

EAORC BULLETIN 1,087 – 14 April 2024

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NOTICES

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 – Changing views of the relationship between Neanderthals and Modern Humans*In Nicholas J. Conard (ed.), When Neanderthals and Modern Humans Met, Tübingen Publications in Prehistory, 5-20 (2006).***NICHOLAS J. CONARD – Changing views of the relationship between Neanderthals and Modern Humans**

Prior to the 1980s comparatively little research addressed the interaction between Neanderthals and modern humans. In recent years the realization that modern humans evolved in Africa and colonized the territories occupied by Neanderthals has led to a major shift in paleoanthropological research. The interaction between Neanderthals and modern populations is now a central focus of study. The running debate on the evolution of cultural modernity results in large measure from the need to explain what behavioral patterns separated modern humans from Neanderthals and led to the latter group's extinction. This introduction presents ways of linking Darwinian approaches with social and economic analyses of Paleolithic populations to develop refutable models and scenarios for what occurred when Neanderthals and modern humans met. These approaches lead to explanations for the extinction of Neanderthals and the spread of modern humans.

https://www.academia.edu/6809465/CHANGING_VIEWS_OF_THE_RELATIONSHIP_BETWEEN_NEANDERTHALS_AND_MODERN_HUMANS

ACADEMIA.EDU – Speaking after Robert G. Bednarik*In Giriraj Kumar (ed.), Study of Palaeoart of the World, Research India Press, 25-30 (2024).***KALYAN KUMAR CHAKRAVARTY – Speaking after Robert G. Bednarik**

This note is derived from Bednarik's observations, distilled, and synthesized from the record of his lifelong research all over the world, for working out scientifically falsifiable methods of recognition, dating, conservation and appreciation of the meaning and shape of rock art in India. He asks for locally evolved methods of combining and mutually validating scientific and ethnographic study of rock art, still preserved by hill and forest-based communities in India, away from postulates of priority and superiority of European rock art, developed in South Western Europe, and propagated as universally valid. He favours multi-linear evolution of human language, as it is implied by the global diversity in palaeoart, and does not see the Franco-Cantabrian or any other early tradition as evidence for a uni-linear evolution. He proposes greater human capacity for symboling and abstraction in the prehistoric past, because of the growing atrophy of human brain, and emphasizes the feasibility of using bio neurological constants for understanding the similar human mind and condition, transcending phylogenetic diversity. The importance and methods of rock art study in India are explained in this note, after Bednarik's research and suggestions, for providing clues to the human language in the prehistoric past.

https://www.academia.edu/116623446/SPEAKING_AFTER_ROBERT_G_BEDNARIK

NEWS**NATURE BRIEFING – Survival of the nicest**

'Survival of the fittest' doesn't require all species to be hardwired for competition, argues evolutionary biologist Jonathan Silvertown in *Selfish Genes to Social Beings*. His examples, from lichen to pirates, show that cooperation is ubiquitous — although it ultimately evolved for the 'selfish' reason that mutual benefits are better than working alone. "If this seems heartless, it's a reflection of the human tendency to apply human moral frameworks to biological phenomena," writes reviewer and public health researcher Jonathan Goodman.

Review of 'Selfish Genes to Social Beings: A Cooperative History of Life' by Jonathan Silvertown, Oxford Univ. Press (2024)

<https://www.nature.com/articles/d41586-024-00999-5>

NATURE BRIEFING – The social intelligence of animals

"I've brought apes a little closer to humans but I've also brought humans down a bit," said primatologist Frans de Waal in 2014. Building on careful observations of primates' unfettered behaviour, de Waal's research suggested that the biggest intellectual challenge for chimpanzees lay in their complex social lives, leading to the study of social intelligence in apes and other species. His and others' studies of aggression, reconciliation, imitation and learning have progressively narrowed the perceived gap between humans and other animals, writes psychologist Andrew Whiten. de Waal was equally comfortable with peer-reviewed research, popular science books and TED talks, and he was unafraid to tackle thorny topics like sex and gender. de Waal has died, aged 75.

<https://www.nature.com/articles/d41586-024-01071-y>

SCIENCEADVISER – Bones from across Europe suggest Stone Age ritual killings

A method of killing used by the modern-day Italian Mafia may have been widespread across Stone Age Europe. In what is called *incaprettamento*, victims are placed on their stomachs with a rope around their ankles and neck, and the weight of their legs slowly strangles them. "It's really a horror," says forensic anthropologist Eric Crubézy.

In a paper published yesterday in *Science Advances*, Crubézy and his colleagues argue that the unusual postures of two women at a 5600-year-old site in France called Saint-Paul-Trois-Châteaux indicate they died in this way—and that the killings were part of a larger pattern of ritual violence among Europe's early farmers. From studying excavation reports from Poland

to the Iberian Peninsula, the team found 20 more examples of skeletons in incappretamento -style positions. All were buried during the Neolithic, between 5500 B.C.E. and 3500 B.C.E., and many of the sites also held evidence of fertility rituals. Crubézy and his co-authors think the graves record human sacrifices and testify to a belief or ritual shared across cultures in the Neolithic. Some colleagues are skeptical of a common belief system—or even that the burials necessarily indicate human sacrifice. Whatever the nature of the ritual, it seems to have gone out of style by 3500 B.C.E., when Neolithic farmers turned their energies to building massive stone monuments like Stonehenge.

<https://www.science.org/content/article/it-s-really-horror-bones-across-europe-suggest-stone-age-ritual-killings>

SCIENCE.ORG NEWS – ‘It’s really a horror.’ Bones from across Europe suggest Stone Age ritual killings

Researchers see signs of a continentwide tradition of human sacrifice.

<https://www.science.org/content/article/it-s-really-horror-bones-across-europe-suggest-stone-age-ritual-killings>

PUBLICATIONS

Current Biology

ARTICLES

MICHAEL GROSS – Of whales and women

The long period of post-reproductive survival is a highly unusual feature of our species. We now know of five other mammals that share this trait — all of them are toothed whales. Still, comparative studies can help us to understand how the menopause evolved in our ancestors.

[https://www.cell.com/current-biology/abstract/S0960-9822\(24\)00371-3](https://www.cell.com/current-biology/abstract/S0960-9822(24)00371-3)

PAPERS

ALEXIS N. BOSSELER et al with ANDREW N. MELTZOFF & PATRICIA K. KUHL – Infants’ brain responses to social interaction predict future language growth

In face-to-face interactions with infants, human adults exhibit a species-specific communicative signal. Adults present a distinctive “social ensemble”: they use infant-directed speech (parentese), respond contingently to infants’ actions and vocalizations, and react positively through mutual eye-gaze and smiling. Studies suggest that this social ensemble is essential for initial language learning. Our hypothesis is that the social ensemble attracts attentional systems to speech and that sensorimotor systems prepare infants to respond vocally, both of which advance language learning. Using infant magnetoencephalography (MEG), we measure 5-month-old infants’ neural responses during live verbal face-to-face (F2F) interaction with an adult (social condition) and during a control (nonsocial condition) in which the adult turns away from the infant to speak to another person. Using a longitudinal design, we tested whether infants’ brain responses to these conditions at 5 months of age predicted their language growth at five future time points. Brain areas involved in attention (right hemisphere inferior frontal, right hemisphere superior temporal, and right hemisphere inferior parietal) show significantly higher theta activity in the social versus nonsocial condition. Critical to theory, we found that infants’ neural activity in response to F2F interaction in attentional and sensorimotor regions significantly predicted future language development into the third year of life, more than 2 years after the initial measurements. We develop a view of early language acquisition that underscores the centrality of the social ensemble, and we offer new insight into the neurobiological components that link infants’ language learning to their early brain functioning during social interaction.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(24\)00317-8](https://www.cell.com/current-biology/fulltext/S0960-9822(24)00317-8)

SCARLETT R. HOWARD & ANDREW B. BARRON – Understanding the limits to animal cognition

The thriving field of comparative cognition examines the behaviour of diverse animals in cognitive terms. Comparative cognition research has primarily focused on the abilities of animals — what tasks they can do — rather than on the limits of their cognition — tasks that exceed an animal’s cognitive abilities. We propose that understanding and identifying cognitive limits is as important as demonstrating the capacities of animal minds. Here, we identify challenges that have deterred the study of cognitive limits related to epistemic, practical and publication problems. The epistemic problem is concerned with how we can confidently infer a cognitive limit from null or negative results. The practical problem is how can we be certain our research has identified a cognitive limit rather than failures in tasks due to methodological or experimental design issues. The publication problem outlines the publication bias toward positive and exciting results over negative or null results in animal cognition. We propose solutions to these three challenges and examples of how to conduct research to confidently identify and confirm cognitive limits in animals. We believe a refocus on the cognitive limits of animals is the next step in the field of comparative cognition. Knowing the limits to the intelligence of different animals will aid us in appreciating the diversity of animal intelligence, and will resolve outstanding questions of how cognition evolves.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(24\)00218-5](https://www.cell.com/current-biology/fulltext/S0960-9822(24)00218-5)

DARBY M. LOSEY et al – Learning leaves a memory trace in motor cortex

How are we able to learn new behaviors without disrupting previously learned ones? To understand how the brain achieves this, we used a brain-computer interface (BCI) learning paradigm, which enables us to detect the presence of a memory of one behavior while performing another. We found that learning to use a new BCI map altered the neural activity that monkeys produced when they returned to using a familiar BCI map in a way that was specific to the learning experience. That is, learning left a “memory trace” in the primary motor cortex. This memory trace coexisted with proficient performance under the familiar map, primarily by altering neural activity in dimensions that did not impact behavior. Forming memory traces might be how the brain is able to provide for the joint learning of multiple behaviors without interference.

[https://www.cell.com/current-biology/abstract/S0960-9822\(24\)00298-7](https://www.cell.com/current-biology/abstract/S0960-9822(24)00298-7)

MAUD MOUGINOT et al – Differences in expression of male aggression between wild bonobos and chimpanzees

Researchers investigating the evolution of human aggression look to our closest living relatives, bonobos (*Pan paniscus*) and chimpanzees (*Pan troglodytes*), as valuable sources of comparative data. Males in the two species exhibit contrasting patterns: male chimpanzees sexually coerce females and sometimes kill conspecifics, whereas male bonobos exhibit less sexual coercion and no reported killing. Among the various attempts to explain these species differences, the self-domestication hypothesis proposes negative fitness consequences of male aggression in bonobos. Nonetheless, the extent to which these species differ in overall rates of aggression remains unclear due to insufficiently comparable observation methods. We used 14 community-years of focal follow data—the gold standard for observational studies—to compare rates of male aggression in 3 bonobo communities at the Kokolopori Bonobo Reserve, Democratic Republic of Congo, and 2 chimpanzee communities at Gombe National Park, Tanzania. As expected, given that females commonly outrank males, we found that bonobos exhibited lower rates of male-female aggression and higher rates of female-male aggression than chimpanzees. Surprisingly, we found higher rates of male-male aggression among bonobos than chimpanzees even when limiting analyses to contact aggression. In both species, more aggressive males obtained higher mating success. Although our findings indicate that the frequency of male-male aggression does not parallel species difference in its intensity, they support the view that contrary to male chimpanzees, whose reproductive success depends on strong coalitions, male bonobos have more individualistic reproductive strategies.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(24\)00253-7](https://www.cell.com/current-biology/fulltext/S0960-9822(24)00253-7)

eLife**NEWS****Understanding autism**

Experiments using cells from people with different types of autism spectrum disorders reveal shared disruption of fundamental developmental processes and a key signaling pathway.

<https://elifesciences.org/digests/82809/understanding-autism>

PAPERS**BINGJIANG LYU et al with WILLIAM D MARSLEN-WILSON – Finding structure during incremental speech comprehension**

A core aspect of human speech comprehension is the ability to incrementally integrate consecutive words into a structured and coherent interpretation, aligning with the speaker’s intended meaning. This rapid process is subject to multidimensional probabilistic constraints, including both linguistic knowledge and non-linguistic information within specific contexts, and it is their interpretative coherence that drives successful comprehension. To study the neural substrates of this process, we extract word-by-word measures of sentential structure from BERT, a deep language model, which effectively approximates the coherent outcomes of the dynamic interplay among various types of constraints. Using representational similarity analysis, we tested BERT parse depths and relevant corpus-based measures against the spatiotemporally resolved brain activity recorded by electro-/magnetoencephalography when participants were listening to the same sentences. Our results provide a detailed picture of the neurobiological processes involved in the incremental construction of structured interpretations. These findings show when and where coherent interpretations emerge through the evaluation and integration of multifaceted constraints in the brain, which engages bilateral brain regions extending beyond the classical fronto-temporal language system. Furthermore, this study provides empirical evidence supporting the use of artificial neural networks as computational models for revealing the neural dynamics underpinning complex cognitive processes in the brain.

<https://elifesciences.org/articles/89311>

ANDREA I. LUPPI et al – A Synergistic Workspace for Human Consciousness Revealed by Integrated Information Decomposition

A central goal of neuroscience is to understand how the brain orchestrates information from multiple input streams into a unified conscious experience. Here, we address two fundamental questions: how is the human information-processing architecture functionally organised, and how does its organisation support consciousness? We combine network science and a rigorous information-theoretic notion of synergy to delineate a “synergistic global workspace”, comprising gateway regions that gather synergistic information from specialised modules across the brain. This information is then integrated within the workspace and widely distributed via broadcaster regions. Through functional MRI analysis, we show that gateway regions of

the synergistic workspace correspond to the brain's default mode network, whereas broadcasters coincide with the executive control network. Demonstrating the empirical relevance of our proposed architecture for neural information processing, we show that loss of consciousness due to general anaesthesia or disorders of consciousness corresponds to a diminished ability of the synergistic workspace to integrate information, which is restored upon recovery. Thus, loss of consciousness coincides with a breakdown of information integration within the synergistic workspace of the human brain. This work contributes to conceptual and empirical reconciliation between two prominent scientific theories of consciousness, the Global Neuronal Workspace and Integrated Information Theory. Taken together, this work provides a new perspective on the role of prominent resting-state networks within the human information-processing architecture, while also advancing our understanding of how the human brain supports consciousness through the synergistic integration of information.

<https://elifesciences.org/reviewed-preprints/88173>

XINLIN HOU et al – Neonatal sensitivity to vocal emotions: A milestone at 37 weeks of gestational age

Emotional responsiveness in neonates, particularly their ability to discern vocal emotions, plays an evolutionarily adaptive role in human communication and adaptive behaviors. The developmental trajectory of emotional sensitivity in neonates is a crucial area of inquiry for understanding the foundations of early social-emotional functioning. However, the precise onset of this sensitivity in neonates and its relationship with gestational age (GA) remain subjects of investigation. In a study involving 120 healthy neonates categorized into six groups based on their GA (ranging from 35 and 40 weeks), we delved into their emotional responses to vocal stimuli. These stimuli encompassed disyllables with happy and neutral prosodies, alongside acoustically matched nonvocal control sounds. The assessments occurred during natural sleep states in neonates, utilizing the odd-ball paradigm and event-related potentials. The results unveil a distinct developmental milestone at 37 weeks GA, marking the point at which neonates exhibit heightened perceptual acuity for emotional vocal expressions. This newfound ability is substantiated by the presence of the mismatch response, akin to an initial form of adult mismatch negativity, elicited in response to positive emotional vocal prosody. Notably, this perceptual shift's specificity becomes evident when no such discrimination is observed in acoustically matched control sounds. Neonates born before 37 weeks GA do not display this level of discrimination ability. This critical developmental milestone carries significant implications for our understanding of early social-emotional development, shedding light on the role of gestational age in shaping early perceptual abilities. Moreover, it introduces the potential for a valuable screening tool in the context of autism, which is characterized by atypical social-emotional functions. This study makes a substantial contribution to the broader field of developmental neuroscience and holds promise for early intervention in neurodevelopmental disorders.

<https://elifesciences.org/reviewed-preprints/95393>

YUJIANG WANG et al – Neuro-evolutionary evidence for a universal fractal primate brain shape

The cerebral cortex displays a bewildering diversity of shapes and sizes across and within species. Despite this diversity, we present a universal multi-scale description of primate cortices. We show that all cortical shapes can be described as a set of nested folds of different sizes. As neighbouring folds are gradually merged, the cortices of 11 primate species follow a common scale-free morphometric trajectory, that also overlaps with over 70 other mammalian species. Our results indicate that all cerebral cortices are approximations of the same archetypal fractal shape with a fractal dimension of $df = 2.5$. Importantly, this new understanding enables a more precise quantification of brain morphology as a function of scale. To demonstrate the importance of this new understanding, we show a scale-dependent effect of ageing on brain morphology. We observe a more than four-fold increase in effect size (from 2 standard deviations to 8 standard deviations) at a spatial scale of approximately 2 mm compared to standard morphological analyses. Our new understanding may therefore generate superior biomarkers for a range of conditions in the future.

<https://elifesciences.org/reviewed-preprints/92080>

Evolutionary Anthropology

PAPERS

ILARIA PRETELLI et al – Child and adolescent foraging: New directions in evolutionary research

Young children and adolescents in subsistence societies forage for a wide range of resources. They often target child-specific foods, they can be very successful foragers, and they share their produce widely within and outside of their nuclear family. At the same time, while foraging, they face risky situations and are exposed to diseases that can influence their immune development. However, children's foraging has largely been explained in light of their future (adult) behavior. Here, we reinterpret findings from human behavioral ecology, evolutionary medicine and cultural evolution to center foraging children's contributions to life history evolution, community resilience and immune development. We highlight the need to foreground immediate alongside delayed benefits and costs of foraging, including inclusive fitness benefits, when discussing children's food production from an evolutionary perspective. We conclude by recommending that researchers carefully consider children's social and ecological context, develop cross-cultural perspectives, and incorporate children's foraging into Indigenous sovereignty discourse.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.22020>

Frontiers for Young Minds

PAPERS

EBEN DAGGETT & MICHAEL C. HOUT – What is Similarity and How Can Scientists Measure It?

Which is closer to a dog: a cat or a fish? Easy! The cat is closer. What you may not have noticed here, is that we asked which is closer, not more similar. It does not matter which term we use because people usually understand that the term closer means more similar when used in questions like this. People often talk about similarity between objects as if this idea could be thought of as a distance between two (or more) items. It feels very natural to use the language of distance (words like closer, near, or far) to describe similarity. The tendency to understand similarity as a distance is useful to scientists because, as you know, it is very easy to measure distances as numbers (like measuring the distance between two points using a ruler). In this article, we will tell you how psychologists measure similarity and use those numbers to explore how the mind works. <https://kids.frontiersin.org/articles/10.3389/frym.2024.1239117>

Frontiers in Human Neuroscience

PAPERS

YI ZHENG – Prototype theory and the importance of literary form for moral imagination

Department of English Language and Literature, Hong Kong Baptist University, Hong Kong, Hong Kong SAR, China
Prototype theory, which argues that categories have graded (and thus fuzzy) membership based on prototypes, has been used as cognitive evidence to support moral particularism because if categories (in moral rules) only have fuzzy conceptual boundaries, moral rules are not enough for moral judgment, as specific situations also need to be considered to determine how these fuzzy categories should be understood, which is what moral particularism believes. The importance of literature for ethics, especially for moral imagination, has also been extensively discussed because literature can provide vivid examples for us to imagine different moral dilemmas, the consequences of different moral choices, and the feelings of different people facing different situations. Martha Nussbaum specifically argues that the literary form is the only adequate form to imagine certain complex moral situations. By analyzing concrete literary examples as well as the related ethical discussions and empirical findings, this article argues that, building on Nussbaum's argument, prototype theory can serve as a cognitive basis for the importance of literary form for moral imagination, because the literary form's tolerance of ambiguity suits how we ambiguously categorize the world.

<https://www.frontiersin.org/articles/10.3389/fnhum.2024.1329628/full>

PHILIPPE BLACHE – A neuro-cognitive model of comprehension based on prediction and unification

Most architectures and models of language processing have been built upon a restricted view of language, which is limited to sentence processing. These approaches fail to capture one primordial characteristic: efficiency. Many facilitation effects are known to be at play in natural situations such as conversation (shallow processing, no real access to the lexicon, etc.) without any impact on the comprehension. In this study, on the basis of a new model integrating into a unique architecture, we present these facilitation effects for accessing the meaning into the classical compositional architecture. This model relies on two mechanisms, prediction and unification, and provides a unique architecture for the description of language processing in its natural environment.

<https://www.frontiersin.org/articles/10.3389/fnhum.2024.1356541/full>

CORNELIA HERBERT – Brain-computer interfaces and human factors: the role of language and cultural differences—Still a missing gap?

Brain-computer interfaces (BCIs) aim at the non-invasive investigation of brain activity for supporting communication and interaction of the users with their environment by means of brain-machine assisted technologies. Despite technological progress and promising research aimed at understanding the influence of human factors on BCI effectiveness, some topics still remain unexplored. The aim of this article is to discuss why it is important to consider the language of the user, its embodied grounding in perception, action and emotions, and its interaction with cultural differences in information processing in future BCI research. Based on evidence from recent studies, it is proposed that detection of language abilities and language training are two main topics of enquiry of future BCI studies to extend communication among vulnerable and healthy BCI users from bench to bedside and real world applications. In addition, cultural differences shape perception, actions, cognition, language and emotions subjectively, behaviorally as well as neuronally. Therefore, BCI applications should consider cultural differences in information processing to develop culture- and language-sensitive BCI applications for different user groups and BCIs, and investigate the linguistic and cultural contexts in which the BCI will be used.

<https://www.frontiersin.org/articles/10.3389/fnhum.2024.1305445/full>

Frontiers in Neurology

PAPERS

G. ANGELOPOULOU et al – Investigating silent pauses in connected speech: Integrating linguistic, neuropsychological, and neuroanatomical perspectives across narrative tasks in post-stroke aphasia

Silent pauses are regarded as integral components of the temporal organization of speech. However, it has also been hypothesized that they serve as markers for internal cognitive processes, including word access, monitoring, planning, and memory functions. Although existing evidence across various pathological populations underscores the importance of investigating silent pauses' characteristics, particularly in terms of frequency and duration, there is a scarcity of data within the domain of post-stroke aphasia.

The primary objective of the present study is to scrutinize the frequency and duration of silent pauses in two distinct narrative tasks within a cohort of 32 patients with chronic post-stroke aphasia, in comparison with a control group of healthy speakers. Subsequently, we investigate potential correlation patterns between silent pause measures, i.e., frequency and duration, across the two narrative tasks within the patient group, their performance in neuropsychological assessments, and lesion data.

Our findings showed that patients exhibited a higher frequency of longer-duration pauses in both narrative tasks compared to healthy speakers. Furthermore, within-group comparisons revealed that patients tended to pause more frequently and for longer durations in the picture description task, while healthy participants exhibited the opposite trend. With regard to our second research question, a marginally significant interaction emerged between performance in semantic verbal fluency and the narrative task, in relation to the location of silent pauses—whether between or within clauses—predicting the duration of silent pauses in the patient group. However, no significant results were observed for the frequency of silent pauses. Lastly, our study identified that the duration of silent pauses could be predicted by distinct Regions of Interest (ROIs) in spared tissue within the left hemisphere, as a function of the narrative task.

Overall, this study follows an integrative approach of linguistic, neuropsychological and neuroanatomical data to define silent pauses in connected speech, and illustrates interrelations between cognitive components, temporal aspects of speech, and anatomical indices, while it further highlights the importance of studying connected speech indices using different narrative tasks.

<https://www.frontiersin.org/journals/neurology/articles/10.3389/fneur.2024.1347514/full>

Frontiers in Psychology

PAPERS

XUEYAO PAN, BINGQIAN LIANG & XI LI – Flexible and fine-grained simulation of speed in language processing

According to the embodied cognition theory, language comprehension is achieved through mental simulation. This account is supported by a number of studies reporting action simulations during language comprehension. However, which details of sensory-motor experience are included in these simulations is still controversial. Here, three experiments were carried out to examine the simulation of speed in action language comprehension. Experiment 1 adopted a lexical decision task and a semantic similarity judgment task on isolated fast and slow action verbs. It has been shown that fast action verbs were processed significantly faster than slow action verbs when deep semantic processing is required. Experiment 2 and Experiment 3 investigated the contextual influence on the simulation of speed, showing that the processing of verbs, either depicting fast actions or neutral actions, would be slowed down when embedded in the slow action sentences. These experiments together demonstrate that the fine-grained information, speed, is an important part of action representation and can be simulated but may not in an automatic way. Moreover, the speed simulation is flexible and can be modulated by the context.

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1333598/full>

Heliyon

PAPERS

WADII BOULILA et al – A Transformer-based Approach Empowered by a Self-Attention Technique for Semantic Segmentation in Remote Sensing

Semantic segmentation of Remote Sensing (RS) images involves the classification of each pixel in a satellite image into distinct and non-overlapping regions or segments. This task is crucial in various domains, including land cover classification, autonomous driving, and scene understanding. While deep learning has shown promising results, there is limited research that specifically addresses the challenge of processing fine details in RS images while also considering the high computational demands. To tackle this issue, we propose a novel approach that combines convolutional and transformer architectures. Our design incorporates convolutional layers with a low receptive field to generate fine-grained feature maps for small objects in very high-resolution images. On the other hand, transformer blocks are utilized to capture contextual information from the input. By leveraging convolution and self-attention in this manner, we reduce the need for extensive downsampling and enable the network to work with full-resolution features, which is particularly beneficial for handling small objects. Additionally, our approach eliminates the requirement for vast datasets, which is often necessary for purely transformer-based networks. In our experimental results, we demonstrate the effectiveness of our method in generating local and

contextual features using convolutional and transformer layers, respectively. Our approach achieves a mean dice score of 80.41%, outperforming other well-known techniques such as UNet, Fully-Connected Network (FCN), Pyramid Scene Parsing Network (PSP Net), and the recent Convolutional vision Transformer (CvT) model, which achieved mean dice scores of 78.57%, 74.57%, 73.45%, and 62.97% respectively, under the same training conditions and using the same training dataset.

[https://www.cell.com/heliyon/fulltext/S2405-8440\(24\)05427-6](https://www.cell.com/heliyon/fulltext/S2405-8440(24)05427-6)

Mind & Language

PAPERS

LUCIEN BAUMGARTNER – The pragmatic view on dual character concepts and expressions

This article introduces a new pragmatic framework for dual character concepts and their expressions, offering an alternative to the received lexical-semantic view. On the prevalent lexical-semantic view, expressions such as “philosopher” or “scientist” are construed as lexical polysemes, comprising both a descriptive and a normative dimension. Thereby, this view prioritizes established norms, neglecting normative expressions emerging in specific contexts. In contrast, the pragmatic view integrates pragmatic modulation as a central element in explaining context-dependent dual character concepts and expressions. This not only accounts for a wider range of phenomena but also addresses several theoretical shortcomings of the lexical view.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12505>

Nature Communications Psychology

PAPERS

CAOIMHE O'REILLY et al – Strategic attitude expressions as identity performance and identity creation in interaction

We assess the strategic alignment of attitudes and the active construction of attitude-based identity across two studies. Study one assessed the twitter response (hashtags in English) to the war in Ukraine for five months after Russia's first invasion of Ukraine 2022 (N = 8149). Results demonstrated that individuals publicly expressed hashtags similar to others close to them in the followership network, showing their support for Ukraine and condemnation of the Russian invasion in qualitatively different ways. Study two was a preregistered Prolific experiment with geographical European participants ran in September, 2022 (N = 1368). Results demonstrated that attitude interaction with ingroup members motivated interactants towards attitude alignment, and attitude alignment strengthened the identification that motivated the alignment in the first place. Results suggest that attitude expression is performative and constrained by one's group relationship with one's audience and the definition of social identity can be constrained by opinion-based identity performance.

<https://www.nature.com/articles/s44271-024-00076-7>

Nature Human Behaviour

ARTICLES

ANDREA I. LUPPI – What anaesthesia reveals about human brains and consciousness

The combination of general anaesthesia and neuroimaging holds unique potential for catalysing integrative and translational discovery about human brains and consciousness. By spanning molecular, cognitive and clinical neuroscience, anaesthesia provides a bridge from molecules to mind across species.

<https://www.nature.com/articles/s41562-024-01860-5>

Nature Reviews Neuroscience

PAPERS

EVELINA FEDORENKO, ANNA A. IVANOVA & TAMAR I. REGEV – The language network as a natural kind within the broader landscape of the human brain

Language behaviour is complex, but neuroscientific evidence disentangles it into distinct components supported by dedicated brain areas or networks. In this Review, we describe the ‘core’ language network, which includes left-hemisphere frontal and temporal areas, and show that it is strongly interconnected, independent of input and output modalities, causally important for language and language-selective. We discuss evidence that this language network plausibly stores language knowledge and supports core linguistic computations related to accessing words and constructions from memory and combining them to interpret (decode) or generate (encode) linguistic messages. We emphasize that the language network works closely with, but is distinct from, both lower-level — perceptual and motor — mechanisms and higher-level systems of knowledge and reasoning. The perceptual and motor mechanisms process linguistic signals, but, in contrast to the language network, are sensitive only to these signals' surface properties, not their meanings; the systems of knowledge and reasoning (such as the system that supports social reasoning) are sometimes engaged during language use but are not language-selective. This Review lays a foundation both for in-depth investigations of these different components of the language processing pipeline and for probing inter-component interactions.

<https://www.nature.com/articles/s41583-024-00802-4>

Nature Scientific Reports

PAPERS

REBECCA RADIC et al – The role of cerebellum in learned vocal communication in adult songbirds

Injury, tumors, ischemia, and lesions in the cerebellum show the involvement of this region in human speech. The association of the cerebellum with learned birdsong has only been identified recently. Cerebellar dysfunction in young songbirds causes learning disabilities, but its role in adult songbirds has not been established. The aim of this study was to investigate the role of the deep cerebellar nuclei (DCN) in adult birdsong. We created bilateral excitotoxic lesions in the DCN of adult male zebra finches (*Taeniopygia guttata*) and recorded their songs for up to 4 months. Using magnetic resonance imaging (MRI) and immunohistochemistry, we validated the lesion efficacy. We found that the song duration significantly increased from 14 weeks post-op; the increase in duration was caused by a greater number of introductory notes as well as a greater number of syllables sung after the introductory notes. On the other hand, the motif duration decreased from 8 weeks after DCN lesions were induced, which was due to faster singing of syllables, not changes in inter-syllable interval length. DCN lesions also caused a decrease in the fundamental frequency of syllables. In summary, we showed that DCN lesions influence the temporal and acoustic features of birdsong. These results suggest that the cerebellum influences singing in adult songbirds.

<https://www.nature.com/articles/s41598-024-58569-8>

New Scientist

NEWS

Left-handed monkeys prompt rethink about evolution of right-handedness

A popular idea links primates living on the ground with a tendency for right-handedness, but findings from urban langurs in India cast doubt on the idea.

<https://www.newscientist.com/article/2425718-left-handed-monkeys-prompt-rethink-about-evolution-of-right-handedness/>

Philosophical Transactions of the Royal Society B

PAPERS

SHUMON T. HUSSAIN & CHRIS BAUMANN – The human side of biodiversity: coevolution of the human niche, palaeo-synanthropy and ecosystem complexity in the deep human past

Today's biodiversity crisis fundamentally threatens the habitability of the planet, thus ranking among the primary human challenges of our time. Much emphasis is currently placed on the loss of biodiversity in the Anthropocene, yet these debates often portray biodiversity as a purely natural phenomenon without much consideration of its human dimensions and frequently lack long-term vistas. This paper offers a deep-time perspective on the key role of the evolving human niche in ecosystem functioning and biodiversity dynamics. We summarize research on past hunter–gatherer ecosystem contributions and argue that human–environment feedback systems with important biodiversity consequences are probably a recurrent feature of the Late Pleistocene, perhaps with even deeper roots. We update current understandings of the human niche in this light and suggest that the formation of palaeo-synanthropic niches in other animals proffers a powerful model system to investigate recursive interactions of foragers and ecosystems. Archaeology holds important knowledge here and shows that ecosystem contributions vary greatly in relation to different human lifeways, some of which are lost today. We therefore recommend paying more attention to the intricate relationship between biodiversity and cultural diversity, contending that promotion of the former depends on fostering the latter.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0021>

PNAS

ARTICLES

GERALD G. CARTER – Modelling the evolution and formation of animal friendship

No summary available.

<https://www.pnas.org/doi/abs/10.1073/pnas.2403318121>

Proceedings of the Royal Society B

PAPERS

ALEXANDER J. STEWART, CHARLIE PILGRIM & NICHOLA J. RAIHANI – Resolving selfish and spiteful interdependent conflict

Interdependence occurs when individuals have a stake in the success or failure of others, such that the outcomes experienced by one individual also generate costs or benefits for others. Discussion on this topic has typically focused on positive interdependence (where gains for one individual result in gains for another) and on the consequences for cooperation. However, interdependence can also be negative (where gains for one individual result in losses for another), which can spark conflict. In this article, we explain when negative interdependence is likely to arise and, crucially, the role played by (mis)perception in shaping an individual's understanding of their interdependent relationships. We argue that, owing to the difficulty in accurately perceiving interdependence with others, individuals might often be mistaken about the

stake they hold in each other's outcomes, which can spark needless, resolvable forms of conflict. We then discuss when and how reducing misperceptions can help to resolve such conflicts. We argue that a key mechanism for resolving interdependent conflict, along with better sources of exogenous information, is to reduce reliance on heuristics such as stereotypes when assessing the nature of our interdependent relationships.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2024.0295>

Science Advances

PAPERS

RACHITH AIYAPPA, ALESSANDRO FLAMMINI & YONG-YEOL AHN – Emergence of simple and complex contagion dynamics from weighted belief networks

Social contagion is a ubiquitous and fundamental process that drives individual and social changes. Although social contagion arises as a result of cognitive processes and biases, the integration of cognitive mechanisms with the theory of social contagion remains an open challenge. In particular, studies on social phenomena usually assume contagion dynamics to be either simple or complex, rather than allowing it to emerge from cognitive mechanisms, despite empirical evidence indicating that a social system can exhibit a spectrum of contagion dynamics—from simple to complex—simultaneously. Here, we propose a model of interacting beliefs, from which both simple and complex contagion dynamics can organically arise. Our model also elucidates how a fundamental mechanism of complex contagion—resistance—can come about from cognitive mechanisms.

<https://www.science.org/doi/10.1126/sciadv.adh4439>

BERTRAND LUDES et al – A ritual murder shaped the Early and Middle Neolithic across Central and Southern Europe

In the Rhône Valley's Middle Neolithic gathering site of Saint-Paul-Trois-Châteaux (France), the positioning of two females within a structure aligned with the solstices is atypical. Their placement (back and prone) under the overhang of a silo in front of a third in a central position suggests a ritualized form of homicidal ligature strangulation. The first occurrence dates back to the Mesolithic, and it is from the Early Neolithic of Central Europe that the practice expands, becoming a sacrificial rite associated with an agricultural context in the Middle Neolithic. Examining 20 cases from 14 sites spanning nearly two millennia from Eastern Europe to Catalonia reveals the evolution of this ritual murder practice.

<https://www.science.org/doi/10.1126/sciadv.adl3374>

Trends in Cognitive Sciences

PAPERS

JUNYI CHU, JOSHUA B. TENENBAUM & LAURA E. SCHULZ – In praise of folly: flexible goals and human cognition

Humans often pursue idiosyncratic goals that appear remote from functional ends, including information gain. We suggest that this is valuable because goals (even prima facie foolish or unachievable ones) contain structured information that scaffolds thinking and planning. By evaluating hypotheses and plans with respect to their goals, humans can discover new ideas that go beyond prior knowledge and observable evidence. These hypotheses and plans can be transmitted independently of their original motivations, adapted across generations, and serve as an engine of cultural evolution. Here, we review recent empirical and computational research underlying goal generation and planning and discuss the ways that the flexibility of our motivational system supports cognitive gains for both individuals and societies.

[https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613\(24\)00059-7](https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00059-7)

Trends in Neurosciences

PAPERS

ALBRECHT STROH et al – The selfish network: how the brain preserves behavioral function through shifts in neuronal network state

Neuronal networks possess the ability to regulate their activity states in response to disruptions. How and when neuronal networks turn from physiological into pathological states, leading to the manifestation of neuropsychiatric disorders, remains largely unknown. Here, we propose that neuronal networks intrinsically maintain network stability even at the cost of neuronal loss. Despite the new stable state being potentially maladaptive, neural networks may not reverse back to states associated with better long-term outcomes. These maladaptive states are often associated with hyperactive neurons, marking the starting point for activity-dependent neurodegeneration. Transitions between network states may occur rapidly, and in discrete steps rather than continuously, particularly in neurodegenerative disorders. The self-stabilizing, metastable, and noncontinuous characteristics of these network states can be mathematically described as attractors. Maladaptive attractors may represent a distinct pathophysiological entity that could serve as a target for new therapies and for fostering resilience.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(24\)00021-3](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(24)00021-3)

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