

# EAORC BULLETIN 1,003 – 4 September 2022

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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.

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### EAORC NEWS – Congratulations for 1,000th Issue

Congratulations for the 1,000th issue! In my book published in June (which is unfortunately (?) written in Japanese) I referred to your name and the bulletin in the acknowledgment, expressing my gratitude to you. Thanks again.

Yuki Ike-uchi

{Masayuki Ike-uchi (2022). *The Origin and Evolution of Human Language Revisited*. *Kaitakusha Language and Culture Selection* 94.

[https://www.amazon.co.jp/-/en/%E6%B1%A0%E5%86%85-%E6%AD%A3%E5%B9%B8/dp/4758925941/ref=sr\\_1\\_1](https://www.amazon.co.jp/-/en/%E6%B1%A0%E5%86%85-%E6%AD%A3%E5%B9%B8/dp/4758925941/ref=sr_1_1)}

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## ACADEMIA.EDU – Multilevel Organisation of Animal Sociality

*In Trends in Ecology & Evolution* 35:9, 834-847 (2020).

### CYRIL C. GRUETER et al – Multilevel Organisation of Animal Sociality

Multilevel societies (MLSs), stable nuclear social units within a larger collective encompassing multiple nested social levels, occur in several mammalian lineages. Their architectural complexity and size impose specific demands on their members requiring adaptive solutions in multiple domains. The functional significance of MLSs lies in their members being equipped to reap the benefits of multiple group sizes. Here, we propose a unifying terminology and operational definition of MLS. To identify new avenues for integrative research, we synthesise current literature on the selective pressures underlying the evolution of MLSs and their implications for cognition, intersexual conflict, and sexual selection. Mapping the drivers and consequences of MLS provides a reference point for the social evolution of many taxa, including our own species.

[https://www.academia.edu/45163815/Multilevel Organisation of Animal Sociality](https://www.academia.edu/45163815/Multilevel_Organisation_of_Animal_Sociality)

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## CONFERENCE ALERT – The Place of Pragmatics in the Evolution of Language

We are Animal Behaviour Live, an international online platform promoting sustainable and inclusive events fully broadcasted online on YouTube. We aim to bring together researchers in animal behaviour from all over the world to discuss the latest research and question our academic practices. We are glad to announce that this year we are hosting the third edition of the Animal Behaviour Live: Annual Online Congress on the 17th and 18th of November 2022.

In line with our ethos, the event is free of charge to all researchers from the community, and we strive to ensure representation from all across the globe and in line with our communities' composition. To ensure that everyone can participate, we organise multiple sessions per day for a holistic coverage of all time zones. In addition, every presentation is available to replay on our YouTube channel for at least two weeks past the congress. You can find more information about our conference on our website (<https://animalbehaviour.live/aoc.html>), or by watching some of our past videos on the YouTube channel (<https://www.youtube.com/channel/UcKAcB-k186yZmalqNJ9JTJw>).

Our organisation is small (we are 7 early career researchers working on a voluntary basis) and the success of this event is based on the support of our community. For this reason, we would be particularly grateful if you could spread the word about this event to your community. To do so, you can find attached a flyer of the event. In addition, if you have a twitter account, you can also follow us (@AnimalBehavLive) and RT our announcement about the congress.

We would like to thank you for your help and hope to see you at the Animal Behaviour Live: Annual Online Conference 2022.

Kinds regards,

The organising committee.

Dr Natacha Rossi (she/her)

Post-doctoral Research Associate, Department of Biological and Experimental Psychology, School of Biological and Behavioural Sciences, Queen Mary University of London, London, UK, E1 4NS

Natacha Rossi [n.rossi@qmul.ac.uk](mailto:n.rossi@qmul.ac.uk)

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## CONFERENCE ALERT – ABS 2023 Annual Meeting

Portland, Oregon - July 11-15, 2023

Together with the ABS Meeting Planning Committee and the ABS Executive Committee, we are excited to invite you to our 2023 annual meeting. We want to thank the membership for the passionate exchange of ideas about the location of next year's meeting and enthusiastically welcome our members to join us in Portland, Oregon at the Oregon Convention Center, for a meeting full of invigorating science and great interactions. We hope you enjoy the unique local culture of Portland and the amazing opportunities for outdoor activities in the region.

We believe that scientific excellence flourishes in an environment where a diversity of voices and perspectives are freely expressed, in an environment of mutual respect for the dignity and worth of every participant. Our diverse, inclusive and welcoming community is one of our main strengths in ABS. We look forward to a meeting where all can learn, be heard and be their authentic self.

ABS Program Officer: Ted Stankowich

ABS Program Officer-Elect: Melissa Hughes

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## NEWS

### FRONTIERS NEWS – New study debunks theory of historic human brain "shrinking"

Human brains may have shrank in size approximately 3,000 years ago, scientists claimed last year.

In a recent article, published in *Frontiers in Ecology and Evolution*, a new team of researchers challenged the data set and analysis behind those findings shared in the same journal a year earlier.

The scientific debate continues.

<https://blog.frontiersin.org/2022/08/11/historic-human-brain-shrinking-false/>

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### FRONTIERS NEWS – Tiny tarsiers show off by singing high notes

New research in *Frontiers in Ecology and Evolution*, shows that Gursky's spectral tarsiers sing complex duets that have evolved to show off their virtuosity and physicality.

<https://blog.frontiersin.org/2022/08/02/frontiers-ecology-evolution-gurskys-spectral-tarsier-virtuoso-duets/>

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### JOHN TEMPLETON FOUNDATION – What happened to evolutionary biology during the 20th century

Evolution, as it is studied today, is much more complex than when Charles Darwin first posited his theory of natural selection, popularly known as “survival of the fittest.” Evolutionary theory has undergone a series of expansions and refinements over the course of the past century and a half. Today, in the first quarter of the 21st century, biologists recognize that there is much more to evolution than DNA replication alone. The “extended evolutionary synthesis” is a family of theoretical perspectives that goes beyond a gene-centric view of evolution to include more sources of biological innovation and adaptations. A new report, commissioned by the John Templeton Foundation and written by Dr. Lynn Chiu of the Department of Evolutionary Biology at the University of Vienna, serves as a road map to understanding Extended Evolutionary Synthesis.

<https://www.templeton.org/discoveries/extended-evolutionary-synthesis>

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### SCIENCE NEWS – Rival teams of male dolphins form the animal world's biggest social networks

Keeping track of male alliances may have driven the marine mammals to evolve bigger brains.

<https://www.science.org/content/article/rival-teams-male-dolphins-form-animal-world-s-biggest-social-networks-long-running>

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### SOCIETY FOR SCIENCE – 7-million-year-old limb fossils may be from the earliest known hominid

An earlier report on one of the bones of a 7-million-year-old creature that may have walked upright has triggered scientific misconduct charges.

<http://click.societyforscience-email.com/?qs=cb6694e64d8e3816194b00606de396413ebe5f11db6b2198b6660f0663a9b229660fbd97f53b6b96fc9b00504a3b390bf3ba03497434146d5b43463ec587641d>

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### SOCIETY FOR SCIENCE – Sleep deprivation may make people less generous

Helping each other is inherently human. Yet new research shows that sleep deprivation may dampen people's desire to donate money.

<http://click.societyforscience-email.com/?qs=cb6694e64d8e38160598e1ba1db5466c3a63d72abd7b2a8e59714d2227933c1cb845cadcd17216c7cfe0c4c9ade05f867bf36cc49bb600d28dea4afa411e6fd4>

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### THE CONVERSATION – Neanderthals died out 40kya, but they have more DNA on Earth than ever before

Here's what we can learn from our closest extinct relatives.

<https://theconversation.com/neanderthals-died-out-40-000-years-ago-but-there-has-never-been-more-of-their-dna-on-earth-189021>

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## PUBLICATIONS

### American Journal of Biological Anthropology

#### REVIEWS

#### MILFORD H. WOLPOFF – The Mismeasure of Man: A moving target

Legacy review of 'The Mismeasure of Man' by Stephen Jay Gould, 1981. New York, NY: W.W. Norton & Company.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24608>

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### Biology Letters

#### PAPERS

#### JULIANE GAVIRAGHI MUSSOI, MARGARET C. STANLEY & KRISTAL E. CAIN – Importance of sleep for avian vocal communication

Sleep is one of the few truly ubiquitous animal behaviours, and though many animals spend enormous periods of time asleep, we have only begun to understand the consequences of sleep disturbances. In humans, sleep is crucial for effective communication. Birds are classic models for understanding the evolution and mechanisms of human language and speech. Bird vocalizations are remarkably diverse, critical, fitness-related behaviours, and the way sleep affects vocalizations is likely

similarly varied. However, research on the effects of sleep disturbances on avian vocalizations is shockingly scarce. Consequently, there is a critical gap in our understanding of the extent to which sleep disturbances disrupt communication. Here, we argue that sleep disturbances are likely to affect all birds' vocal performance by interfering with motivation, memory consolidation and vocal maintenance. Further, we suggest that quality sleep is likely essential when learning new vocalizations and that sleep disturbances will have especially strong effects on learned vocalizations. Finally, we advocate for future research to address gaps in our understanding of how sleep influences vocal learning and performance in birds.  
<https://royalsocietypublishing.org/doi/full/10.1098/rsbl.2022.0223>

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## Frontiers in Ecology and Evolution

### PAPERS

#### **EUGENE ROSENBERG – Rapid acquisition of microorganisms and microbial genes can help explain punctuated evolution**

The punctuated mode of evolution posits that evolution occurs in rare bursts of rapid evolutionary change followed by long periods of genetic stability (stasis). The accepted cause for the rapid changes in punctuated evolution is special ecological circumstances – selection forces brought about by changes in the environment. This article presents a complementary explanation for punctuated evolution by the rapid formation of genetic variants in animals and plants by the acquisition of microorganisms from the environment into microbiomes and microbial genes into host genomes by horizontal gene transfer. Several examples of major evolutionary events driven by microorganisms are discussed, including the formation of the first eukaryotic cell, the ability of some animals to digest cellulose and other plant cell-wall complex polysaccharides, dynamics of root system architecture, and the formation of placental mammals. These changes by cooperation were quantum leaps in the evolutionary development of complex biological systems and can contribute to an understanding of the mechanisms underlying punctuated evolution.

<https://www.frontiersin.org/articles/10.3389/fevo.2022.957708/full>

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## Mind & Language

### PAPERS

#### **RUTH GARRETT MILLIKAN – Self-signs and intensional contexts**

Paradigm intensional contexts result from the unmarked use of referential expressions as “self-signs”, signs that refer to themselves as tokens, types, or members of Sellarsian “dot-quoted” kinds. Self-signing (but unquoted) linguistic expressions are more difficult to recognize than non-linguistic self-signs such as the color of a felt pen's casing that represents the color of ink inside. I will discuss non-linguistic self-signing, then examine self-signing in quotation, in “said that ...” contexts and in “believes that ...” contexts. The phenomenon of intensionality may reduce to a kind of equivocation, a matter of notation rather than a necessary feature of language.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12436>

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#### **JOE DEWHURST & CHRISTOPHER BURR – Normative folk psychology and decision theory**

Our aim in this paper is to explore two possible directions of interaction between normative folk psychology and decision theory. In one direction, folk psychology plays a regulative role that constrains practical decision-making. In the other direction, decision theory provides novel tools and norms that shape folk psychology. We argue that these interactions could lead to the emergence of an iterative “decision theoretic spiral,” where folk psychology influences decision-making, decision-making is studied by decision theory, and decision theory influences folk psychology. Understanding these interactions is important both for the theoretical study of social cognition and decision theory, and also for thinking about how to implement practical interventions into real-world decision-making.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12347>

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#### **TORFINN THOMESSEN HUVENES & ANDREAS STOKKE – Context as knowledge**

It has been argued that common ground information is unsuited to the role that contexts play in the theory of indexical and demonstrative reference. This paper explores an alternative view that identifies shared information with what is common knowledge among the participants. We argue this view of shared information avoids the problems for the common ground approach concerning reference while preserving its advantages in accounting for communication.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12351>

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#### **MATEJ DROBŇÁK – Normative inferentialism on linguistic understanding**

The aim of this paper is to establish a specific view of linguistic understanding based on the framework of normative inferentialism. Normative inferentialism is presented as an overspecification (rich) account of meaning—the meaning of a sentence is understood as a cluster of context-dependent contents. The standard psychological mechanism responsible for reaching understanding of an utterance depends on the ability to eliminate contextually irrelevant aspects/parts of meaning. The advantages of the view are that the mechanism can (a) explain a wide range of linguistic phenomena including polysemy, homonymy, and conversational implicatures, and (b) explain partial understanding of an utterance.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12337>

### **ERICH RAST – The theory theory of metalinguistic disputes**

According to the theory theory of metalinguistic disputes, disagreements in metalinguistic disputes are based on diverging underlying theories, opinions, or world views. An adequate description of metalinguistic disagreement needs to consider the compatibility and topics of such theories. Although topic continuity can be spelled out in terms of measurement operations, it is argued that even metalinguistic disputes about a term used in different, mutually compatible theories can be substantive because the dispute is indirectly about the virtues of the underlying theories. The account is defended against externalist and holist objections.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12355>

### **HEATHER DYKE – Weak neo-Whorfianism and the philosophy of time**

According to a thesis I call the linguistic assumption, the structure of language is a guide to the fundamental nature of reality. It is deployed in the metaphysical debate over the nature of time. In that debate, it is more radical than the Sapir–Whorf hypothesis, and should be rejected. A weak interpretation of the Sapir–Whorf hypothesis makes the empirical claim that speakers of different languages experience, perceive, or think about aspects of the world differently. I survey recent experimental evidence that supports this hypothesis which, I argue, gives us further reason to reject the linguistic assumption.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12339>

### **GERARDO VIERA – The perceived unity of time**

While we perceive events in our environment through multiple sensory systems, we nevertheless perceive all of these events as occupying a single unified timeline. Time, as we perceive it, is unified. I argue that existing accounts of the perceived unity of time fail. Instead, the perceived unity of time must be constructed by integrating our initially fragmented timekeeping capacities. However, existing accounts of multimodal integration do not tell us how this might occur. Something new is needed. I finish the paper by articulating the hurdles that must be overcome to provide an account of the perceived unity of time.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12331>

### **ALFREDO VERNAZZANI – Do we see facts?**

Philosophers of perception frequently assume that we see actual states of affairs, or facts. Call this claim factualism. In his book, William Fish suggests that factualism is supported by phenomenological observation as well as by experimental studies on multiple object tracking and dynamic feature-object integration. In this paper, I examine the alleged evidence for factualism, focusing mainly on object detection and tracking. I argue that there is no scientific evidence for factualism. This conclusion has implications for studies on the phenomenology and epistemology of visual perception.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12336>

### **JORDAN C.V. TAYLOR – Solipsistic sentience**

This article examines the nature of affective states across biological taxa. It argues that affect constitutes a primary form of consciousness. Creatures capable of affect are sentient of their bodily states and can behave in ways intended to maintain or restore them to a homeostatic range. After reviewing and critiquing neurobiological and philosophical theories of the evolution of consciousness, this article argues that some possible creatures are limited to self-directed affective states, even if those creatures are capable of exteroception. Such creatures enjoy solipsistic sentience: awareness of their own selves and bodily demands, but unawareness of their exogenous environments.

*{Possible creatures, yes; but unlikely to get their genes into the future. The English translation of solipsism, self-obsession, reveals the problem: why bother?}*

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12341>

## **COMMENTARIES**

### **JONATHAN BIRCH & ANDREW BUSKELL – How we got stuck: The origins of hierarchy and inequality**

Kim Sterelny's book *The Pleistocene social contract* provides an exceptionally well-informed and credible narrative explanation of the origins of inequality and hierarchy. In this essay review, we reflect on the role of rational choice theory in Sterelny's project, before turning to Sterelny's reasons for doubting the importance of cultural group selection. In the final section, we compare Sterelny's big picture with an alternative from David Wengrow and David Graeber.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12420>

### **KIM STERELNY – Further thoughts on hierarchy and inequality**

This paper responds to Birch and Buskell's thoughtful critique. In it, I defend my use of behavioural ecology. I argue, contra Birch and Buskell, that I can give a principled defence of the emergence of conventions for respecting property, modelling as a network of pairwise iterated PDs between incipient farmers. Second, I defend my scepticism about the power of cultural group selection to optimise community normative packages. Finally, I located my views, as requested, against those of The



Dawn of Everything. I argue that the more complex “original position” envisaged in Dawn depends on special conditions rarely found on Pleistocene Africa.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12435>

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## Nature Communications

### PAPERS

#### **KEVIN ELLIS et al – Synthesizing theories of human language with Bayesian program induction**

Automated, data-driven construction and evaluation of scientific models and theories is a long-standing challenge in artificial intelligence. We present a framework for algorithmically synthesizing models of a basic part of human language: morpho-phonology, the system that builds word forms from sounds. We integrate Bayesian inference with program synthesis and representations inspired by linguistic theory and cognitive models of learning and discovery. Across 70 datasets from 58 diverse languages, our system synthesizes human-interpretable models for core aspects of each language’s morpho-phonology, sometimes approaching models posited by human linguists. Joint inference across all 70 data sets automatically synthesizes a meta-model encoding interpretable cross-language typological tendencies. Finally, the same algorithm captures few-shot learning dynamics, acquiring new morphophonological rules from just one or a few examples. These results suggest routes to more powerful machine-enabled discovery of interpretable models in linguistics and other scientific domains.

<https://www.nature.com/articles/s41467-022-32012-w>

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## Nature Ecology & Evolution

### PAPERS

#### **DANIEL SOL et al with LOUIS LEFEBVRE – Neuron numbers link innovativeness with both absolute and relative brain size in birds**

A longstanding issue in biology is whether the intelligence of animals can be predicted by absolute or relative brain size. However, progress has been hampered by an insufficient understanding of how neuron numbers shape internal brain organization and cognitive performance. On the basis of estimations of neuron numbers for 111 bird species, we show here that the number of neurons in the pallial telencephalon is positively associated with a major expression of intelligence: innovation propensity. The number of pallial neurons, in turn, is greater in brains that are larger in both absolute and relative terms and positively covaries with longer post-hatching development periods. Thus, our analyses show that neuron numbers link cognitive performance to both absolute and relative brain size through developmental adjustments. These findings help unify neuro-anatomical measures at multiple levels, reconciling contradictory views over the biological significance of brain expansion. The results also highlight the value of a life history perspective to advance our understanding of the evolutionary bases of the connections between brain and cognition.

<https://www.nature.com/articles/s41559-022-01815-x>

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## Nature Scientific Data

### PAPERS

#### **BENJAMIN LIPKIN et al with EVELINA FEDORENKO – Probabilistic atlas for the language network based on precision fMRI data from >800 individuals**

Two analytic traditions characterize fMRI language research. One relies on averaging activations across individuals. This approach has limitations: because of inter-individual variability in the locations of language areas, any given voxel/vertex in a common brain space is part of the language network in some individuals but in others, may belong to a distinct network. An alternative approach relies on identifying language areas in each individual using a functional ‘localizer’. Because of its greater sensitivity, functional resolution, and interpretability, functional localization is gaining popularity, but it is not always feasible, and cannot be applied retroactively to past studies. To bridge these disjoint approaches, we created a probabilistic functional atlas using fMRI data for an extensively validated language localizer in 806 individuals. This atlas enables estimating the probability that any given location in a common space belongs to the language network, and thus can help interpret group-level activation peaks and lesion locations, or select voxels/electrodes for analysis. More meaningful comparisons of findings across studies should increase robustness and replicability in language research.

<https://www.nature.com/articles/s41597-022-01645-3>

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## Nature Scientific Reports

### PAPERS

#### **ANASTASIA GLUSHKO, DAVID POEPEL & KARSTEN STEINHAEUER – Overt and implicit prosody contribute to neurophysiological responses previously attributed to grammatical processing**

Recent neurophysiological research suggests that slow cortical activity tracks hierarchical syntactic structure during online sentence processing. Here we tested an alternative hypothesis: electrophysiological activity peaks at constituent phrase as well as sentence frequencies reflect cortical tracking of overt or covert (implicit) prosodic grouping. Participants listened to series of sentences presented in three conditions while electroencephalography (EEG) was recorded. First, prosodic cues in the sentence materials were neutralized. We found an EEG spectral power peak elicited at a frequency that only ‘tagged’ covert, implicit prosodic change, but not any major syntactic constituents. In the second condition, participants listened to a

series of sentences with overt prosodic grouping cues that either aligned or misaligned with the syntactic phrasing in the sentences (initial overt prosody trials). Following each overt prosody trial, participants were presented with a second series of sentences lacking overt prosodic cues (instructed prosody trial) and were instructed to imagine the prosodic contour present in the previous, overt prosody trial. The EEG responses reflected an interactive relationship between syntactic processing and prosodic tracking at the frequencies of syntactic constituents (sentences and phrases): alignment of syntax and prosody boosted EEG responses, whereas their misalignment had an opposite effect. This was true for both overt and imagined prosody conditions. We conclude that processing of both overt and covert prosody is reflected in the frequency-tagged neural responses at sentence constituent frequencies. These findings need to be incorporated in any account that aims to identify neural markers reflecting syntactic processing.

<https://www.nature.com/articles/s41598-022-18162-3>

#### **MAJID MOHEBBI, SEYED NASER RAZAVI & MOHAMMAD ALI BALAFAR – Computing semantic similarity of texts based on deep graph learning with ability to use semantic role label information**

We propose a deep graph learning approach for computing semantic textual similarity (STS) by using semantic role labels generated by a Semantic Role Labeling (SRL) system. SRL system output has significant challenges in dealing with graph-neural networks because it doesn't have a graph structure. To address these challenges, we propose a novel SRL graph by using semantic role labels and dependency grammar. For processing the SRL graph, we proposed a Deep Graph Neural Network (DGNN) based graph-U-Net model that is placed on top of the transformers to use a variety of transformers to process representations obtained from them. We investigate the effect of using the proposed DGNN and SRL graph on the performance of some transformers in computing STS. For the evaluation of our approach, we use STS2017 and SICK datasets. Experimental evaluations show that using the SRL graph accompanied by applying the proposed DGNN increases the performance of the transformers used in the DGNN.

<https://www.nature.com/articles/s41598-022-19259-5>

#### **CHEN SI et al – Modelling representations in speech normalization of prosodic cues**

The lack of invariance problem in speech perception refers to a fundamental problem of how listeners deal with differences of speech sounds produced by various speakers. The current study is the first to test the contributions of mentally stored distributional information in normalization of prosodic cues. This study starts out by modelling distributions of acoustic cues from a speech corpus. We proceeded to conduct three experiments using both naturally produced lexical tones with estimated distributions and manipulated lexical tones with f0 values generated from simulated distributions. State of the art statistical techniques have been used to examine the effects of distribution parameters in normalization and identification curves with respect to each parameter. Based on the significant effects of distribution parameters, we proposed a probabilistic parametric representation (PPR), integrating knowledge from previously established distributions of speakers with their indexical information. PPR is still accessed during speech perception even when contextual information is present. We also discussed the procedure of normalization of speech signals produced by unfamiliar talker with and without contexts and the access of long-term stored representations.

<https://www.nature.com/articles/s41598-022-18838-w>

#### **NICCOLÒ MAZZUCCO et al – Multiproxy study of 7500-year-old wooden sickles from the Lakeshore Village of La Marmotta, Italy**

The lakeshore site of La Marmotta is one of the most important Early Neolithic sites of Mediterranean Europe. The site is famous for the exceptional preservation of organic materials, including numerous wooden artefacts related to navigation, agriculture, textile production, and basketry. This article presents interdisciplinary research on three of the most complete and well-preserved sickles recovered from the site, yet unpublished. All the components of the tools are analysed: the stone inserts, the wooden haft and the adhesive substances used to fix the stones inside the haft. Our innovative methodology combines use-wear and microtexture analysis of stone tools through confocal microscopy, taxonomical and technological analysis of wood, gas chromatography–mass spectrometry analysis of the adhesive substances, and pollen, non-pollen palynomorphs, and phytolith analysis of the remains incorporated within the adhesive. This multiproxy approach provides a significant insight into the life of these tools, from their production to their use and abandonment, providing evidence of the species of harvested plants and the conditions of the field during the harvesting.

<https://www.nature.com/articles/s41598-022-18597-8>

#### **GREGORY J. DEPOW, HAUSE LIN & MICHAEL INZLICHT – Cognitive effort for self, strangers, and charities**

Effort is aversive and often avoided, even when earning benefits for oneself. Yet, people sometimes work hard for others. How do people decide who is worth their effort? Prior work shows people avoid physical effort for strangers relative to themselves, but invest more physical effort for charity. Here, we find that people avoid cognitive effort for others relative to themselves, even when the cause is a personally meaningful charity. In two studies, participants repeatedly decided whether to invest cognitive effort to gain financial rewards for themselves and others. In Study 1, participants (N = 51; 150 choices) were less willing to invest cognitive effort for a charity than themselves. In Study 2, participants (N = 47; 225 choices) were more willing to work cognitively for a charity than an intragroup stranger, but again preferred cognitive exertion that benefited themselves. Computational modeling suggests that, unlike prior physical effort findings, cognitive effort discounted



the subjective value of rewards linearly. Exploratory machine learning analyses suggest that people who represented others more similarly to themselves were more willing to invest effort on their behalf, opening up new avenues for future research. *{I would say, "people who represented themselves more similarly to others were more willing to invest effort on their behalf". The representation of the self to the self is, for me, more fundamental to human societies than the representation of others to the self.}*

<https://www.nature.com/articles/s41598-022-19163-y>

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## New Scientist

### NEWS

#### **Human ancestors may have walked on two legs 7 million years ago**

An analysis of thigh and forearm bones from *Sahelanthropus tchadensis* suggests the early hominin was mainly bipedal, but the claim is controversial.

<https://www.newscientist.com/article/2335079-human-ancestors-may-have-walked-on-two-legs-7-million-years-ago/>

### ARTICLES

#### **COLIN BARRAS – Who is Ancestor X? The biggest mystery in human evolution**

The search for the direct ancestor of humans, Neanderthals and Denisovans has been protracted and puzzling. Now, fresh clues are adding a surprising twist to the tale.

<https://www.newscientist.com/article/2335613-who-is-ancestor-x-the-biggest-mystery-in-human-evolution/>

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## PeerJ

### PAPERS

#### **JUAN ANTONIO PÉREZ-CLAROS & PAUL PALMQVIST – Heterochronies and allometries in the evolution of the hominid cranium: a morphometric approach using classical anthropometric variables**

This article studies the evolutionary change of allometries in the relative size of the two main cranial modules (neurocranium and splanchnocranium) in the five living hominid species and a diverse sample of extinct hominins. We use six standard craniometric variables as proxies for the length, width and height of each cranial module. Factor analysis and two-block partial least squares (2B-PLS) show that the great apes and modern humans share a pervasive negative ontogenetic allometry in the neurocranium and a positive one in the splanchnocranium. This developmental constraint makes it possible to interpret the cranial heterochronies in terms of ontogenetic scaling processes (i.e., extensions or truncations of the ancestral ontogenetic trajectory) and lateral transpositions (i.e., parallel translations of the entire trajectory starting from a different shape for a given cranial size). We hypothesize that ontogenetic scaling is the main evolutionary modality in the australopithecines while in the species of *Homo* it is also necessary to apply transpositions. Both types of processes are coordinated in *Homo*, which result in an evolutionary trend toward an increase in brain size and in the degree of paedomorphosis from the earliest habilines.

<https://peerj.com/articles/13991/>

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## PLoS Biology

### PAPERS

#### **ZACH LADWIG, YUHUA YU & CATERINA GRATTON – Combined methods reveal task activation dynamics in human brain networks**

A clear understanding of how human brain networks reflect task performance has been lacking, in part due to methodological difficulties. A new study combines the temporal resolution of EEG, MRI source localization, and multivariate modeling to address this need.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001749>

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#### **ETI BEN SIMON et al – Sleep loss leads to the withdrawal of human helping across individuals, groups, and large-scale societies**

Humans help each other. This fundamental feature of *homo sapiens* has been one of the most powerful forces sculpting the advent of modern civilizations. But what determines whether humans choose to help one another? Across 3 replicating studies, here, we demonstrate that sleep loss represents one previously unrecognized factor dictating whether humans choose to help each other, observed at 3 different scales (within individuals, across individuals, and across societies). First, at an individual level, 1 night of sleep loss triggers the withdrawal of help from one individual to another. Moreover, fMRI findings revealed that the withdrawal of human helping is associated with deactivation of key nodes within the social cognition brain network that facilitates prosociality. Second, at a group level, ecological night-to-night reductions in sleep across several nights predict corresponding next-day reductions in the choice to help others during day-to-day interactions. Third, at a large-scale national level, we demonstrate that 1 h of lost sleep opportunity, inflicted by the transition to Daylight Saving Time, reduces real-world altruistic helping through the act of donation giving, established through the analysis of over 3 million charitable donations. Therefore, inadequate sleep represents a significant influential force determining whether humans choose to help one another, observable across micro- and macroscopic levels of civilized interaction. The

implications of this effect may be non-trivial when considering the essentiality of human helping in the maintenance of cooperative, civil society, combined with the reported decline in sufficient sleep in many first-world nations.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001733>

### **RAVI D. MILL et al – Network modeling of dynamic brain interactions predicts emergence of neural information that supports human cognitive behavior**

How cognitive task behavior is generated by brain network interactions is a central question in neuroscience. Answering this question calls for the development of novel analysis tools that can firstly capture neural signatures of task information with high spatial and temporal precision (the “where and when”) and then allow for empirical testing of alternative network models of brain function that link information to behavior (the “how”). We outline a novel network modeling approach suited to this purpose that is applied to noninvasive functional neuroimaging data in humans. We first dynamically decoded the spatiotemporal signatures of task information in the human brain by combining MRI-individualized source electroencephalography (EEG) with multivariate pattern analysis (MVPA). A newly developed network modeling approach—dynamic activity flow modeling—then simulated the flow of task-evoked activity over more causally interpretable (relative to standard functional connectivity [FC] approaches) resting-state functional connections (dynamic, lagged, direct, and directional). We demonstrate the utility of this modeling approach by applying it to elucidate network processes underlying sensory–motor information flow in the brain, revealing accurate predictions of empirical response information dynamics underlying behavior. Extending the model toward simulating network lesions suggested a role for the cognitive control networks (CCNs) as primary drivers of response information flow, transitioning from early dorsal attention network-dominated sensory-to-response transformation to later collaborative CCN engagement during response selection. These results demonstrate the utility of the dynamic activity flow modeling approach in identifying the generative network processes underlying neurocognitive phenomena.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001686>

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## **PLoS One**

### **PAPERS**

#### **NEHA BOSE & DANIEL SGROI – The role of personality beliefs and “small talk” in strategic behaviour**

Humans are predisposed to forming “first impressions” about the people we encounter including impressions about their personality traits. While the relationship between personality and strategic decision-making has been widely explored, we examine the role of personality impressions in predicting strategic behaviour and devising behavioural responses. In a laboratory setting, after only 4-minutes of “small talk”, subjects developed a sense of the personality of their partners, particularly extraversion, which consequently changed their behaviour in future interactions. Subjects cooperated more in public goods games when they believed their partner to be extraverted and found it more difficult to out-guess opponents they perceived as similar to themselves in a level-k reasoning task, having engaged in conversation with them. We trace how language can generate these effects using text analysis, showing that talking more makes individuals appear extraverted and pro-social which in turn engenders pro-social behaviour in others.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0269523>

#### **KALOYAN DANOVSKI & MARKUS BREDE – On the evolutionary language game in structured and adaptive populations**

We propose an evolutionary model for the emergence of shared linguistic convention in a population of agents whose social structure is modelled by complex networks. Through agent-based simulations, we show a process of convergence towards a common language, and explore how the topology of the underlying networks affects its dynamics. We find that small-world effects act to speed up convergence, but observe no effect of topology on the communicative efficiency of common languages. We further explore differences in agent learning, discriminating between scenarios in which new agents learn from their parents (vertical transmission) versus scenarios in which they learn from their neighbors (oblique transmission), finding that vertical transmission results in faster convergence and generally higher communicability. Optimal languages can be formed when parental learning is dominant, but a small amount of neighbor learning is included. As a last point, we illustrate an exclusion effect leading to core-periphery networks in an adaptive networks setting when agents attempt to reconnect towards better communicators in the population.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0273608>

#### **MARIA TSFASMAN et al – The world seems different in a social context: A neural network analysis of human experimental data**

Human perception and behavior are affected by the situational context, in particular during social interactions. A recent study demonstrated that humans perceive visual stimuli differently depending on whether they do the task by themselves or together with a robot. Specifically, it was found that the central tendency effect is stronger in social than in non-social task settings. The particular nature of such behavioral changes induced by social interaction, and their underlying cognitive processes in the human brain are, however, still not well understood. In this paper, we address this question by training an artificial neural network inspired by the predictive coding theory on the above behavioral data set. Using this computational model, we investigate whether the change in behavior that was caused by the situational context in the human experiment could be explained by continuous modifications of a parameter expressing how strongly sensory and prior information affect

perception. We demonstrate that it is possible to replicate human behavioral data in both individual and social task settings by modifying the precision of prior and sensory signals, indicating that social and non-social task settings might in fact exist on a continuum. At the same time, an analysis of the neural activation traces of the trained networks provides evidence that information is coded in fundamentally different ways in the network in the individual and in the social conditions. Our results emphasize the importance of computational replications of behavioral data for generating hypotheses on the underlying cognitive mechanisms of shared perception and may provide inspiration for follow-up studies in the field of neuroscience. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0273643>

### **ANDREW J. COLLINS & SHEIDA ETEMADIDAVAN – Humans and the core partition: An agent-based modeling experiment**

Although strategic coalition formation is traditionally modeled using cooperative game theory, behavioral game theorists have repeatedly shown that outcomes predicted by game theory are different from those generated by actual human behavior. To further explore these differences, in a cooperative game theory context, we experiment to compare the outcomes resulting from human participants' behavior to those generated by a cooperative game theory solution mechanism called the core partition. Our experiment uses an interactive simulation of a glove game, a particular type of cooperative game, to collect the participant's decision choices and their resultant outcomes. Two different glove games are considered, and the outputs from 62 trial games are analyzed. The experiment's outcomes show that core coalitions, which are coalitions in a core partition, are found in about 42% of games. Though this number may seem low, a trial's outcome is more complex than whether the human player finds a core coalition or not. Finding the core coalition depends on factors such as the other possible feasible solutions and the payoffs available from these solutions. These factors, and the complexity they generate, are discussed in the paper.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0273961>

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## PNAS

### PAPERS

#### **RICHARD C. CONNOR et al with STEPHANIE L. KING – Strategic intergroup alliances increase access to a contested resource in male bottlenose dolphins**

Efforts to understand human social evolution rely largely on comparisons with nonhuman primates. However, a population of bottlenose dolphins in Shark Bay, Western Australia, combines a chimpanzee-like fission-fusion grouping pattern, mating system, and life history with the only nonhuman example of strategic multilevel male alliances. Unrelated male dolphins form three alliance levels, or "orders", in competition over females: both within-group alliances (i.e., first- and second-order) and between-group alliances (third-order), based on cooperation between two or more second-order alliances against other groups. Both sexes navigate an open society with a continuous mosaic of overlapping home ranges. Here, we use comprehensive association and consortship data to examine fine-scale alliance relationships among 121 adult males. This analysis reveals the largest nonhuman alliance network known, with highly differentiated relationships among individuals. Each male is connected, directly or indirectly, to every other male, including direct connections with adult males outside of their three-level alliance network. We further show that the duration with which males consort females is dependent upon being well connected with third-order allies, independently of the effect of their second-order alliance connections, i.e., alliances between groups increase access to a contested resource, thereby increasing reproductive success. Models of human social evolution traditionally link intergroup alliances to other divergent human traits, such as pair bonds, but our study reveals that intergroup male alliances can arise directly from a chimpanzee-like, promiscuous mating system without one-male units, pair bonds, or male parental care.

<https://www.pnas.org/doi/full/10.1073/pnas.2121723119>

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## Royal Society Open Science

### PAPERS

#### **NICOLE DANAHER-GARCIA et al – The partial merger of two dolphin societies**

Interactions between mammalian social groups are generally antagonistic as individuals in groups cooperate to defend resources from non-members. Members of the family Delphinidae inhabit a three-dimensional habitat where resource defence is usually impractical. Here, we describe a long-term partial fusion of two communities of Atlantic spotted dolphins (*Stenella frontalis*). The northern community, studied for 30 years, immigrated 160 km to the range of the southern community, observed for 20 years. Both communities featured fission-fusion grouping patterns, strongest associations between adult males, and frequent affiliative contact between individuals. For the 5-year period following the immigration, we found members of all age classes and both sexes in mixed groups, but there was a strong bias toward finding immigrant males in mixed groups. Some association levels between males, and males and females, from different communities were as high as the highest within-community associations. Affiliative contacts indicate that these individuals were forming social relationships. The mixing of two separate social groups with new bond formation is rare in terrestrial mammal groups. Such mixing between spotted dolphin groups suggests that adaptations to respond aggressively to 'outsiders' are diminished in this species and possibly other ecologically similar dolphins.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.211963>

**STELLA C. GERDEMANN et al – The ontogeny of children's social emotions in response to (un)fairness**

Humans have a deeply rooted sense of fairness, but its emotional foundation in early ontogeny remains poorly understood. Here, we asked if and when 4- to 10-year-old children show negative social emotions, such as shame or guilt, in response to advantageous unfairness expressed through a lowered body posture (measured using a Kinect depth sensor imaging camera). We found that older, but not younger children, showed more negative emotions, i.e. a reduced upper body posture, after unintentionally disadvantaging a peer on (4,1) trials than in response to fair (1,1) outcomes between themselves and others. Younger children, in contrast, expressed more negative emotions in response to the fair (1,1) split than in response to advantageous inequity. No systematic pattern of children's emotional responses was found in a non-social context, in which children divided resources between themselves and a non-social container. Supporting individual difference analyses showed that older children in the social context expressed negative emotions in response to advantageous inequity without directly acting on this negative emotional response by rejecting an advantageously unfair offer proposed by an experimenter at the end of the study. These findings shed new light on the emotional foundation of the human sense of fairness and suggest that children's negative emotional response to advantageous unfairness developmentally precedes their rejection of advantageously unfair resource distributions.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.191456>

**ADWAIT DESHPANDE, BAS VAN BOEKHOLT & KLAUS ZUBERBUHLER – Preliminary evidence for one-trial social learning of vervet monkey alarm calling**

How do non-human primates learn to use their alarm calls? Social learning is a promising candidate, but its role in the acquisition of meaning and call usage has not been studied systematically, neither during ontogeny nor in adulthood. To investigate the role of social learning in alarm call comprehension and use, we exposed groups of wild vervet monkeys to two unfamiliar animal models in the presence or absence of conspecific alarm calls. To assess the learning outcome of these experiences, we then presented the models for a second time to the same monkeys, but now without additional alarm call information. In subjects previously exposed in conjunction with alarm calls, we found heightened predator inspection compared to control subjects exposed without alarm calls, indicating one-trial social learning of 'meaning'. Moreover, some juveniles (but not adults) produced the same alarm calls they heard during the initial exposure whereas the authenticity of the models had an additional effect. Our experiment provides preliminary evidence that, in non-human primates, call meaning can be acquired by one-trial social learning but that subject age and core knowledge about predators additionally moderate the acquisition of novel call-referent associations.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.210560>

**QIANHUI NI et al with HENRIKE MOLL – No signs of automatic perspective-taking or its modulation by joint attention in toddlers using an object retrieval task**

It is currently debated whether simple forms of social perspective-taking that are in place by late infancy are performed automatically. We conducted two experiments (N = 124) to test whether 3-year-olds show automatic perspective-taking during object searches, and whether automatic perspective-taking is facilitated by joint attention. Children were asked to retrieve an object immediately after it was moved from one (L1) to another (L2) location within a container, e.g. a sandbox. In Experiment 1, a between-subjects design was used, with children being randomly assigned to one of three experimental conditions: one in which child and other jointly attended to the object in L1 (joint attention condition); one in which the other was present but unengaged with the child when the object was placed in L1 (other present condition) and a baseline condition in which only the child was present (no other condition). Automatic perspective-taking should manifest in biased searches toward L1 in the other present and joint attention conditions, but not in the no other condition. No automatic perspective-taking was observed in either experiment, regardless of whether the other person left and remained absent (Experiment 1) or returned after the object was relocated (Experiment 2). The findings contribute to a growing body of empirical data that questions the existence of automatic perspective-taking.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.220347>

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**Science Advances****PAPERS****BYEOL KIM et al – When self comes to a wandering mind: Brain representations and dynamics of self-generated concepts in spontaneous thought**

Self-relevant concepts are major building blocks of spontaneous thought, and their dynamics in a natural stream of thought are likely to reveal one's internal states that are important for mental health. Here, we conducted a functional magnetic resonance imaging experiment (n = 62) to examine brain representations and dynamics of self-generated concepts in the context of spontaneous thought using a newly developed free association-based thought sampling task. The dynamics of conceptual associations were predictive of individual differences in general negative affectivity, replicating across multiple datasets (n = 196). Reflecting on self-generated concepts strongly engaged brain regions linked to autobiographical memory, conceptual processes, emotion, and autonomic regulation, including the medial prefrontal and medial temporal subcortical structures. Multivariate pattern-based predictive modeling revealed that the neural representations of valence became more person-specific as the level of perceived self-relevance increased. Overall, this study sheds light on how self-generated concepts in spontaneous thought construct inner affective states and idiosyncrasies.

## Trends in Ecology and Evolution

### PAPERS

#### **STEFANI A. CRABTREE & JENNIFER A. DUNNE – Towards a science of archaeoecology**

We propose defining a field of research called ‘archaeoecology’ that examines the past ~60 000 years of interactions between humans and ecosystems to better understand the human place within them. Archaeoecology explicitly integrates questions, data, and approaches from archaeology and ecology, and coalesces recent and future studies that demonstrate the usefulness of integrating archaeological, environmental, and ecological data for understanding the past. Defining a subfield of archaeoecology, much as the related fields of environmental archaeology and palaeoecology have emerged as distinct areas of research, provides a clear intellectual context for helping us to understand the trajectory of human–ecosystem interactions in the past, during the present, and into the future.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(22\)00174-4](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(22)00174-4)

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