However, we found no evidence of a scarcity bias in our experiment, suggesting that participants did not inherently find rarer targets more rewarding.

<https://royalsocietypublishing.org/doi/10.1098/rsos.240060>

Science Advances

PAPERS

JAMES C. CHATTERS et al – Mammoth featured heavily in Western Clovis diet

Ancient Native American ancestors (Clovis) have been interpreted as either specialized megafauna hunters or generalist foragers. Supporting data are typically indirect (toolkits, associated fauna) or speculative (models, actualistic experiments). Here, we present stable isotope analyses of the only known Clovis individual, the 18-month-old Anzick child, to directly infer maternal protein diet. Using comparative fauna from this region and period, we find that mammoth was the largest contributor to Clovis diet, followed by elk and bison/camel, while the contribution of small mammals was negligible, broadly consistent with the Clovis zooarchaeological record. When compared with second-order consumers, the Anzick-1 maternal diet is closest to that of scimitar cat, a mammoth specialist. Our findings are consistent with the Clovis megafaunal specialist model, using sophisticated technology and high residential mobility to subsist on the highest ranked prey, an adaptation allowing them to rapidly expand across the Americas south of the Pleistocene ice sheets.

<https://www.science.org/doi/10.1126/sciadv.adr3814>

FRANÇOIS LANOË et al – Late Pleistocene onset of mutualistic human/canid (*Canis spp.*) relationships in subarctic Alaska

Large canids (wolves, dogs, and coyote) and people form a close relationship in northern (subarctic and arctic) socioecological systems. Here, we document the antiquity of this bond and the multiple ways it manifested in interior Alaska, a region key to understanding the peopling of the Americas and early northern lifeways. We compile original and existing genomic, isotopic, and osteological canid data from archaeological, paleontological, and modern sites. Results show that in contrast to canids recovered in non-anthropogenic contexts, canids recovered in association with human occupations are markedly diverse. They include multiple species and intraspecific lineages, morphological variation, and diets ranging from terrestrial to marine. This variation is expressed along both geographic and temporal gradients, starting in the terminal Pleistocene with canids showing high marine dietary estimates. This paper provides evidence of the multiple ecological relationships between canids and people in the north—from predation, probable commensalism, and taming, to domestication—and of their early onset.

<https://www.science.org/doi/10.1126/sciadv.ads1335>

RUNNAN CAO et al – Domain-specific representation of social inference by neurons in the human amygdala and hippocampus

Inferring the intentions and emotions of others from behavior is crucial for social cognition. While neuroimaging studies have identified brain regions involved in social inference, it remains unknown whether performing social inference is an abstract computation that generalizes across different stimulus categories or is specific to certain stimulus domain. We recorded single-neuron activity from the medial temporal lobe (MTL) and the medial frontal cortex (MFC) in neurosurgical patients performing different types of inferences from images of faces, hands, and natural scenes. Our findings indicate distinct neuron populations in both regions encoding inference type for social (faces, hands) and nonsocial (scenes) stimuli, while stimulus category was itself represented in a task-general manner. Uniquely in the MTL, social inference type was represented by separate subsets of neurons for faces and hands, suggesting a domain-specific representation. These results reveal evidence for specialized social inference processes in the MTL, in which inference representations were entangled with stimulus type as expected from a domain-specific process.

<https://www.science.org/doi/10.1126/sciadv.ado6166>

EYAL ROZENFELD & MOSHE PARNAS – Neuronal circuit mechanisms of competitive interaction between action-based and coincidence learning

How information is integrated across different forms of learning is crucial to understanding higher cognitive functions. Animals form classic or operant associations between cues and their outcomes. It is believed that a prerequisite for operant conditioning is the formation of a classical association. Thus, both memories coexist and are additive. However, the two memories can result in opposing behavioral responses, which can be disadvantageous. We show that *Drosophila* classical and operant olfactory conditioning rely on distinct neuronal pathways leading to different behavioral responses. Plasticity in both pathways cannot be formed simultaneously. If plasticity occurs at both pathways, interference between them occurs and learning is disrupted. Activity of the navigation center is required to prevent plasticity in the classical pathway and enable it in the operant pathway. These findings fundamentally challenge hierarchical views of operant and classical learning and show that active processes prevent coexistence of the two memories.

<https://www.science.org/doi/10.1126/sciadv.adq3016>

Trends in Cognitive Sciences**PAPERS****DANIEL REDHEAD – Social structure and the evolutionary ecology of inequality**

From rising disparities in income to limited socio-political representation for minority groups, inequality is a topic of perennial interest for contemporary society. Research in the evolutionary sciences has started to investigate how social structure allows inequality to evolve, but is developing in silo from existing work in the social and cognitive sciences. I synthesise these literatures to present a theoretical framework of how and why cultural and ecological conditions can create social structure that either produces or constrains inequality. According to this framework, such conditions dictate the costs and benefits of cooperation that shape individuals' social preferences and resulting behaviours. These behaviours aggregate to produce distinct structures of a society's social networks, which generate different levels of inequality observed across societies.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(24\)00289-4](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00289-4)

Trends in Ecology and Evolution**ARTICLES****S. HELENE RICHTER et al – Animal research revisited – the case of behavioural studies**

Animal research is a matter of intense public debate, with some people supporting and some opposing it. Drawing from examples of behavioural biology, we argue that such an 'all-or-nothing' debate falls short. We highlight the potential of better science communication and tailored ethics assessments to foster a more nuanced view.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(24\)00287-8](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(24)00287-8)

Trends in Neurosciences**PAPERS****CHRISTOPHE VARIN & ALBAN DE KERCHOVE D'EXAERDE – Neuronal encoding of behaviors and instrumental learning in the dorsal striatum**

The dorsal striatum is instrumental in regulating motor control and goal-directed behaviors. The classical description of the two output pathways of the dorsal striatum highlights their antagonistic control over actions. However, recent experimental evidence implicates both pathways and their coordinated activities during actions. In this review, we examine the different models proposed for striatal encoding of actions during self-paced behaviors and how they can account for evidence harvested during goal-directed behaviors. We also discuss how the activation of striatal ensembles can be reshaped and reorganized to support the formation of instrumental learning and behavioral flexibility. Future work integrating these considerations may resolve controversies regarding the control of actions by striatal networks.

[https://www.cell.com/trends/neurosciences/abstract/S0166-2236\(24\)00225-X](https://www.cell.com/trends/neurosciences/abstract/S0166-2236(24)00225-X)

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