

## EAORC BULLETIN 1,039 – 14 May 2023

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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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### EDITORIAL INTERJECTIONS

Comments in curly brackets are editorial interjections. The Editor reserves the right to be wrong.

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### RESEARCHGATE – Communication for collaborative computation: two transitions in human evolution

*Philosophical Transactions of The Royal Society B Biological Sciences* 378(1872):20210404 (2023).

#### DANIEL DOR – Communication for collaborative computation: two major transitions in human evolution

This paper presents and defends the following theoretical arguments: (1) The uniqueness of the human condition lies in the fact that only humans engage in collaborative computation, where different individuals work together on shared computational challenges. Collaborative computation is the foundation of our cumulative cultures. (2) Collaborative computation requires individuals to engage in instructive communication, where senders do not just send messages to receivers—but also send them instructions that the receivers are obliged to follow in the course of computing the messages. (3) The process of human evolution was driven throughout by the invention and development of tools of instructive communication. (4) In this process, two separate major transitions should be identified. The first was made possible by the toolkit of representational gestures (pointing, eye contact, manual demonstration, pantomime and more) that Merlin Donald called the toolkit of mimesis. Mimesis allows for collaborative computation as long as the information requiring computation is available for direct experiencing by the participants. The second was made possible by language, the tool that allowed its users, for the first time, to engage in collaborative computations of information they did not experience together—through the systematic instruction of the mental computations of imagination. This article is part of the theme issue ‘Human socio-cultural evolution in light of evolutionary transitions’.

[https://www.researchgate.net/publication/367360155\\_Communication\\_for\\_collaborative\\_computation\\_two\\_major\\_transitions\\_in\\_human\\_evolution](https://www.researchgate.net/publication/367360155_Communication_for_collaborative_computation_two_major_transitions_in_human_evolution)

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## NEWS

### NATURE BRIEFING – ‘Pangenome’ charts human diversity

The first draft of a human ‘pangenome’ has been published. Unlike the first complete human genome sequence, which was derived mostly from the DNA of just one person, the pangenome is drawn from 47 people from around the globe, including individuals from Africa, the Americas, Asia and Europe. More genomes are being added — 350 will be analysed by mid-2024. They will allow geneticists to identify variations in the genomes of diverse populations and investigate links between genes and disease. “This is like going from black-and-white television to 1080p,” says genome scientist Keolu Fox.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=e7a830d157&e=1db4b9a19b>

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### SCIENCE.ORG NEWS – Fake scientific papers are alarmingly common

But new tools show promise in tackling growing symptom of academia’s “publish or perish” culture.

<https://www.science.org/content/article/fake-scientific-papers-are-alarmingly-common>

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### THE CONVERSATION – Neanderthals hunted bigger animals, across a larger range, than modern humans

The analysis could help us understand behavioural differences between the two groups of humans.

<https://theconversationuk.cmail20.com/t/r-l-ttjtuud-khhililahh-yk/>

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## PUBLICATIONS

### Biology Letters

#### PAPERS

#### **ANTTI O. TANSKANEN, SAMULI HELLE & MIRKKA DANIELSBACKA – Differential grandparental investment when maternal grandmothers are living versus deceased**

Grandparents can increase their inclusive fitness by investing time and resources in their grandchildren. However, not all grandparents make such investments equally, and between-grandparent differences in this regard can be predicted based on paternity uncertainty, lineage and grandparents' sex. Using population-based data for English and Welsh adolescents ( $n = 1430$ ), we examined whether the death of the most important grandparent (in terms of investment), the maternal grandmother (MGM), changes relative support for existing hypotheses predicting differential grandparental-investment patterns. To contrast the predictions of the grandparental investment hypotheses, we used generalized order-restricted information criterion approximation. We consequently found that, when MGMs are alive, the most-supported hypothesis is ‘discriminative grandparental solicitude’, which ranks grandparental investment as MGMs > maternal grandfathers (MGFs) > paternal grandmothers (PGMs) > paternal grandfathers (PGFs). However, when MGMs are deceased, the paternity uncertainty hypothesis (MGFs = PGMs > PGFs) receives the most support; this is due to increased investment by PGMs. Thus, when the heaviest investors (i.e. MGMs) are deceased, PGM investments are closer to—but do not exceed—MGF investments.

<https://royalsocietypublishing.org/doi/10.1098/rsbl.2023.0061>

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### Cell Reports

#### PAPERS

#### **YONATAN SANZ PERL et al – Low-dimensional organization of global brain states of reduced consciousness**

Brain states are frequently represented using a unidimensional scale measuring the richness of subjective experience (level of consciousness). This description assumes a mapping between the high-dimensional space of whole-brain configurations and the trajectories of brain states associated with changes in consciousness, yet this mapping and its properties remain unclear. We combine whole-brain modeling, data augmentation, and deep learning for dimensionality reduction to determine a mapping representing states of consciousness in a low-dimensional space, where distances parallel similarities between states. An orderly trajectory from wakefulness to patients with brain injury is revealed in a latent space whose coordinates represent metrics related to functional modularity and structure-function coupling, increasing alongside loss of consciousness. Finally, we investigate the effects of model perturbations, providing geometrical interpretation for the stability and reversibility of states. We conclude that conscious awareness depends on functional patterns encoded as a low-dimensional trajectory within the vast space of brain configurations.

[https://www.cell.com/cell-reports/fulltext/S2211-1247\(23\)00502-8](https://www.cell.com/cell-reports/fulltext/S2211-1247(23)00502-8)

## Current Biology

### ARTICLES

**MASSIMO TRUSEL & TODD F. ROBERTS – Neural circuits: How the songbird brain orchestrates courtship displays**

Volitional production of complex behaviors can be motivated by intrinsic rewards and also by extrinsic cues, like social engagement. A new study has revealed the neural circuit permitting social motivation to release multi-component courtship behaviors in a songbird, specifically the zebra finch.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)00384-6](https://www.cell.com/current-biology/fulltext/S0960-9822(23)00384-6)

**MATTHEW R. LONGO – Comparative cognition: Capuchin monkeys believe in magic**

Capuchin monkeys are unique among New World monkeys for their manual dexterity and use of tools. New research using magical sleight of hand shows visual perception of others' actions paralleling their manual skills.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)00383-4](https://www.cell.com/current-biology/fulltext/S0960-9822(23)00383-4)

### PAPERS

**MOR BEN-TOV, FABIOLA DUARTE & RICHARD MOONEY – A neural hub for holistic courtship displays**

Courtship displays often involve the concerted production of several distinct courtship behaviors. The neural circuits that enable the concerted production of the component behaviors of a courtship display are not well understood. Here, we identify a midbrain cell group (A11) that enables male zebra finches to produce their learned songs in concert with various other behaviors, including female-directed orientation, pursuit, and calling. Anatomical mapping reveals that A11 is at the center of a complex network including the song premotor nucleus HVC as well as brainstem regions crucial to calling and locomotion. Notably, lesioning A11 terminals in HVC blocked female-directed singing but did not interfere with female-directed calling, orientation, or pursuit. In contrast, lesioning A11 cell bodies strongly reduced and often abolished all female-directed courtship behaviors. However, males with either type of lesion still produced songs when in social isolation. Lastly, imaging calcium-related activity in A11 terminals in HVC showed that during courtship, A11 signals HVC about female-directed calls and during female-directed singing, about the transition from simpler introductory notes to the acoustically more complex syllables that depend intimately on HVC for their production. These results show how a brain region important to reproduction in both birds and mammals enables holistic courtship displays in male zebra finches, which include learning songs, calls, and other non-vocal behaviors.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(23\)00245-2](https://www.cell.com/current-biology/fulltext/S0960-9822(23)00245-2)

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## eLife

### PAPERS

**ALAN V. RINCON et al – Higher social tolerance is associated with more complex facial behavior in macaques**

The social complexity hypothesis for communicative complexity posits that animal societies with more complex social systems require more complex communication systems. We tested the social complexity hypothesis on three macaque species that vary in their degree of social tolerance and complexity. We coded facial behavior in >3000 social interactions across three social contexts (aggressive, submissive, affiliative) in 389 animals, using the Facial Action Coding System for macaques (MaqFACS). We quantified communicative complexity using three measures of uncertainty: entropy, specificity, and prediction error. We found that the relative entropy of facial behavior was higher for the more tolerant crested macaques as compared to the less tolerant Barbary and rhesus macaques across all social contexts, indicating that crested macaques more frequently use a higher diversity of facial behavior. The context specificity of facial behavior was higher in rhesus as compared to Barbary and crested macaques, demonstrating that Barbary and crested macaques used facial behavior more flexibly across different social contexts. Finally, a random forest classifier predicted social context from facial behavior with highest accuracy for rhesus and lowest for crested, indicating there is higher uncertainty and complexity in the facial behavior of crested macaques. Overall, our results support the social complexity hypothesis.

<https://elifesciences.org/reviewed-preprints/87008>

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## Evolutionary Anthropology

### ARTICLES

**RENATA P. ARAUJO et al – Benchmarking methods and data for the whole-outline geometric morphometric analysis of lithic tools**

Originally developed for the quantitative analysis of organismal shapes, both two-dimensional (2D) and 3D geometric morphometric methods (GMMs) have recently gained some prominence in archaeology for the analysis of stone tools— unquestionably the primary deep-time data source for the earliest periods of human cultural evolution. The key strength of GMM rests in its ability to statistically quantify and hence qualify complex shapes, which in turn can be used to infer social interaction, function, reduction, as well as to assess classification systems and cultural relatedness.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.21981>

## Frontiers in Earth Science

### PAPERS

#### **ALFRED F. PAWLIK & RICZAR B. FUENTES – Prehistoric Hunter-Gatherers in the Philippines—Subsistence strategies, adaptation, and behaviour in maritime environments**

Archaeological research in the Philippines has produced a timeline of currently over 700,000 years of human occupation. However, while an initial presence of early hominins has been securely established through several radiometric dates between 700 ka to 1 ma from Luzon Island, there is currently little evidence for the presence of hominins after those episodes until c. 67 to 50 ka for Luzon or any of the other Philippine islands. At approximately 40 ka, anatomically modern humans had arrived in the Philippines. Early sites with fossil and/or artifactual evidence are Tabon Cave in Palawan and Bubog 1 in Occidental Mindoro, the latter situated in the Wallacean part of the archipelago. This paper presents an overview of the archaeological research on the prehistory of the Philippines from the Pleistocene until the Late Holocene and the arrival of the first farmers, presumably from Austronesian language groups approximately 4,000 years ago. Research on this topic has significantly intensified over the past 20 years and is providing a variety of evidence for the successful adaptation of those first islanders to maritime environments, the diversity of technological and subsistence strategies, and increasingly complex interrelationships across Island Southeast Asia.

<https://www.frontiersin.org/articles/10.3389/feart.2023.1110147/full>

## Frontiers in Psychology

### PAPERS

#### **ELIZABETH QING ZHANG, EDWARD RUOYANG SHI & LLUÍS BARCELÓ-COBLIJN – Categorical perception and language evolution: a comparative and neurological perspective**

Categorical Perception (CP) is a ubiquitous phenomenon in nature (Eimas et al., 1971; Goldstone and Hendrickson, 2010). Discreteness is a prominent feature of human language (Hockett, 1960). In this paper, we propose that CP could have played a foundational role for discreteness of language in evolution. We firstly approach discreteness from a domain general perspective and highlight how it is salient in language. Then by reviewing CP of sounds in non-human animals, we argue that CP has its phylogenetic roots in terms of evolution. Following this, we explain how CP could have been the basis for discreteness with neurological evidence focusing on the auditory cortex, (pre)motor cortex and the basal ganglia. At last, we suggest that clinical linguistics provides revealing insights on the role of CP in language. The current work discusses the role of perception in language evolution, which provides a new avenue to explore the evolution of human language from the sensory-motor system.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1110730/full>

#### **KRYSTIAN MACHETA, ARKADIUSZ GUT & FRANCISCO PONS – The link between emotion comprehension and cognitive perspective taking in theory of mind (ToM): a study of preschool children**

The study examined the relation between perspective taking embedded in theory of mind (ToM) and emotion comprehension (EC) in young children. Our study involved children from Poland aged 3–6 (N = 99; 54% boys) from public and private kindergartens residing mainly in urban areas, whose parents could mostly be classified as middle class. The children were examined with the Test of Emotion Comprehension (TEC) and three tasks targeting three aspects of ToM: a first-order false belief task, an appearance-reality test, and a mental states opacity task. The results showed similarities in performances between these different measures. However, only the opacity task predicted the emotion comprehension test results ( $\eta^2 = 0.13$ ). The results indicate that the key element of ToM that explains individual differences in children's emotion comprehension is the full-blown understanding of perspective taking, namely that having access to an object under one description does not ensure access to that object under all descriptions. In the research, we took also into account the linguistic side of such specific competences as ToM and EC, which allowed us to see the role of language in scaffolding the development of children's ability to handle such socially fundamental tasks as understanding emotions and epistemic states.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1150959/full>

## Nature

### PAPERS

#### **EVAN M. GORDON et al. – A somato-cognitive action network alternates with effector regions in motor cortex**

Motor cortex (M1) has been thought to form a continuous somatotopic homunculus extending down the precentral gyrus from foot to face representations, despite evidence for concentric functional zones and maps of complex actions. Here, using precision functional magnetic resonance imaging (fMRI) methods, we find that the classic homunculus is interrupted by regions with distinct connectivity, structure and function, alternating with effector-specific (foot, hand and mouth) areas. These inter-effector regions exhibit decreased cortical thickness and strong functional connectivity to each other, as well as to the cingulo-opercular network (CON), critical for action and physiological control, arousal, errors and pain. This interdigitation of action control-linked and motor effector regions was verified in the three largest fMRI datasets. Macaque and pediatric (newborn, infant and child) precision fMRI suggested cross-species homologues and developmental precursors of the inter-effector system. A battery of motor and action fMRI tasks documented concentric effector somatotopies,

separated by the CON-linked inter-effector regions. The inter-effectors lacked movement specificity and co-activated during action planning (coordination of hands and feet) and axial body movement (such as of the abdomen or eyebrows). These results, together with previous studies demonstrating stimulation-evoked complex actions and connectivity to internal organs such as the adrenal medulla, suggest that M1 is punctuated by a system for whole-body action planning, the somato-cognitive action network (SCAN). In M1, two parallel systems intertwine, forming an integrate–isolate pattern: effector-specific regions (foot, hand and mouth) for isolating fine motor control and the SCAN for integrating goals, physiology and body movement.

<https://www.nature.com/articles/s41586-023-05964-2>

## Nature Communications Biology

### PAPERS

#### **QING LI et al – Automatic landmarking identifies new loci associated with face morphology and implicates Neanderthal introgression in human nasal shape**

We report a genome-wide association study of facial features in >6000 Latin Americans based on automatic landmarking of 2D portraits and testing for association with inter-landmark distances. We detected significant associations ( $P$ -value  $< 5 \times 10^{-8}$ ) at 42 genome regions, nine of which have been previously reported. In follow-up analyses, 26 of the 33 novel regions replicate in East Asians, Europeans, or Africans, and one mouse homologous region influences craniofacial morphology in mice. The novel region in 1q32.3 shows introgression from Neanderthals and we find that the introgressed tract increases nasal height (consistent with the differentiation between Neanderthals and modern humans). Novel regions include candidate genes and genome regulatory elements previously implicated in craniofacial development, and show preferential transcription in cranial neural crest cells. The automated approach used here should simplify the collection of large study samples from across the world, facilitating a cosmopolitan characterization of the genetics of facial features.

<https://www.nature.com/articles/s42003-023-04838-7>

## Nature Humanities & Social Sciences Communications

### PAPERS

#### **DENIS TVERSKOI et al with SERGEY GAVRILETS – Disentangling material, social, and cognitive determinants of human behavior and beliefs**

In social interactions, human decision-making, attitudes, and beliefs about others coevolve. Their dynamics are affected by cost-benefit considerations, cognitive processes (such as cognitive dissonance, social projecting, and logic constraints), and social influences by peers (via descriptive and injunctive social norms) and by authorities (e.g., educational, cultural, religious, political, administrative, individual or group, real or fictitious). Here we attempt to disentangle some of this complexity by using an integrative mathematical modeling and a 35-day online behavioral experiment. We utilize data from a Common Pool Resources experiment with or without messaging promoting a group-beneficial level of resource extraction. We directly estimate the weights of different factors in decision-making and beliefs dynamics. We show that personal norms and conformity with expected peers' actions have the largest impact on decision-making while material benefits and normative expectations have smaller effects. Individuals behaving prosocially are characterized by higher weights of personal norms while antisocial types are more affected by conformity. Messaging greatly decreases the weight of personal norms while simultaneously increases the weight of conformity. It also markedly influences personal norms and normative expectations. Both cognitive and social factors are important in the dynamics of beliefs. Between-individual variation is present in all measured characteristics and notably impacts observed group behavior. At the same time, gender differences are small. We argue that one can hardly understand social behavior without understanding the dynamics of personal beliefs and beliefs about others and that cognitive, social, and material factors all play important roles in these processes. Our results have implications for understanding and predicting social processes triggered by certain shocks (e.g., social unrest, a pandemic, or a natural disaster) and for designing policy interventions aiming to change behavior (e.g., actions aimed at environment protection or climate change mitigation).

<https://www.nature.com/articles/s41599-023-01745-4>

## Nature Scientific Reports

### PAPERS

#### **ISAAC J. HANDLEY-MINER et al – The intentions of information sources can affect what information people think qualifies as true**

The concept of truth is at the core of science, journalism, law, and many other pillars of modern society. Yet, given the imprecision of natural language, deciding what information should count as true is no easy task, even with access to the ground truth. How do people decide whether a given claim of fact qualifies as true or false? Across two studies ( $N = 1181$ ; 16,248 observations), participants saw claims of fact alongside the ground truth about those claims. Participants classified each claim as true or false. Although participants knew precisely how accurate the claims were, participants classified claims as false more often when they judged the information source to be intending to deceive (versus inform) their audience, and classified claims as true more often when they judged the information source to be intending to provide an approximate

(versus precise) account. These results suggest that, even if people have access to the same set of facts, they might disagree about the truth of claims if they attribute discrepant intentions to information sources. Such findings may shed light on the robust and persistent disagreements over claims of fact that have arisen in the “post-truth era”.

<https://www.nature.com/articles/s41598-023-34806-4>

### **TOBIAS RIEDE et al – Post-pubertal developmental trajectories of laryngeal shape and size in humans**

Laryngeal morphotypes have been hypothesized related to both phonation and to laryngeal pathologies. Morphotypes have not been validated or demonstrated quantitatively and sources of shape and size variation are incompletely understood but are critical for the explanation of behavioral changes (e.g., changes of physical properties of a voice) and for therapeutic approaches to the larynx. This is the first study to take this crucial step and results are likely to have implications for surgeons and speech language pathologists. A stratified human sample was interrogated for phenotypic variation of the vocal organ. First, computed tomography image stacks were used to generate three-dimensional reconstructions of the thyroid cartilage. Then cartilage shapes were quantified using multivariate statistical analysis of high dimensional shape data from margins and surfaces of the thyroid cartilage. The effects of sex, age, body mass index (BMI) and body height on size and shape differences were analyzed. We found that sex, age, BMI and the age–sex interaction showed significant effects on the mixed sex sample. Among males, only age showed a strong effect. The thyroid cartilage increased in overall size, and the angulation between left and right lamina decreased in older males. Age, BMI and the age–height interaction were statistically significant factors within females. The angulation between left and right lamina increased in older females and was smaller in females with greater BMI. A cluster analysis confirmed the strong age effect on larynx shape in males and a complex interaction between the age, BMI and height variables in the female sample. The investigation demonstrated that age and BMI, two risk factors in a range of clinical conditions, are associated with shape and size variation of the human larynx. The effects influence shape differently in female and male larynges. The male–female shape dichotomy is partly size-dependent but predominantly size-independent.

<https://www.nature.com/articles/s41598-023-34347-w>

## PLoS One

### PAPERS

### **FRANCISCO PLANA, JORGE PÉREZ & ANDRÉS ABELIUK – Modularity of food-sharing networks minimises the risk for individual and group starvation in hunter-gatherer societies**

It has been argued that hunter-gatherers’ food-sharing may have provided the basis for a whole range of social interactions, and hence its study may provide important insight into the evolutionary origin of human sociality. Motivated by this observation, we propose a simple network optimization model inspired by a food-sharing dynamic that can recover some empirical patterns found in social networks. We focus on two of the main food-sharing drivers discussed by the anthropological literature: the reduction of individual starvation risk and the care for the group welfare or egalitarian access to food shares, and show that networks optimizing both criteria may exhibit a community structure of highly-cohesive groups around special agents that we call hunters, those who inject food into the system. These communities appear under conditions of uncertainty and scarcity in the food supply, which suggests their adaptive value in this context. We have additionally obtained that optimal welfare networks resemble social networks found in lab experiments that promote more egalitarian income distribution, and also distinct distributions of reciprocity among hunters and non-hunters, which may be consistent with some empirical reports on how sharing is distributed in waves, first among hunters, and then hunters with their families. These model results are consistent with the view that social networks functionally adaptive for optimal resource use, may have created the environment in which prosocial behaviors evolved. Finally, our model also relies on an original formulation of starvation risk, and it may contribute to a formal framework to proceed in this discussion regarding the principles guiding food-sharing networks.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0272733>

### **TAKAHIRO TSUMURA & SEIJI YAMADA – Influence of agent’s self-disclosure on human empathy**

As AI technologies progress, social acceptance of AI agents, including intelligent virtual agents and robots, is becoming even more important for more applications of AI in human society. One way to improve the relationship between humans and anthropomorphic agents is to have humans empathize with the agents. By empathizing, humans act positively and kindly toward agents, which makes it easier for them to accept the agents. In this study, we focus on self-disclosure from agents to humans in order to increase empathy felt by humans toward anthropomorphic agents. We experimentally investigate the possibility that self-disclosure from an agent facilitates human empathy. We formulate hypotheses and experimentally analyze and discuss the conditions in which humans have more empathy toward agents. Experiments were conducted with a three-way mixed plan, and the factors were the agents’ appearance (human, robot), self-disclosure (high-relevance self-disclosure, low-relevance self-disclosure, no self-disclosure), and empathy before/after a video stimulus. An analysis of variance (ANOVA) was performed using data from 918 participants. We found that the appearance factor did not have a main effect, and self-disclosure that was highly relevant to the scenario used facilitated more human empathy with a statistically significant difference. We also found that no self-disclosure suppressed empathy. These results support our

hypotheses. This study reveals that self-disclosure represents an important characteristic of anthropomorphic agents which helps humans to accept them.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0283955>

### **MAR SUAREZ & MARIA SOLEDAD BEATO – False memory in a second language: The importance of controlling the knowledge of word meaning**

In the globalized world we live in, it is increasingly common for people to speak more than one language. Although research in psychology has been widely interested in the study of false memories with the Deese/Roediger-McDermott (DRM) paradigm, to date, there is a scarcity of studies comparing false memories in the first and the second language (L1 and L2, respectively). It is noteworthy that one of the most studied variables in the DRM paradigm, the backward associative strength (BAS), has hardly been studied in the L2. Moreover, the only study that recently examined this matter found differences in the knowledge of L2-word meaning between the high-BAS and low-BAS lists, which would hinder the interpretation of the BAS effect in L2 false memories. Taking all this into account, the current work examined false memories in the L1 (Spanish) and the L2 (English) as a function of BAS overcoming the limitations of the previous study. We selected DRM lists using both Spanish and English free association norms and lists were constructed to vary in BAS values while controlling the knowledge of word meaning. Results showed that false recognition was greater in the L1 or dominant language than in the L2 or non-dominant language. Furthermore, BAS modulated the false recognition in both the L1 and the L2. That is, false recognition was higher in high-BAS than low-BAS lists in both languages. Sensitivity index from the signal-detection theory helped us gain further insight into these results. The main findings are discussed in the light of theoretical models from both the false memory and the second language processing literature. Finally, practical implications and future research are provided.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0285747>

## PNAS

### COMMENTARIES

#### **ALAIN MORIN – Self-awareness in fish?**

Kohda et al. present results suggesting that cleaner fish can recognize a photograph of themselves based on introspection of a mental image of their face (“autoscopic” image), which they take as evidence of private self-awareness. In my opinion, the report suffers from several limitations that cast doubt on the conclusions reached.

<https://www.pnas.org/doi/full/10.1073/pnas.2303377120>

#### **MASANORI KOHDA et al – Reply to Morin: Cleaner fish have a concept of the self**

We welcome the comments by Morin, who offers a philosopher’s perspective on our research. First, Morin comments on our claim that cleaner fish can have a mental image of the self [“autoscopic image”]. Using multiple experiments, we document compelling evidence that cleaner fish recognize the self in photographs via self-face recognition, with the most likely mechanism being a mental image of the self, not by kinesthetic visual matching. Morin states, “There still could be other unknown underlying mechanisms no one thought about yet.” This is a claim that could be made against any experimental study, and we await a genuine alternative hypothesis explaining our results that we can test.

<https://www.pnas.org/doi/full/10.1073/pnas.2303923120>

## Proceedings of the Royal Society B

### PAPERS

#### **AVI BENOZIO, BAILEY R. HOUSE & MICHAEL TOMASELLO – Apes reciprocate food positively and negatively**

Reciprocal food exchange is widespread in human societies but not among great apes, who may view food mainly as a target for competition. Understanding the similarities and differences between great apes’ and humans’ willingness to exchange food is important for our models regarding the origins of uniquely human forms of cooperation. Here, we demonstrate in-kind food exchanges in experimental settings with great apes for the first time. The initial sample consisted of 13 chimpanzees and 5 bonobos in the control phases, and the test phases included 10 chimpanzees and 2 bonobos, compared with a sample of 48 human children aged 4 years. First, we replicated prior findings showing no spontaneous food exchanges in great apes. Second, we discovered that when apes believe that conspecifics have ‘intentionally’ transferred food to them, positive reciprocal food exchanges (food-for-food) are not only possible but reach the same levels as in young children (approx. 75–80%). Third, we found that great apes engage in negative reciprocal food exchanges (no-food for no-food) but to a lower extent than children. This provides evidence for reciprocal food exchange in great apes in experimental settings and suggests that while a potential mechanism of fostering cooperation (via positive reciprocal exchanges) may be shared across species, a stabilizing mechanism (via negative reciprocity) is not.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2022.2541>

**E. GIROLA, R. A. DUNLOP & M. J. NOAD – Singing humpback whales respond to wind noise, but not to vessel noise**

Animal communication systems evolved in the presence of noise generated by natural sources. Many species can increase the source levels of their sounds to maintain effective communication in elevated noise conditions, i.e. they have a Lombard response. Human activities generate additional noise in the environment creating further challenges for these animals. Male humpback whales are known to adjust the source levels of their songs in response to wind noise, which although variable is always present in the ocean. Our study investigated whether this Lombard response increases when singing males are exposed to additional noise generated by motor vessels. Humpback whale singers were recorded off eastern Australia using a fixed hydrophone array. The source levels of the songs produced while the singers were exposed to varying levels of wind noise and vessel noise were measured. Our results show that, even when vessel noise is dominant, singing males still adjust the source levels of their songs to compensate for the underlying wind noise, and do not further increase their source levels to compensate for the additional noise produced by the vessel. Understanding humpback whales' response to noise is important for developing mitigation policies for anthropogenic activities at sea.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2023.0204>

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**Science**
**ARTICLES****JEFFREY BRAINARD – New tools show promise for tackling paper mills**

Fake papers—a symptom of academia's "publish or perish" pressure—are alarmingly common, new findings suggest.

<https://www.science.org/content/article/fake-scientific-papers-are-alarmingly-common>

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**Trends in Cognitive Sciences**
**PAPERS****MARINA DUBOVA & ROBERT L. GOLDSTONE – Carving joints into nature: reengineering scientific concepts in light of concept-laden evidence**

A new wave of proposals suggests that scientists must reassess scientific concepts in light of accumulated evidence.

However, reengineering scientific concepts in light of data is challenging because scientific concepts affect the evidence itself in multiple ways. Among other possible influences, concepts (i) prime scientists to overemphasize within-concept similarities and between-concept differences; (ii) lead scientists to measure conceptually relevant dimensions more accurately; (iii) serve as units of scientific experimentation, communication, and theory-building; and (iv) affect the phenomena themselves. When looking for improved ways to carve nature at its joints, scholars must take the concept-laden nature of evidence into account to avoid entering a vicious circle of concept-evidence mutual substantiation.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00096-7](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00096-7)

**DANICA DILLION et al – Can AI language models replace human participants?**

Recent work suggests that language models such as GPT can make human-like judgments across a number of domains. We explore whether and when language models might replace human participants in psychological science. We review nascent research, provide a theoretical model, and outline caveats of using AI as a participant.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00098-0](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00098-0)

**ERIN E. HECHT et al – The evolutionary neuroscience of domestication**

How does domestication affect the brain? This question has broad relevance. Domesticated animals play important roles in human society, and substantial recent work has addressed the hypotheses that a domestication syndrome links phenotypes across species, including *Homo sapiens*. Surprisingly, however, neuroscience research on domestication remains largely disconnected from current knowledge about how and why brains change in evolution. This article aims to bridge that gap. Examination of recent research reveals some commonalities across species, but ultimately suggests that brain changes associated with domestication are complex and variable. We conclude that interactions between behavioral, metabolic, and life-history selection pressures, as well as the role of experience and environment, are currently largely overlooked and represent important directions for future research.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00070-0](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00070-0)

**DANIEL BALLIET & BJÖRN LINDSTRÖM – Inferences about interdependence shape cooperation**

During social interactions in daily life, people possess imperfect knowledge of their interdependence (i.e., how behaviors affect each person's outcomes), and what people infer about their interdependence can shape their behaviors. We review theory and research that suggests people can infer their interdependence with others along several dimensions, including mutual dependence, power, and corresponding-versus-conflicting interests. We discuss how perceptions of interdependence affect how people cooperate and punish others' defection in everyday life. We propose that people understand their interdependence with others through knowledge of the action space, cues during social interactions (e.g., partner behaviors), and priors based on experience. Finally, we describe how learning interdependence could occur through domain-specific and domain-general mechanisms.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00065-7](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00065-7)

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## Trends in Neurosciences

### PAPERS

#### **ABIGAIL S. GREENE et al – Why is everyone talking about brain state?**

The rapid and coordinated propagation of neural activity across the brain provides the foundation for complex behavior and cognition. Technical advances across neuroscience subfields have advanced understanding of these dynamics, but points of convergence are often obscured by semantic differences, creating silos of subfield-specific findings. In this review we describe how a parsimonious conceptualization of brain state as the fundamental building block of whole-brain activity offers a common framework to relate findings across scales and species. We present examples of the diverse techniques commonly used to study brain states associated with physiology and higher-order cognitive processes, and discuss how integration across them will enable a more comprehensive and mechanistic characterization of the neural dynamics that are crucial to survival but are disrupted in disease.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(23\)00101-7](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(23)00101-7)

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