

EAORC BULLETIN 1,015 – 27 November 2022

CONTENTS

NOTICES	3
PUBLICATION ALERTS.....	3
EAORC NEWS – Free Advent e-calendars.....	3
NEWS	3
SAPIENS – Monogamy. Grandmas. Milk. The Evolution of Childhood Is Very Strange.....	3
SAPIENS – The Neanderthal Throat—Did Neanderthals Speak?	3
SAPIENS – The Revolutionary Genius of Neanderthals.....	3
SAPIENS – Did Neanderthals Make Art?	3
SOCIETY FOR SCIENCE – Rats can bob their heads to the beat.....	4
SOCIETY FOR SCIENCE – Long considered loners, many marsupials may have complex social lives.....	4
SOCIETY FOR SCIENCE – Carvings on Australia’s boab trees reveal a generation’s lost history.....	4
THE CONVERSATION – The real Paleo diet: how ancient humans actually prepared food.....	4
PUBLICATIONS	4
American Journal of Biological Anthropology	4
REVIEWS	4
CARA OCOBOCK & MICHAEL A. LITTLE – The biology of human adaptability.....	4
Animal Behaviour.....	4
PAPERS	4
HIRUNI SAMADI et al with LARS CHITTKA – Do bumble bees play?.....	4
C. VILETTE et al – Network formation during social integration in juvenile vervet monkeys.....	4
Cell.....	5
PAPERS	5
RILEY J. MANGAN et al – Adaptive sequence divergence forged new neurodevelopmental enhancers in humans	5
Current Biology	5
ARTICLES	5
MICHAEL GROSS – Neanderthals come to life	5
SUSANA Q. LIMA – Social behavior: Closing the gap for close encounters.....	5
eLife.....	5
PAPERS	5
YU-CHI CHEN et al – The individuality of shape asymmetries of the human cerebral cortex	5
Evolutionary Anthropology	6
PAPERS	6
CHENG LIU & DIETRICH STOUT – Inferring cultural reproduction from lithic data: A critical review	6
REVIEWS	6
KEVIN D. HUNT – Critical theory, evolutionary theory, and testosterone.....	6
Frontiers for Young Minds.....	6
PAPERS	6
KERRYN A. WARREN, TERRENCE B. RITZMAN & REBECCA R. ACKERMANN – What Would the Child of a Human and a Neanderthal Look Like?	6
Frontiers in Human Neuroscience	6
PAPERS	6
MARK N. WALLACE et al – The large numbers of minicolumns in the primary visual cortex of humans, chimpanzees and gorillas are related to high visual acuity	6
Frontiers in Psychology	7
PAPERS	7
MARIA PAPHITI & KURT EGGERS – Cognitive flexibility in younger and older children who stutter.....	7
MARIA PAPHITI, EIRA JANSSON-VERKASALO & KURT EGGERS – Complex response inhibition and cognitive flexibility in school-aged Cypriot-Greek-speaking children who stutter.....	7
STEFAN HEIM, STELLA POLYAK & KATJA HUßMANN – Mimicking effects of auditory verbal hallucinations on language production at the level of words, sentences and stories.....	7
MAURIZIO CASARRUBEA et al – Structural analyses in the study of behavior: From rodents to non-human primates.....	7
Nature	8
NEWS	8

Prehistoric rubbish hints that early cooks cared about flavour	8
Nature Communications	8
PAPERS	8
RYAN SCHACHT et al – Adult sex ratios: causes of variation and implications for animal and human societies	8
ANDREA QUAGLIARIELLO – Ancient oral microbiomes support gradual Neolithic dietary shifts towards agriculture.....	8
JAN J. KREIDER et al – Resource sharing is sufficient for the emergence of division of labour	8
Nature Italy	9
ARTICLES	9
MARTA PATERLINI – For mice, altruism starts in the amygdala.....	9
Nature Molecular Psychiatry	9
PAPERS	9
YING XIONG et al – Social isolation and the brain: effects and mechanisms.....	9
Nature Reviews Neuroscience	9
PAPERS	9
DELARAM FARZANFAR et al – From cognitive maps to spatial schemas	9
Nature Reviews Psychology	9
PAPERS	9
MATTHEW J. HORNSEY et al – Individual, intergroup and nation-level influences on belief in conspiracy theories.....	9
Nature Scientific Data	10
PAPERS	10
SHAONAN WANG et al – An fMRI Dataset for Concept Representation with Semantic Feature Annotations	10
Nature Scientific Reports	10
PAPERS	10
SLAWOMIR WACEWICZ et al – The adaptive significance of human scleral brightness: an experimental study.....	10
JACOPO TURINI & MELISSA LE-HOA VÕ – Hierarchical organization of objects in scenes is reflected in mental representations of objects.....	10
SHUAI WANG et al – Graph theoretical analysis reveals the functional role of the left ventral occipito-temporal cortex in speech processing.....	10
NADIAH P. KRISTENSEN, HISASHI OHTSUKI & RYAN A. CHISHOLM – Ancestral social environments plus nonlinear benefits can explain cooperation in human societies	11
SIMON A. PARFITT, MARK D. LEWIS & SILVIA M. BELLO – Taphonomic and technological analyses of Lower Palaeolithic bone tools from Clacton-on-Sea, UK	11
THOMAS KROKER et al – Noninvasive stimulation of the ventromedial prefrontal cortex modulates rationality of human decision-making	11
FRANK SIROCKO et al – Thresholds for the presence of glacial megafauna in central Europe during the last 60,000 years	11
MARIANNE DESCHAMPS et al with JOÃO ZILHÃO – Organization of residential space, site function variability, and seasonality of activities among MIS 5 Iberian Neandertals.....	12
ELADIO MONTERO-PORRAS et al – Fast deliberation is related to unconditional behaviour in iterated Prisoners’ Dilemma experiments.....	12
Neuron	12
PAPERS	12
ASAF GILBOA & MORRIS MOSCOVITCH – No consolidation without representation: Correspondence between neural and psychological representations in recent and remote memory	12
New Scientist	12
NEWS	12
Modern humans evolved a 'selfish' X chromosome after Africa exodus	12
ARTICLES	13
ANDREA VALENTINO – The hunt for the lost ancestral language of Europe and southern Asia	13
PLoS One	13
PAPERS	13
KILIAN OLLIVIER et al – Structural invariants and semantic fingerprints in the “ego network” of words	13
ANDREW M. ROBBINS et al – Population dynamics of western gorillas at Mbeli Bai.....	13
HIDENORI KOMATSU et al – Searching for the universality of nudging: A cross-cultural comparison of the information effects of reminding people about familial support.....	13
PNAS	14
PAPERS	14
CLAUDIA WILKE et al with KATIE E. SLOCOMBE – Declarative referential gesturing in a wild chimpanzee (<i>Pan troglodytes</i>)	14
Science Advances	14
PAPERS	14
BENJAMIN PITT et al with STEVEN T. PIANTADOSI – Different reference frames on different axes: Space and language in indigenous Amazonians	14
JESSICA TAUBERT et al – A broadly tuned network for affective body language in the macaque brain	14
Trends in Cognitive Sciences	14
PAPERS	14

JAMES B. HEALD, MÁTÉ LENGYEL & DANIEL M. WOLPERT – Contextual inference in learning and memory.....	14
ARIELLE S. KELLER et al – Hierarchical functional system development supports executive function.....	15
Trends in Neurosciences	15
ARTICLES.....	15
NICOLE C. RUST & JOSEPH E. LEDOUX – The tricky business of defining brain functions.....	15
PAPERS.....	15
NORA MALIKA ROÛAST & MONIKA SCHÖNAUER – Continuously changing memories: a framework for proactive and non-linear consolidation ..	15
M. BELÉN PARDI, ANNA SCHROEDER & JOHANNES J. LETZKUS – Probing top-down information in neocortical layer 1.....	15
SUBSCRIBE to the EAORC Bulletin	15
UNSUBSCRIBE from the EAORC Bulletin	15
PRODUCED BY AND FOR THE EAORC EMAIL GROUP.....	16

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.

EAORC NEWS – Free Advent e-calendars

I have 20 copies of the Jacquie Lawson Advent e-calendar to give away (<https://www.jacquelawson.com/advent>). Just send your email address to martin.edwardes@btoopenworld.com and I will activate a copy for you. You will receive an email giving details of how to set up the advent calendar on your machine – the process is easy, I’ve just set up my own copy. Details of what you get are on the Jacquie Lawson page (see above).

NEWS

SAPIENS – Monogamy. Grandmas. Milk. The Evolution of Childhood Is Very Strange.

In the animal kingdom, humans are a peculiar species. For one, we are among less than 10 percent of species on the planet that are largely monogamous. Drawing from her new book, *Growing Up Human: The Evolution of Childhood*, bioarchaeologist Brenna Hassett explores this and other strange facts about human childhood, parenthood, and grandparents.

<https://sapiens.us11.list-manage.com/track/click?u=80f6cf678900daf984bf763b7&id=e7e76a3e81&e=dc0eff6180>

SAPIENS – The Neanderthal Throat—Did Neanderthals Speak?

The first two pages of Claire Cameron’s novel *The Last Neanderthal* contain a glossary—a handful of words used by the family of Neanderthals at the center of the story. This imaginary language helps to paint a rich picture of Neanderthal life within the fictional narrative, but it makes a massive assumption about a question still much debated by researchers: Did Neanderthals speak?

<https://www.sapiens.org/biology/did-neanderthals-speak/>

SAPIENS – The Revolutionary Genius of Neanderthals

FOR THE LAST dozen years or so, Geico Insurance has run commercials featuring Neanderthals in modern contexts. The story line varies, but the take-home point does not: Switching to Geico is so easy that “even a cave man can do it,” says the tag line. The Neanderthal’s feelings are invariably hurt, and a stereotype gets perpetuated. Do Neanderthals really deserve such derision?

<https://www.sapiens.org/culture/neanderthals-levallois-technique/>

SAPIENS – Did Neanderthals Make Art?

As a Neanderthal researcher, I’m familiar with the stereotypes of *Homo neanderthalensis*: dull, unintelligent, lacking the imagination to do more than bash each other on the head. They just sat around, gnawing on mammoth, awaiting their inevitable extinction. So, in 2018, I was excited when I saw a headline announcing “It’s Official: Neanderthals Created Art.” I quickly found the scientific article and read that new evidence from Spain had dated art in three caves at more than 65,000 years old. The only people in Europe at that time were Neanderthals!

<https://www.sapiens.org/archaeology/did-neanderthals-make-art/>

SOCIETY FOR SCIENCE – Rats can bob their heads to the beat

Rats' rhythmic response to human music doesn't mean they like to dance, but it may shed light on how brains evolved to perceive rhythm.

<http://click.societyforscience->

[email.com/?qs=de73a88a9ad4bc2ad986fa437be1e8f282b502006a6d5e846ced73daf59763ef7ee28cdbd3a2822db27f857a988fb4b3eff1119e52a19b5d3e477348b37c24d5](http://click.societyforscience-email.com/?qs=de73a88a9ad4bc2ad986fa437be1e8f282b502006a6d5e846ced73daf59763ef7ee28cdbd3a2822db27f857a988fb4b3eff1119e52a19b5d3e477348b37c24d5)

SOCIETY FOR SCIENCE – Long considered loners, many marsupials may have complex social lives

Some marsupials may be more sociable than previously thought, opening the door to a possible deep legacy of social organization systems in mammals.

<http://click.societyforscience->

[email.com/?qs=de73a88a9ad4bc2aed819e06ddba43d667dc248c15d765cf53f1e234799ac77f8fb4bb3118818215eb731474e612702c8dba1f33b90391fc0cd6e57b3514bb27](http://click.societyforscience-email.com/?qs=de73a88a9ad4bc2aed819e06ddba43d667dc248c15d765cf53f1e234799ac77f8fb4bb3118818215eb731474e612702c8dba1f33b90391fc0cd6e57b3514bb27)

SOCIETY FOR SCIENCE – Carvings on Australia's boab trees reveal a generation's lost history

Archaeologists and an Aboriginal family are working together to rediscover a First Nations group's lost connections to the land.

<http://click.societyforscience->

[email.com/?qs=eb65774a005782fee1ef2483a38a0dca28f250b8d1c13d48d48f2364d1ed4aadcf060755547399fe1cd5cf09ed92ea49b1a30d0b77dfe3af0fafdab39b94e017](http://click.societyforscience-email.com/?qs=eb65774a005782fee1ef2483a38a0dca28f250b8d1c13d48d48f2364d1ed4aadcf060755547399fe1cd5cf09ed92ea49b1a30d0b77dfe3af0fafdab39b94e017)

THE CONVERSATION – The real Paleo diet: how ancient humans actually prepared food

New study shows Neanderthals and Homo Sapiens had a taste for sharp and bitter food.

<https://theconversationuk.cmail20.com/t/r-l-tjtkltuk-khhililahlh-u/>

PUBLICATIONS

American Journal of Biological Anthropology

REVIEWS

CARA OCOBOCK & MICHAEL A. LITTLE – The biology of human adaptability

Review of 'The biology of human adaptability', Edited by Paul T. Baker & Joseph S. Weiner, Clarendon Press, 1967.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24644>

Animal Behaviour

PAPERS

HIRUNI SAMADI et al with LARS CHITKA – Do bumble bees play?

A variety of animals have been found to interact with and manipulate inanimate objects 'just for fun', that is, to play. Most clear examples of object play come from mammals and birds. However, whether insects interact with inanimate objects as a form of play has never been systematically examined. Here, we show that rolling of wooden balls by bumble bees, *Bombus terrestris*, fulfils behavioural criteria for animal play and is akin to play in other animals. We found that ball rolling (1) did not contribute to immediate survival strategies, (2) was intrinsically rewarding, (3) differed from functional behaviour in form, (4) was repeated but not stereotyped, and (5) was initiated under stress-free conditions. Through the design of the experiment and with the support of behavioural observations, we excluded the possibilities that ball rolling was driven by exploration for food, clutter clearing or mating. Similar to vertebrate play, we also found age and sex differences for ball rolling by bumble bees: younger bees rolled more balls than older bees and male bees rolled individual balls for longer durations than females. We explicitly show that ball rolling is itself a rewarding activity. After being trained to find freely movable balls in one of two differently coloured chambers, bees showed a preference for the colour of the chamber where they had rolled balls. Our results contribute to the question of sentience in insects and lend further support for the existence of positive affective states in these animals.

<https://www.sciencedirect.com/science/article/pii/S0003347222002366>

C. VILETTE et al – Network formation during social integration in juvenile vervet monkeys

Understanding the development of social relationships, or the process of socialization, can provide insights into the processes by which social network structures emerge and vary across species. In this analysis, we investigated the process of network formation from a developmental perspective using data from three groups of wild vervet monkeys, *Chlorocebus pygerythrus*. We used a dynamic social network approach that allowed us to capture patterns of social change over time. Specifically, we considered the temporal dynamics of two separate interaction networks, spatial and grooming associations, and investigated these patterns between the sexes. We used these data to test predictions derived from a developmental

framework on relationship formation put forward by Kohn (2019, *Animal Behaviour*, 154, 1–6). We found that females and males differed in their grooming patterns but were similar in their spatial associations. Furthermore, spatial proximity ego-networks showed seasonal patterns, whereas grooming ego-networks did not. When all relevant centrality measures were considered in concert, we found evidence to suggest that a distinctive network structure forms across the course of development, with ego-networks composed of few strong ties and many weak ties, regardless of behaviour and sex. However, these networks were not produced according to the processes described by Kohn (2019), perhaps because Kohn's framework is concerned mainly with network composition and not structure. Overall, our results provide evidence for social niche construction across development, with the formation of a core social 'bubble' of strong ties that can provide a consistent and predictable immediate social environment. More broadly, these patterns suggest that network formation is a process of ongoing adjustment to the social environment, and not an attempt to meet an optimal end goal.

<https://www.sciencedirect.com/science/article/abs/pii/S0003347222002792>

Cell

PAPERS

RILEY J. MANGAN et al – Adaptive sequence divergence forged new neurodevelopmental enhancers in humans

Searches for the genetic underpinnings of uniquely human traits have focused on human-specific divergence in conserved genomic regions, which reflects adaptive modifications of existing functional elements. However, the study of conserved regions excludes functional elements that descended from previously neutral regions. Here, we demonstrate that the fastest-evolved regions of the human genome, which we term "human ancestor quickly evolved regions" (HAQERs), rapidly diverged in an episodic burst of directional positive selection prior to the human-Neanderthal split, before transitioning to constraint within hominins. HAQERs are enriched for bivalent chromatin states, particularly in gastrointestinal and neurodevelopmental tissues, and genetic variants linked to neurodevelopmental disease. We developed a multiplex, single-cell in vivo enhancer assay to discover that rapid sequence divergence in HAQERs generated hominin-unique enhancers in the developing cerebral cortex. We propose that a lack of pleiotropic constraints and elevated mutation rates poised HAQERs for rapid adaptation and subsequent susceptibility to disease.

[https://www.cell.com/cell/fulltext/S0092-8674\(22\)01358-7](https://www.cell.com/cell/fulltext/S0092-8674(22)01358-7)

Current Biology

ARTICLES

MICHAEL GROSS – Neanderthals come to life

Although the populations of Neanderthals and Denisovans are extinct, their genetic heritage is increasingly relevant to modern humans, as the Nobel Prize awarded to Svante Pääbo has highlighted. An increasing number of genetic studies also shed light on the lives they lived.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)01755-9](https://www.cell.com/current-biology/fulltext/S0960-9822(22)01755-9)

SUSANA Q. LIMA – Social behavior: Closing the gap for close encounters

Social touch can launch a cascade of emotions with enormous impact on the development and maintenance of emotional, cognitive and social functioning. A recent study identifies a novel pathway that facilitates physical contact via its direct impact on brain circuits controlling social behavior.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)01630-X](https://www.cell.com/current-biology/fulltext/S0960-9822(22)01630-X)

eLife

PAPERS

YU-CHI CHEN et al – The individuality of shape asymmetries of the human cerebral cortex

Asymmetries of the cerebral cortex are found across diverse phyla and are particularly pronounced in humans, with important implications for brain function and disease. However, many prior studies have confounded asymmetries due to size with those due to shape. Here, we introduce a novel approach to characterize asymmetries of the whole cortical shape, independent of size, across different spatial frequencies using magnetic resonance imaging data in three independent datasets. We find that cortical shape asymmetry is highly individualized and robust, akin to a cortical fingerprint, and identifies individuals more accurately than size-based descriptors, such as cortical thickness and surface area, or measures of inter-regional functional coupling of brain activity. Individual identifiability is optimal at coarse spatial scales (~37 mm wavelength), and shape asymmetries show scale-specific associations with sex and cognition, but not handedness. While unihemispheric cortical shape shows significant heritability at coarse scales (~65 mm wavelength), shape asymmetries are determined primarily by subject-specific environmental effects. Thus, coarse-scale shape asymmetries are highly personalized, sexually dimorphic, linked to individual differences in cognition, and are primarily driven by stochastic environmental influences.

<https://elifesciences.org/articles/75056>

Evolutionary Anthropology

PAPERS

CHENG LIU & DIETRICH STOUT – Inferring cultural reproduction from lithic data: A critical review

The cultural reproduction of lithic technology, long an implicit assumption of archaeological theories, has garnered increasing attention over the past decades. Major debates ranging from the origins of the human culture capacity to the interpretation of spatiotemporal patterning now make explicit reference to social learning mechanisms and cultural evolutionary dynamics. This burgeoning literature has produced important insights and methodological innovations. However, this rapid growth has sometimes led to confusion and controversy due to an under-examination of underlying theoretical and methodological assumptions. The time is thus ripe for a critical assessment of progress in the study of the cultural reproduction of lithic technology. Here we review recent work addressing the evolutionary origins of human culture and the meaning of artifact variation at both intrasite and intersite levels. We propose that further progress will require a more extended and context-specific evolutionary approach to address the complexity of real-world cultural reproduction.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21964>

REVIEWS

KEVIN D. HUNT – Critical theory, evolutionary theory, and testosterone

Review of 'Testosterone: An unauthorized biography' by R.M. Jordan-Young & K. Karkazis, Harvard University Press (2019); and 'The story of testosterone, the hormone that dominates and divides us' by C. Hooven, Henry Holt (2021).

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21960>

Frontiers for Young Minds

PAPERS

KERRY A. WARREN, TERENCE B. RITZMAN & REBECCA R. ACKERMANN – What Would the Child of a Human and a Neanderthal Look Like?

Long ago there were many different species (or kinds) of humans. These included our ancestors, as well as another group, called the Neanderthals, who went extinct and no longer exist. Neanderthals looked very different from us: big muscles, big brains, and no chins. In 2010, scientists managed to study the DNA (genetic code) from these ancient Neanderthals and found, with surprise, that our ancestors had children with them. Neanderthal DNA exists in many people alive today. But we still did not know what the children of humans and Neanderthals (known as hybrids) would look like. By looking at the hybrid children of different kinds of mice, scientists realized that hybrids look very strange indeed. Based on this research, scientists think that human-Neanderthal children would have large heads (even bigger than the Neanderthals) and that their faces would look a little more like humans than Neanderthals.

<https://kids.frontiersin.org/articles/10.3389/frym.2022.652490>

Frontiers in Human Neuroscience

PAPERS

MARK N. WALLACE et al – The large numbers of minicolumns in the primary visual cortex of humans, chimpanzees and gorillas are related to high visual acuity

Minicolumns are thought to be a fundamental neural unit in the neocortex and their replication may have formed the basis of the rapid cortical expansion that occurred during primate evolution. We sought evidence of minicolumns in the primary visual cortex (V-1) of three great apes, three rodents and representatives from three other mammalian orders: Eulipotyphla (European hedgehog), Artiodactyla (domestic pig) and Carnivora (ferret). Minicolumns, identified by the presence of a long bundle of radial, myelinated fibers stretching from layer III to the white matter of silver-stained sections, were found in the human, chimpanzee, gorilla and guinea pig V-1. Shorter bundles confined to one or two layers were found in the other species but represent modules rather than minicolumns. The inter-bundle distance, and hence density of minicolumns, varied systematically both within a local area that might represent a hypercolumn but also across the whole visual field. The distance between all bundles had a similar range for human, chimpanzee, gorilla, ferret and guinea pig: most bundles were 20–45 μm apart. By contrast, the space between bundles was greater for the hedgehog and pig (20–140 μm). The mean density of minicolumns was greater in tangential sections of the gorilla and chimpanzee (1,243–1,287 bundles/ mm^2) than in human (314–422 bundles/ mm^2) or guinea pig (643 bundles/ mm^2). The minicolumnar bundles did not form a hexagonal lattice but were arranged in thin curving and branched bands separated by thicker bands of neuropil/somata. Estimates of the total number of modules/minicolumns within V-1 were strongly correlated with visual acuity.

<https://www.frontiersin.org/articles/10.3389/fnana.2022.1034264/full>

MARIA PAPHITI & KURT EGGERS – Cognitive flexibility in younger and older children who stutter

Recent research findings suggest possible weaknesses in cognitive flexibility (CF) in children who stutter (CWS) when compared to children who do not stutter (CWNS). Studies so far, have been conducted with either younger (3–6 years old) or older children (6–12 years old) with a variety of measures. The purpose of the present study was to investigate CF with the use of a single behavioral measure across a broader age range (4–10 years old).

Participants were 37 CWS (mean age = 6.90 years) and 37 age- and gender-matched CWNS (mean age = 6.88 years), divided in a younger (below 7 years) and older (above 7 years) age group. All participants undertook a computerized visual set-shifting task consisting of three blocks. CF was evaluated through across- and within-block comparisons of the actual response speed and accuracy values. In addition, mixing- and set-shifting-costs were evaluated based on the mean response speed and accuracy.

All participants showed expected mixing- and set-shifting-costs. Only the within-block analyses yielded significant between (sub)group differences. Investigation of the block × classification group × age group interactions showed that older CWS had larger set-shifting-costs (slowed down more and made more errors) compared to older CWNS.

While all participants required more time during set-shifting trials, only the older CWS (7–10 years old), and not younger CWS, were slower and made more errors. This finding corroborates previous findings in CWS of a similar age and could possibly point to a role of CF in stuttering persistence.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1017319/full>

MARIA PAPHITI, EIRA JANSSON-VERKASALO & KURT EGGERS – Complex response inhibition and cognitive flexibility in school-aged Cypriot-Greek-speaking children who stutter

Over the last few years, research findings have suggested limitations in executive function (EF) of children who stutter (CWS) with the evidence being more consistent in studies with preschoolers (3–6 years old) than in studies with school-aged children (6–12 years old). The purpose of the current study was to assess complex response inhibition and cognitive flexibility in school-aged CWS and their non-stuttering peers.

Participants, 19 CWS (mean age = 7.58 years, range 6.08–9.17) and 19 age- and gender-matched children who do not stutter (CWNS; mean age = 7.58 years, range 6.08–9.33), completed a visual task consisting of three task blocks. Analyses were based on response times and error percentages during the different task blocks.

All participants showed expected performance-costs in task block comparisons targeting complex response inhibition and cognitive flexibility. Significant group differences were found in measures of cognitive flexibility with CWS performing slower compared to CWNS ($p = 0.02$). Additionally, significant block × group interactions demonstrated that CWS, compared to CWNS, slowed down more (i.e., higher performance-cost) under both complex response inhibition ($p = 0.049$) and cognitive flexibility task conditions ($p = 0.04$ for no-set-shifting and $p = 0.02$ for set-shifting).

These results are in line with some of the previous findings in school-aged CWS and suggest that CWS present lower performance in complex response inhibition and cognitive flexibility task conditions when compared to their non-stuttering peers.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.991138/full>

STEFAN HEIM, STELLA POLYAK & KATJA HUßMANN – Mimicking effects of auditory verbal hallucinations on language production at the level of words, sentences and stories

Schizophrenia is characterised foremost by hallucinations, delusions and disorganised speech. Deficits in the internal speech monitor may contribute to the development of auditory-verbal hallucinations. This study investigates potential effects in the opposite direction: could the presence of auditory-verbal hallucinations have an effect on speech production? To this end, a recent mimicking/simulation approach was adopted for 40 healthy participants who perceived either white noise or hallucination-like speech recordings during different language production tasks with increasing demands: picture naming, verbal fluency with and without category switch, sentence production, and discourse. In line with reports about real schizophrenia cases in the literature, mimicking auditory-verbal hallucinations affected verbal fluency (switch condition) and sentence production (duration) in a different way than mere noise. These effects were not correlated, suggesting that hallucinations may even affect different levels of linguistic complexity in different ways. Anyway, in both cases (mimicked), auditory hallucination appear to contribute to the emergence of disordered speech. The mimicking/simulation paradigm may in future help to identify and disentangle the various factors contributing to disorganised speech in schizophrenia. They may also support the development and implementation of new protocols, e.g., in speech and language therapy in persons with schizophrenia in order to improve their communication skills despite the presence of auditory-verbal hallucinations.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1017865/full>

MAURIZIO CASARRUBEA et al – Structural analyses in the study of behavior: From rodents to non-human primates

The term “structure” indicates a set of components that, in relation to each other, shape an organic complex. Such a complex takes on essential connotations of functionally unitary entity resulting from the mutual relationships of its constituent elements. In a broader sense, we can use the word “structure” to define the set of relationships among the elements of an

emergent system that is not determined by the mere algebraic sum of these elements, but by the interdependence relationships of these components from which the function of the entire structure itself derives. The behavior of an integrated living being can be described in structural terms via an ethogram, defined as an itemized list of behavioral units. Akin to an architectural structure, a behavioral structure arises from the reciprocal relationships that the individual units of behavior establish. Like an architectural structure, the function of the resulting behaving complex emerges from the relationships of the parts. Hence, studying behavior in its wholeness necessitates not only the identification of its constitutive units in their autarchic individuality, but also, and importantly, some understanding of their relationships. This paper aimed to critically review different methods to study behavior in structural terms. First, we emphasized the utilization of T-pattern analysis, i.e., one of the most effective and reliable tools to provide structural information on behavior. Second, we discussed the application of other methodological approaches that are based on the analysis of transition matrices, such as hierarchical clustering, stochastic analyses, and adjusted residuals. Unlike T-pattern analysis, these methods allow researchers to explore behavioral structure beyond its temporal characteristics and through other relational constraints. After an overview of how these methods are used in the study of animal behavior, from rodents to non-human primates, we discussed the specificities, advantages and challenges of each approach. This paper could represent a useful background for all scientists who intend to study behavior both quantitatively and structurally, that is in terms of the reciprocal relationships that the various units of a given behavioral repertoire normally weave together.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1033561/full>

Nature

NEWS

Prehistoric rubbish hints that early cooks cared about flavour

Ancient chefs made bitter plants taste better with techniques such as grinding and soaking.

<https://www.nature.com/articles/d41586-022-03766-6>

Nature Communications

PAPERS

RYAN SCHACHT et al – Adult sex ratios: causes of variation and implications for animal and human societies

Converging lines of inquiry from across the social and biological sciences target the adult sex ratio (ASR; the proportion of males in the adult population) as a fundamental population-level determinant of behavior. The ASR, which indicates the relative number of potential mates to competitors in a population, frames the selective arena for competition, mate choice, and social interactions. Here we review a growing literature, focusing on methodological developments that sharpen knowledge of the demographic variables underlying ASR variation, experiments that enhance understanding of the consequences of ASR imbalance across societies, and phylogenetic analyses that provide novel insights into social evolution. We additionally highlight areas where research advances are expected to make accelerating contributions across the social sciences, evolutionary biology, and biodiversity conservation.

<https://www.nature.com/articles/s42003-022-04223-w>

ANDREA QUAGLIARIELLO – Ancient oral microbiomes support gradual Neolithic dietary shifts towards agriculture

The human microbiome has recently become a valuable source of information about host life and health. To date little is known about how it may have evolved during key phases along our history, such as the Neolithic transition towards agriculture. Here, we shed light on the evolution experienced by the oral microbiome during this transition, comparing Palaeolithic hunter-gatherers with Neolithic and Copper Age farmers that populated a same restricted area in Italy. We integrate the analysis of 76 dental calculus oral microbiomes with the dietary information derived from the identification of embedded plant remains. We detect a stronger deviation from the hunter-gatherer microbiome composition in the last part of the Neolithic, while to a lesser extent in the early phases of the transition. Our findings demonstrate that the introduction of agriculture affected host microbiome, supporting the hypothesis of a gradual transition within the investigated populations.

<https://www.nature.com/articles/s41467-022-34416-0>

JAN J. KREIDER et al – Resource sharing is sufficient for the emergence of division of labour

Division of labour occurs in a broad range of organisms. Yet, how division of labour can emerge in the absence of pre-existing interindividual differences is poorly understood. Using a simple but realistic model, we show that in a group of initially identical individuals, division of labour emerges spontaneously if returning foragers share part of their resources with other group members. In the absence of resource sharing, individuals follow an activity schedule of alternating between foraging and other tasks. If non-foraging individuals are fed by other individuals, their alternating activity schedule becomes interrupted, leading to task specialisation and the emergence of division of labour. Furthermore, nutritional differences between individuals reinforce division of labour. Such differences can be caused by increased metabolic rates during foraging or by dominance interactions during resource sharing. Our model proposes a plausible mechanism for the self-organised

emergence of division of labour in animal groups of initially identical individuals. This mechanism could also play a role for the emergence of division of labour during the major evolutionary transitions to eusociality and multicellularity.

<https://www.nature.com/articles/s41467-022-35038-2>

Nature Italy

ARTICLES

MARTA PATERLINI – For mice, altruism starts in the amygdala

Scientists identify the brain circuits and social factors that regulate altruistic and selfish behaviours in rodents.

<https://www.nature.com/articles/d43978-022-00157-3>

Nature Molecular Psychiatry

PAPERS

YING XIONG et al – Social isolation and the brain: effects and mechanisms

An obvious consequence of the coronavirus disease (COVID-19) pandemic is the worldwide reduction in social interaction, which is associated with many adverse effects on health in humans from babies to adults. Although social development under normal or isolated environments has been studied since the 1940s, the mechanism underlying social isolation (SI)-induced brain dysfunction remains poorly understood, possibly due to the complexity of SI in humans and translational gaps in findings from animal models. Herein, we present a systematic review that focused on brain changes at the molecular, cellular, structural and functional levels induced by SI at different ages and in different animal models. SI studies in humans and animal models revealed common socioemotional and cognitive deficits caused by SI in early life and an increased occurrence of depression and anxiety induced by SI during later stages of life. Altered neurotransmission and neural circuitry as well as abnormal development and function of glial cells in specific brain regions may contribute to the abnormal emotions and behaviors induced by SI. We highlight distinct alterations in oligodendrocyte progenitor cell differentiation and oligodendrocyte maturation caused by SI in early life and later stages of life, respectively, which may affect neural circuit formation and function and result in diverse brain dysfunctions. To further bridge animal and human SI studies, we propose alternative animal models with brain structures and complex social behaviors similar to those of humans.

<https://www.nature.com/articles/s41380-022-01835-w>

Nature Reviews Neuroscience

PAPERS

DELARAM FARZANFAR et al – From cognitive maps to spatial schemas

A schema refers to a structured body of prior knowledge that captures common patterns across related experiences. Schemas have been studied separately in the realms of episodic memory and spatial navigation across different species and have been grounded in theories of memory consolidation, but there has been little attempt to integrate our understanding across domains, particularly in humans. We propose that experiences during navigation with many similarly structured environments give rise to the formation of spatial schemas (for example, the expected layout of modern cities) that share properties with but are distinct from cognitive maps (for example, the memory of a modern city) and event schemas (such as expected events in a modern city) at both cognitive and neural levels. We describe earlier theoretical frameworks and empirical findings relevant to spatial schemas, along with more targeted investigations of spatial schemas in human and non-human animals. Consideration of architecture and urban analytics, including the influence of scale and regionalization, on different properties of spatial schemas may provide a powerful approach to advance our understanding of spatial schemas.

<https://www.nature.com/articles/s41583-022-00655-9>

Nature Reviews Psychology

PAPERS

MATTHEW J. HORNSEY et al – Individual, intergroup and nation-level influences on belief in conspiracy theories

Conspiracy theories are part of mainstream public life, with the potential to undermine governments, promote racism, ignite extremism and threaten public health efforts. Psychological research on conspiracy theories is booming, with more than half of the academic articles on the topic published since 2019. In this Review, we synthesize the literature with an eye to understanding the psychological factors that shape willingness to believe conspiracy theories. We begin at the individual level, examining the cognitive, clinical, motivational, personality and developmental factors that predispose people to believe conspiracy theories. Drawing on insights from social and evolutionary psychology, we then review research examining conspiracy theories as an intergroup phenomenon that reflects and reinforces societal fault lines. Finally, we examine how conspiracy theories are shaped by the economic, political, cultural and socio-historical contexts at the national level. This multilevel approach offers a deep and broad insight into conspiracist thinking that increases understanding of the problem and offers potential solutions.

<https://www.nature.com/articles/s44159-022-00133-0>

Nature Scientific Data

PAPERS

SHAONAN WANG et al – An fMRI Dataset for Concept Representation with Semantic Feature Annotations

The neural representation of concepts is a focus of many cognitive neuroscience studies. Prior works studying concept representation with neural imaging data have been largely limited to concrete concepts. The use of relatively small and constrained sets of stimuli leaves open the question of whether the findings can generalize to other concepts. We share an fMRI dataset in which 11 participants thought of 672 individual concepts, including both concrete and abstract concepts. The concepts were probed using words paired with images in which the words were selected to cover a wide range of semantic categories. Furthermore, according to the componential theories of concept representation, we collected the 54 semantic features of the 672 concepts comprising sensory, motor, spatial, temporal, affective, social, and cognitive experiences by crowdsourcing annotations. The quality assessment results verify this as a high-quality neuroimaging dataset. Such a dataset is well suited to study how the brain represents different semantic features and concepts, creating the essential condition to investigate the neural representation of individual concepts.

<https://www.nature.com/articles/s41597-022-01840-2>

Nature Scientific Reports

PAPERS

SLAWOMIR WACEWICZ et al – The adaptive significance of human scleral brightness: an experimental study

Homogeneously depigmented sclerae have long been proposed to be uniquely human—an adaptation to enable cooperative behaviour by facilitating interpersonal coordination through gaze following. However, recent evidence has shown that deeply pigmented sclerae also afford gaze following if surrounding a bright iris. Furthermore, while current scleral depigmentation is clearly adaptive in modern humans, it is less clear how the evolutionarily intermediate stages of scleral pigmentation may have been adaptive. In sum, it is unclear why scleral depigmentation became the norm in humans, while not so in sister species like chimpanzees, or why some extant species display intermediate degrees of pigmentation (as our ancestors presumably did at some point). We created realistic facial images of 20 individually distinct hominins with diverse facial morphologies, each face in the (i) humanlike bright sclera and (ii) generalised apelike dark sclera version. Participants in two online studies rated the bright-sclera hominins as younger, healthier, more attractive and trustworthy, but less aggressive than the dark-sclera hominins. Our results support the idea that the appearance of more depigmented sclerae promoted perceived traits that fostered trust, increasing fitness for those individuals and resulting in depigmentation as a fixed trait in extant humans.

<https://www.nature.com/articles/s41598-022-24403-2>

JACOPO TURINI & MELISSA LE-HOA VÕ – Hierarchical organization of objects in scenes is reflected in mental representations of objects

The arrangement of objects in scenes follows certain rules (“Scene Grammar”), which we exploit to perceive and interact efficiently with our environment. We have proposed that Scene Grammar is hierarchically organized: scenes are divided into clusters of objects (“phrases”, e.g., the sink phrase); within every phrase, one object (“anchor”, e.g., the sink) holds strong predictions about identity and position of other objects (“local objects”, e.g., a toothbrush). To investigate if this hierarchy is reflected in the mental representations of objects, we collected pairwise similarity judgments for everyday object pictures and for the corresponding words. Similarity judgments were stronger not only for object pairs appearing in the same scene, but also object pairs appearing within the same phrase of the same scene as opposed to appearing in different phrases of the same scene. Besides, object pairs with the same status in the scenes (i.e., being both anchors or both local objects) were judged as more similar than pairs of different status. Comparing effects between pictures and words, we found similar, significant impact of scene hierarchy on the organization of mental representation of objects, independent of stimulus modality. We conclude that the hierarchical structure of visual environment is incorporated into abstract, domain general mental representations of the world.

<https://www.nature.com/articles/s41598-022-24505-x>

SHUAI WANG et al – Graph theoretical analysis reveals the functional role of the left ventral occipito-temporal cortex in speech processing

The left ventral occipito-temporal cortex (left-vOT) plays a key role in reading. Interestingly, the area also responds to speech input, suggesting that it may have other functions beyond written word recognition. Here, we adopt graph theoretical analysis to investigate the left-vOT’s functional role in the whole-brain network while participants process spoken sentences in different contexts. Overall, different connectivity measures indicate that the left-vOT acts as an interface enabling the communication between distributed brain regions and sub-networks. During simple speech perception, the left-vOT is systematically part of the visual network and contributes to the communication between neighboring areas, remote areas, and sub-networks, by acting as a local bridge, a global bridge, and a connector, respectively. However, when speech comprehension is explicitly required, the specific functional role of the area and the sub-network to which the left-vOT belongs change and vary with the quality of speech signal and task difficulty. These connectivity patterns provide insightful

information on the contribution of the left-vOT in various contexts of language processing beyond its role in reading. They advance our general understanding of the neural mechanisms underlying the flexibility of the language network that adjusts itself according to the processing context.

<https://www.nature.com/articles/s41598-022-24056-1>

NADIAH P. KRISTENSEN, HISASHI OHTSUKI & RYAN A. CHISHOLM – Ancestral social environments plus nonlinear benefits can explain cooperation in human societies

Human cooperation (paying a cost to benefit others) is puzzling from a Darwinian perspective, particularly in groups with strangers who cannot repay nor are family members. The beneficial effects of cooperation typically increase nonlinearly with the number of cooperators, e.g., increasing returns when cooperation is low and diminishing returns when cooperation is high. Such nonlinearity can allow cooperation between strangers to persist evolutionarily if a large enough proportion of the population are already cooperators. However, if a lone cooperator faces a conflict between the group's and its own interests (a social dilemma), that raises the question of how cooperation arose in the first place. We use a mathematically tractable evolutionary model to formalise a chronological narrative that has previously only been investigated verbally: given that ancient humans interacted mostly with family members (genetic homophily), cooperation evolved first by kin selection, and then persisted in situations with nonlinear benefits as homophily declined or even if interactions with strangers became the norm. The model also predicts the coexistence of cooperators and defectors observed in the human population (polymorphism), and may explain why cooperators in behavioural experiments prefer to condition their contribution on the contributions of others (conditional cooperation in public goods games).

<https://www.nature.com/articles/s41598-022-24590-y>

SIMON A. PARFITT, MARK D. LEWIS & SILVIA M. BELLO – Taphonomic and technological analyses of Lower Palaeolithic bone tools from Clacton-on-Sea, UK

The exceptional survival of Middle Pleistocene wooden spears at Schöningen (Germany) and Clacton-on-Sea (UK) provides tantalizing evidence for the widespread use of organic raw materials by early humans. At Clacton, less well-known organic artefacts include modified bones that were identified by the Abbé Henri Breuil in the 1920s. Some of these pieces were described and figured by Hazzledine Warren in his classic 1951 paper on the flint industry from the Clacton Channel, but they have been either overlooked in subsequent studies or dismissed as the product of natural damage. We provide the first detailed analysis of two Clactonian bone tools found by Warren and a previously unrecognized example recovered in 1934 during excavations directed by Mary Leakey. Microscopic examination of percussion damage suggests the bones were used as knapping hammers to shape or resharpen flake tools. Early Palaeolithic bone tools are exceedingly rare, and the Clacton examples are the earliest known organic knapping hammers associated with a core-and-flake (Mode 1) lithic technology. The use of soft hammers for knapping challenges the consensus that Clactonian flintknapping was undertaken solely with hard hammerstones, thus removing a major technological and behavioural difference used to distinguish the Clactonian from late Acheulean handaxe (Mode 2) industries.

<https://www.nature.com/articles/s41598-022-23989-x>

THOMAS KROKER et al – Noninvasive stimulation of the ventromedial prefrontal cortex modulates rationality of human decision-making

The framing-effect is a bias that affects decision-making depending on whether the available options are presented with positive or negative connotations. Even when the outcome of two choices is equivalent, people have a strong tendency to avoid the negatively framed option. The ventromedial prefrontal cortex (vmPFC) is crucial for rational decision-making, and dysfunctions in this region have been linked to cognitive biases, impulsive behavior and gambling addiction. Using a financial decision-making task in combination with magnetoencephalographic neuroimaging, we show that excitatory compared to inhibitory non-invasive transcranial direct current stimulation (tDCS) of the vmPFC reduces framing-effects while improving the assessment of loss-probabilities, ultimately leading to increased overall gains. Behavioral and neural data consistently suggest that this improvement in rational decision-making is predominately due to an attenuation of biases towards negative affect (loss-aversion and risk-aversion). These findings recommend further research towards clinical applications of vmPFC-tDCS as in addictive disorders.

<https://www.nature.com/articles/s41598-022-24526-6>

FRANK SIROCKO et al – Thresholds for the presence of glacial megafauna in central Europe during the last 60,000 years

Lake sediment records from Holzmaar and the infilled maar of Auel (Eifel, Germany) are used to reconstruct landscape changes and megafauna abundances. Our data document a forested landscape from 60,000 to 48,000 yr b2k and a stepwise vegetation change towards a glacial desert after 26,000 yr b2k. The Eifel landscape was continuously inhabited from 48,000 to 9000 yr b2k by large mammals, documented by the presence of spores of coprophilous fungi from *Sordaria* and *Sporormiella* fungi that grow on fecal remains of the megafauna. Megafauna reached higher numbers during cold stadial climates but was present also during the warmer interstadials. Highest abundance was at 56,500/48,500/38,500/33,000/27,000/21,000/16,200/14,000 yr b2k, i.e. under different climate regimes. Some of these

dates were associated with clear human presence, which indicates that megafauna was not overkilled by humans. In contrast, human presence could quite likely have been stimulated by the abundant food supply. Megafauna presence decreased significantly when tree abundance increased during interstadials. The Megafauna disappeared finally at 11,400 yr b2k with the development of the early Holocene forest cover, which appears to be the most important threshold for megafauna presence.

<https://www.nature.com/articles/s41598-022-22464-x>

MARIANNE DESCHAMPS et al with JOÃO ZILHÃO – Organization of residential space, site function variability, and seasonality of activities among MIS 5 Iberian Neandertals

Whether ethnoarcheological models of hunter-gatherer mobility, landscape use, and structuration of the inhabited space are relevant to the archeology of Neandertals and the Middle Paleolithic remains controversial. The thin lenses of hearth-associated stone tools and faunal remains excavated in sub-complex AS5 of Cueva Antón (Murcia, Spain) significantly advance these debates. Dated to 77.8–85.1 ka, these living floors are interstratified in river-accumulated sands and were buried shortly after abandonment by low-energy inundation events, with minimal disturbance and negligible palimpsest formation. Stone tools were made and ergonomically modified to fit tasks; their spatial distributions and use-wear reveal hearth-focused activities and a division of the inhabited space into resting and working areas. Site function varied with season of the year: units III-i/j1 and III-i/j2-3 record winter visits focused on filleting and hide processing, while woodworking predominated in unit III-b/d, which subsumes visits to the site over the course of at least one winter, one spring, and one summer. These snapshots of Neandertal behavior match expectations derived from the ethnographic and Upper Paleolithic records for the lifeways of hunter-gatherers inhabiting temperate regions with a markedly seasonal climate.

<https://www.nature.com/articles/s41598-022-24430-z>

ELADIO MONTERO-PORRAS et al – Fast deliberation is related to unconditional behaviour in iterated Prisoners' Dilemma experiments

People have different preferences for what they allocate for themselves and what they allocate to others in social dilemmas. These differences result from contextual reasons, intrinsic values, and social expectations. What is still an area of debate is whether these differences can be estimated from differences in each individual's deliberation process. In this work, we analyse the participants' reaction times in three different experiments of the Iterated Prisoner's Dilemma with the Drift Diffusion Model, which links response times to the perceived difficulty of the decision task, the rate of accumulation of information (deliberation), and the intuitive attitudes towards the choices. The correlation between these results and the attitude of the participants towards the allocation of resources is then determined. We observe that individuals who allocated resources equally are correlated with more deliberation than highly cooperative or highly defective participants, who accumulate evidence more quickly to reach a decision. Also, the evidence collection is faster in fixed neighbour settings than in shuffled ones. Consequently, fast decisions do not distinguish cooperators from defectors in these experiments, but appear to separate those that are more reactive to the behaviour of others from those that act categorically.

<https://www.nature.com/articles/s41598-022-24849-4>

Neuron

PAPERS

ASAF GILBOA & MORRIS MOSCOVITCH – No consolidation without representation: Correspondence between neural and psychological representations in recent and remote memory

Memory systems consolidation is often conceived as the linear, time-dependent, neurobiological shift of memory from hippocampal-cortical to cortico-cortical dependency. We argue that contrary to this unidirectional view of memory reorganization, information about events may be retained in multiple forms (e.g., event-specific sensory-near episodic memory, event-specific gist information, event-general schematic information, or abstract semantic memory). These representations can all form at the time of the event and may continue to coexist for long durations. Their relative strength, composition, and dominance of expression change with time and experience, with task demands, and through their dynamic interaction with one another. These different psychological mnemonic representations depend on distinct functional and structural neurobiological substrates such that there is a neural-psychological representation correspondence (NPRC) among them. We discuss how the dynamics of psychological memory representations are reflected in multiple levels of neurobiological markers and their interactions. By this view, there are only variations of synaptic consolidation and memory dynamics without assuming a distinct systems consolidation process.

[https://www.cell.com/neuron/fulltext/S0896-6273\(21\)00291-9](https://www.cell.com/neuron/fulltext/S0896-6273(21)00291-9)

New Scientist

NEWS

Modern humans evolved a 'selfish' X chromosome after Africa exodus

The chromosome may contain regions that promote their DNA's spread by killing sperm that carry Y chromosomes. However, Y chromosomes may have evolved counter mechanisms over time.

ARTICLES**ANDREA VALENTINO – The hunt for the lost ancestral language of Europe and southern Asia**

We've long known there was an ancient language that gave rise to English, Bengali and dozens of other tongues – now we're on the brink of working out where Proto-Indo-European was spoken.

<https://www.newscientist.com/article/mg25634141-000-the-hunt-for-the-lost-ancestral-language-of-europe-and-southern-asia/>

PLoS One**PAPERS****KILIAN OLLIVIER et al – Structural invariants and semantic fingerprints in the “ego network” of words**

Well-established cognitive models coming from anthropology have shown that, due to the cognitive constraints that limit our “bandwidth” for social interactions, humans organize their social relations according to a regular structure. In this work, we postulate that similar regularities can be found in other cognitive processes, such as those involving language production. In order to investigate this claim, we analyse a dataset containing tweets of a heterogeneous group of Twitter users (regular users and professional writers). Leveraging a methodology similar to the one used to uncover the well-established social cognitive constraints, we find regularities at both the structural and semantic levels. In the former, we find that a concentric layered structure (which we call ego network of words, in analogy to the ego network of social relationships) very well captures how individuals organise the words they use. The size of the layers in this structure regularly grows (approximately 2-3 times with respect to the previous one) when moving outwards, and the two penultimate external layers consistently account for approximately 60% and 30% of the used words, irrespective of the number of layers of the user. For the semantic analysis, each ring of each ego network is described by a semantic profile, which captures the topics associated with the words in the ring. We find that ring #1 has a special role in the model. It is semantically the most dissimilar and the most diverse among the rings. We also show that the topics that are important in the innermost ring also have the characteristic of being predominant in each of the other rings, as well as in the entire ego network. In this respect, ring #1 can be seen as the semantic fingerprint of the ego network of words.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0277182>

ANDREW M. ROBBINS et al – Population dynamics of western gorillas at Mbeli Bai

Long-term studies of population dynamics can provide insights into life history theory, population ecology, socioecology, conservation biology and wildlife management. Here we examine 25 years of population dynamics of western gorillas at Mbeli Bai, a swampy forest clearing in Nouabalé-Ndoki National Park, the Republic of Congo. The Mbeli population more than doubled from 101 to 226 gorillas during the study. After adjusting for a net influx of gorillas into the study population, the increase represents an inherent growth rate of 0.7% per year, with 95% confidence limits between -0.7% and 2.6%. The influx of gorillas mainly involved immigration of individuals into existing study groups (social dispersal), but it also included the appearance of a few previously unknown groups (locational dispersal). The average group size did not change significantly during the study, which is consistent with the possibility that western gorillas face socioecological constraints on group size, even when the population is increasing. We found no significant evidence of density dependence on female reproductive success or male mating competition. The distribution of gorillas among age/sex categories also did not change significantly, which suggests that the population had a stable age structure. Our results provide evidence of population stability or growth for some western gorillas (albeit within a small area). The results highlight the value of law enforcement, long-term monitoring, and protected areas; but they do not diminish the importance of improving conservation for this critically endangered species.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0275635>

HIDENORI KOMATSU et al – Searching for the universality of nudging: A cross-cultural comparison of the information effects of reminding people about familial support

Nudging is a method for eliciting a desired behavior. One approach to nudging involves information provision. When information presented for this purpose is designed from an evolutionary perspective, it may reveal a deeper level of rationality within human decision-making that might otherwise appear to be irrational. Based on insights from the evolution of altruism, we previously designed a message to remind people of the benefits they have received from the actions of relatives to realize industrialization. We then demonstrated that using this message in Japan was effective at moderating extreme risk-averse attitudes toward air pollution resulting from industrialization. However, the universality of the intervention effect, including whether it could be affected by exogenous factors, was not explored. Therefore, in the present study, we conducted a randomized controlled trial based on an online survey carried out in Japan, Canada, and the US. The intervention was shown to be effective in all the three countries, but the effect size varied according to segment. Although women showed more intervention effects than men in Japan and the US, no significant sex difference was observed in Canada. In terms of personality traits, higher agreeableness significantly contributed to the intervention effects. The influence of the COVID-19 pandemic, which necessitated many lifestyle changes, was found to weaken the intervention

effect by increasing the message effect in the control group. We propose that this effect was caused by an increased perception of familial support in everyday life. These results suggest that the nudge message was universally effective, although the effect size might have been affected by cultural factors and social events.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0277969>

PNAS

PAPERS

CLAUDIA WILKE et al with KATIE E. SLOCOMBE – Declarative referential gesturing in a wild chimpanzee (*Pan troglodytes*)

Humans are argued to be unique in their ability and motivation to share attention with others about external entities—sharing attention for sharing's sake. Indeed, in humans, using referential gestures declaratively to direct the attention of others toward external objects and events emerges in the first year of life. In contrast, wild great apes seldom use referential gestures, and when they do, it seems to be exclusively for imperative purposes. This apparent species difference has fueled the argument that the motivation and ability to share attention with others is a human-specific trait with important downstream consequences for the evolution of our complex cognition [M. Tomasello, *Becoming Human* (2019)]. Here, we report evidence of a wild ape showing a conspecific an item of interest. We provide video evidence of an adult female chimpanzee, Fiona, showing a leaf to her mother, Sutherland, in the context of leaf grooming in Kibale Forest, Uganda. We use a dataset of 84 similar leaf-grooming events to explore alternative explanations for the behavior, including food sharing and initiating dyadic grooming or playing. Our observations suggest that in highly specific social conditions, wild chimpanzees, like humans, may use referential showing gestures to direct others' attention to objects simply for the sake of sharing. The difference between humans and our closest living relatives in this regard may be quantitative rather than qualitative, with ramifications for our understanding of the evolution of human social cognition.

<https://www.pnas.org/doi/full/10.1073/pnas.2206486119>

Science Advances

PAPERS

BENJAMIN PITT et al with STEVEN T. PIANTADOSI – Different reference frames on different axes: Space and language in Indigenous Amazonians

Spatial cognition is central to human behavior, but the way people conceptualize space varies within and across groups for unknown reasons. Here, we found that adults from an indigenous Bolivian group used systematically different spatial reference frames on different axes, according to known differences in their discriminability: In both verbal and nonverbal tests, participants preferred allocentric (i.e., environment-based) space on the left-right axis, where spatial discriminations (like “b” versus “d”) are notoriously difficult, but the same participants preferred egocentric (i.e., body-based) space on the front-back axis, where spatial discrimination is relatively easy. The results (i) establish a relationship between spontaneous spatial language and memory across axes within a single culture, (ii) challenge the claim that each language group has a predominant spatial reference frame at a given scale, and (iii) suggest that spatial thinking and language may both be shaped by spatial discrimination abilities, as they vary across cultures and contexts.

<https://www.science.org/doi/full/10.1126/sciadv.abp9814>

JESSICA TAUBERT et al – A broadly tuned network for affective body language in the macaque brain

Body language is a powerful tool that we use to communicate how we feel, but it is unclear whether other primates also communicate in this way. Here, we use functional magnetic resonance imaging to show that the body-selective patches in macaques are activated by affective body language. Unexpectedly, we found these regions to be tolerant of naturalistic variation in posture as well as species; the bodies of macaques, humans, and domestic cats all evoked a stronger response when they conveyed fear than when they conveyed no affect. Multivariate analyses confirmed that the neural representation of fear-related body expressions was species-invariant. Collectively, these findings demonstrate that, like humans, macaques have body-selective brain regions in the ventral visual pathway for processing affective body language. These data also indicate that representations of body stimuli in these regions are built on the basis of emergent properties, such as socio-affective meaning, and not just putative image properties.

<https://www.science.org/doi/full/10.1126/sciadv.add6865>

Trends in Cognitive Sciences

PAPERS

JAMES B. HEALD, MÁTÉ LENGYEL & DANIEL M. WOLPERT – Contextual inference in learning and memory

Context is widely regarded as a major determinant of learning and memory across numerous domains, including classical and instrumental conditioning, episodic memory, economic decision-making, and motor learning. However, studies across these domains remain disconnected due to the lack of a unifying framework formalizing the concept of context and its role in learning. Here, we develop a unified vernacular allowing direct comparisons between different domains of contextual learning. This leads to a Bayesian model positing that context is unobserved and needs to be inferred. Contextual inference

then controls the creation, expression, and updating of memories. This theoretical approach reveals two distinct components that underlie adaptation, proper and apparent learning, respectively referring to the creation and updating of memories versus time-varying adjustments in their expression. We review a number of extensions of the basic Bayesian model that allow it to account for increasingly complex forms of contextual learning.

<https://email.bt.com/mail/index-rui.jsp>

ARIELLE S. KELLER et al – Hierarchical functional system development supports executive function

In this perspective, we describe how developmental improvements in youth executive function (EF) are supported by hierarchically organized maturational changes in functional brain systems. We first highlight evidence that functional brain systems are embedded within a hierarchical sensorimotor-association axis of cortical organization. We then review data showing that functional system developmental profiles vary along this axis: systems near the associative end become more functionally segregated, while those in the middle become more integrative. Developmental changes that strengthen the hierarchical organization of the cortex may support EF by facilitating top-down information flow and balancing within- and between-system communication. We propose a central role for attention and frontoparietal control systems in the maturation of healthy EF and suggest that reduced functional system differentiation across the sensorimotor-association axis contributes to transdiagnostic EF deficits.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00285-6](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00285-6)

Trends in Neurosciences

ARTICLES

NICOLE C. RUST & JOSEPH E. LEDOUX – The tricky business of defining brain functions

Neuroscience has a long history of investigating the neural correlates of brain functions. One example is fear, which has been studied intensely in a variety of species. In parallel, unease about definitions of brain functions has existed for over 100 years. Because the translational impact of basic research hinges on how we define these functions, these definitions should be carefully considered.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(22\)00213-2](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(22)00213-2)

PAPERS

NORA MALIKA ROÛAST & MONIKA SCHÖNAUER – Continuously changing memories: a framework for proactive and non-linear consolidation

The traditional view of long-term memory is that memory traces mature in a predetermined 'linear' process: their neural substrate shifts from rapidly plastic medial temporal regions towards stable neocortical networks. We propose that memories remain malleable, not by repeated reinstantiations of this linear process but instead via dynamic routes of proactive and non-linear consolidation: memories change, their trajectory is flexible and reversible, and their physical basis develops continuously according to anticipated demands. Studies demonstrating memory updating, increasing hippocampal dependence to support adaptive use, and rapid neocortical plasticity provide evidence for continued non-linear consolidation. Although anticipated demand can affect all stages of memory formation, the extent to which it shapes the physical memory trace repeatedly and proactively will require further dedicated research.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(22\)00212-0](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(22)00212-0)

M. BELÉN PARDI, ANNA SCHROEDER & JOHANNES J. LETZKUS – Probing top-down information in neocortical layer 1

Accurate perception of the environment is a constructive process that requires integration of external bottom-up sensory signals with internally generated top-down information. Decades of work have elucidated how sensory neocortex processes physical stimulus features. By contrast, examining how top-down information is encoded and integrated with bottom-up signals has been challenging using traditional neuroscience methods. Recent technological advances in functional imaging of brain-wide afferents in behaving mice have enabled the direct measurement of top-down information. Here, we review the emerging literature on encoding of these internally generated signals by different projection systems enriched in neocortical layer 1 during defined brain functions, including memory, attention, and predictive coding. Moreover, we identify gaps in current knowledge and highlight future directions for this rapidly advancing field.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(22\)00215-6](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(22)00215-6)

SUBSCRIBE to the EAORC Bulletin

If you would like to subscribe to this free weekly newsletter, please contact martin.edwardes@btopenworld.com.

UNSUBSCRIBE from the EAORC Bulletin

Send an email to martin.edwardes@btopenworld.com with the subject "EAORC unsubscribe".

PRODUCED BY AND FOR THE EAORC EMAIL GROUP

EAORC is a fee-free academic internet news service and has no commercial sponsorship or other commercial interests.

EAORC website information is at <http://martinedwardes.me.uk/eaorc/>

If you have received this bulletin, and are unhappy about receiving it, please contact martin.edwardes@btopenworld.com.