EAORC BULLETIN 1,082 – 10 March 2024

CONTENTS

NOTICES

PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.
If there is a journal you feel I should be tracking on a regular basis, let me know.
And if you have any other ideas for extending the "EAORC experience", please contact me.

EDITORIAL INTERJECTIONS

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

NEW E-BOOK ALERT – The Sources of Language Grammar: An Anthropological Perspective

Martin P.J. Edwardes (2024). The Sources of Language Grammar: An Anthropological Perspective. Scitsiugnil Press.
Free download at http://martinedwardes.me.uk/scitsiugnil/sources_of_language_grammar_ebook.html.

ACADEMIA.EDU – Hominin Evolution

In T.K. Shackelford & V.A. Weekes-Shackelford (eds.), Encyclopedia of Evolutionary Psychological Science, Springer International Publishing (2017).

LAURA VAN HOLSTEIN & ROBERT A. FOLEY – Hominin Evolution

Early evolutionary biologists answered the question of human origins by searching for the precise location of "man's place in nature," in T.H. Huxley's phrasing, based on comparative anatomy between living species. Research has moved from viewing humanity at the top of the scala naturae to seeing it as "just" a big-brained, bipedal primate, and the focus shifted to explaining how we arrived at "our" place. The post-nineteenth-century focus has been on understanding the evolutionary circumstances that produced Homo sapiens, based on the idea that human-specific traits are the product of the same evolutionary processes that led to all other species. This effort is notably multidisciplinary: human origins fall within the remit of anthropology, biology, genetics, zoology, primatology, geology, and psychology. The (occasionally contentious) synthesis of work within these fields has produced a coherent, albeit pixelated picture, of which this summary is a sketch. It first reviews hominin evolutionary history chronologically and then explores evolutionary patterns, including the evolution of cognition, in more depth.
https://www.academia.edu/35324499/Hominin_Evolution

NEWS

NATURE BRIEFING – Oldest stone tools in Europe point East

Stone tools found in western Ukraine date to roughly 1.4 million years ago, making them the oldest known artefacts in Europe made by ancient humans. The findings support the theory that our early relatives — probably of the versatile species Homo erectus — first entered Europe from the east and spread west. The type of tools, and the location where they were found, hint that the first Europeans might have moved westwards along the valleys of the Danube River.
https://www.nature.com/articles/s41586-024-07151-3

NATURE BRIEFING – Podcast: Bees learn new tricks from others

One behaviour that was thought to be unique to humans is the ability to learn something from your predecessors that you couldn't figure out on your own. Now researchers have shown that bumblebees are also capable of this 'standing on the shoulders of giants' approach to learning. Bees taught how to complete a puzzle too difficult to solve on their own were able to share this knowledge with other bees, raising the possibility that this ability could be widespread among animals.
https://www.nature.com/articles/d41586-024-00427-8

SAPIENS – Excavating the Coexistence of Neanderthals and Modern Humans

An archaeologist explains how remains recently recovered from a cave in present-day Germany suggest that Neanderthals and modern humans populated Europe together for at least 10,000 years.
https://www.sapiens.org/biology/coexistence-neanderthals-humans/

SAPIENS – Women at the Hearth and on the Hunt
New archaeological findings about hunting challenge entrenched beliefs about gender roles in ancient hunter-gatherer societies.
https://www.sapiens.org/archaeology/female-hunters/

SAPIENS – The Anthropologists Who Undid Sex, Race, and Gender
In Gods of the Upper Air, a biographer reveals how anthropologist Franz Boas and his students helped transform how human differences and similarities are perceived.
Review of 'Gods of the Upper Air: How a Circle of Renegade Anthropologists Reinvented Race, Sex, and Gender in the 20th Century' by Charles King. Doubleday, 2019.
https://www.sapiens.org/culture/gods-of-the-upper-air-review/

SCIENCEADVISER – Our most mysterious cousins
Only scattered Denisovan bones have been found. Still, scientists are getting a clearer picture of what this cousin of ours was like thanks to DNA hiding in our genomes.
https://www.nytimes.com/2024/03/02/science/denisovan-neanderthal-dna.html

SCIENCE.ORG NEWS – Stone tools in Ukraine were left by Europe's first known humans
Primitive tools help trace the paths of Homo erectus out of Africa.
https://www.science.org/content/article/stone-tools-ukraine-were-left-europe-s-first-known-humans

SCIENCE.ORG NEWS – Where did India's people come from? Massive genetic study reveals surprises
Analysis confirms Iranian influx, but also finds genes from Neanderthals and a mysterious human ancestor.
https://www.science.org/content/article/where-did-india-s-people-come-massive-genetic-study-reveals-surprises

PUBLICATIONS

Current Biology
PAPERS

LISA K. CHINN et al – Tactile localization promotes infant self-recognition in the mirror-mark test
Mirror self-recognition has been hailed by many as a milestone in the acquisition of self-awareness with respect to phylogenesis and human ontogenesis. Yet there has been considerable controversy over the extent to which species other than humans and their closest primate relatives are capable of mirror self-recognition, and to the mechanisms that give rise to this ability. One influential view is that mirror self-recognition in humans and their closest primate relatives is a cognitive advance that is a product of primate evolution, stemming from more recently evolved neural structures and networks that develop through experience-independent mechanisms during ontogenesis. In contrast, we show that the development of mirror self-recognition in human infants is a perception-action achievement, building on infants' ability to localize and reach to targets on the body. Infants who were given experience reaching to tactile targets on their bodies in the months prior to recognizing themselves in a mirror achieved mirror self-recognition earlier than infants in either a yoked age-matched control group or a longitudinal control group without such experience. Our results demonstrate that self-touch functions as an intermodal gateway through which infants learn how to localize and reach to stimuli on their bodies, including those that can only be seen in a mirror. These findings identify an overlooked role for the routine activity of self-touch in establishing a representation of the body and suggest that the development of human self-awareness is rooted in self-directed action.
https://www.cell.com/current-biology/abstract/S0960-9822(24)00170-2

eLife
PAPERS

ZILU LIANG et al – Social navigation: distance and grid-like codes support navigation of abstract social space in human brain
People form impressions about others during daily social encounters and infer personality traits from others' behaviors. Such trait inference is thought to rely on two universal dimensions, i.e., competence and warmth. These two dimensions can be used to construct a 'social cognitive map' organizing massive information obtained from social encounters efficiently. Originated from spatial cognition, the neural codes supporting representation and navigation of spatial cognitive map has been widely studied. Recent studies suggest similar neural mechanism subserves the map-like architecture in social cognition as well. Here we investigated how spatial codes operate beyond physical environment and support the representation and navigation of social cognitive map. We designed a social value space defined by two dimensions of competence and warmth. Behaviorally, participants were able to navigate to a learned location from random starting locations in this abstract social

space. At neural level, we identified representation of distance in precuneus, fusiform gyrus and middle occipital gyrus. We also found partial evidence of grid-like representation patterns in medial prefrontal cortex and entorhinal cortex. Moreover, the intensity of grid-like response scaled with performance of navigating in social space and social avoidance trait scores. Our findings suggest a neurocognitive mechanism by which social information can be organized into a structured representation namely cognitive map and its relevance to social well-being.
https://elifesciences.org/reviewed-preprints/89025

Frontiers in Earth Science

PAPERS

AHMED H. MOGHAZI et al – Early Pleistocene depositional and environmental conditions at Dachangliang, Nihewan Basin, NE China

The Pleistocene sediments of Nihewan Basin in NE China are intensively studied since ca. 100 years because of its rich mammalian fossil record and abundant stone-artifact-bearing layers. To better understand the mechanisms underlying past climate and environmental changes in the basin, three sediment sections at the Dachangliang location were investigated using a multi-proxy toolbox of sedimentological, magnetic susceptibility (MS) and micropalaeontological analyses. The exposed sediments are lithologically mostly relatively homogeneous, with grain sizes in a relatively small range. However, variations in colour, bedding structures, concentrations of magnetic minerals and the ostracod assemblage were used to correlate the three sections to form the synthetic NH-T section of 86.2-m total length. The sediments mainly represent varicoloured silt of probably reworked loess deposits, partially interbedded with fine sand layers and minor contributions of clay particles. These sediments are interpreted to have accumulated in wetlands alternating with deposition on an alluvial plain, and with a lacustrine setting which probably existed from time to time. These different depositional settings are expressed in the three dominant fine to coarse silt-sized components and the ostracod-assemblage changes (mostly Limnocythere flexa, Ilyocypris spp. and Leucocythere sp.). The recorded ostracods of laterally apparently consistent white marl beds (dominantly Cytherissa lacustris) were used to stratigraphically correlate these sections. The resulting NH-T section was further correlated with the three proximal artefact-bearing sections Majuangou, Banshan and Xiantai which have published magnetostratigraphic data. The correlation shows that the investigated sedimentary sequence was probably formed between ca. 1.7 and 0.9 Ma. The relatively continuous synthetic sequence NH-T represents three main wetter periods with three intervening drier intervals, possibly synchronous with interglacial (S23-S20, S15-S13 and S10-S9) and glacial (L20-L18, L17-L16 and L13-L11) periods which were previously inferred from the palaeoclimatic records of the Chinese Loess Plateau (CLP) in the SW of the Nihewan Basin.
https://www.frontiersin.org/articles/10.3389/feart.2024.1335360/full

Frontiers in Pediatrics

PAPERS

LINDA CUPPLES, TERESA Y. C. CHING & SANNA HOU – Speech, language, functional communication, psychosocial outcomes and QOL in school-age children with congenital unilateral hearing loss

Children with early-identified unilateral hearing loss (UHL) might be at risk for delays in early speech and language, functional communication, psychosocial skills, and quality of life (QOL). However, a paucity of relevant research prohibits strong conclusions. This study aimed to provide new evidence relevant to this issue.
Participants were 34 children, ages 9;0 to 12;7 (years;months), who were identified with UHL via newborn hearing screening. Nineteen children had been fitted with hearing devices, whereas 15 had not. Assessments included measures of speech perception and intelligibility; language and cognition; functional communication; psychosocial abilities; and QOL.
As a group, the children scored significantly below the normative mean and more than one standard deviation below the typical range on speech perception in spatially separated noise, and significantly below the normative mean on written passage comprehension. Outcomes in other aspects appear typical. There was however considerable within participant variation in the children's degree of hearing loss over time, raising the possibility that this pattern of results might change as children get older. The current study also revealed that participants with higher levels of nonverbal ability demonstrated better general language skills and better ability to comprehend written passages. By contrast, neither perception of speech in collocated noise nor fitting with a hearing device accounted for unique variance in outcome measures. Future research should, however, evaluate the fitting of hearing devices using random assignment of participants to groups in order to avoid any confounding influence of degree of hearing loss or children's past/current level of progress.
https://www.frontiersin.org/articles/10.3389/fped.2024.1282952/full

Frontiers in Psychology

PAPERS

LEONARDO PIOT, THIERRY NAZZI & NATALIE BOLL-AVETISYAN – Infants' sensitivity to phonotactic regularities related to perceptually low-salient fricatives: a cross-linguistic study

Infants' sensitivity to language-specific phonotactic regularities emerges between 6- and 9- months of age, and this sensitivity has been shown to impact other early processes such as wordform segmentation and word learning. However, the

acquisition of phonotactic regularities involving perceptually low-salient phonemes (i.e., phoneme contrasts that are hard to discriminate at an early age), has rarely been studied and prior results show mixed findings. Here, we aimed to further assess infants' acquisition of such regularities, by focusing on the low-salient contrast of /s/- and /ʃ/-initial consonant clusters. Using the headturn preference procedure, we assessed whether French- and German-learning 9-month-old infants are sensitive to language-specific regularities varying in frequency within and between the two languages (i.e., /st/ and /sp/ frequent in French, but infrequent in German, /ʃt/ and /ʃp/ frequent in German, but infrequent in French).
French-learning infants preferred the frequent over the infrequent phonotactic regularities, but the results for the German-learning infants were less clear.
These results suggest crosslinguistic acquisition patterns, although an exploratory direct comparison of the French- and German-learning groups was inconclusive, possibly linked to low statistical power to detect such differences. Nevertheless, our findings suggest that infants' early phonotactic sensitivities extend to regularities involving perceptually low-salient phoneme contrasts at 9 months, and highlight the importance of conducting cross-linguistic research on such language-specific processes.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1367240/full

Frontiers in Psychiatry

PAPERS

JULIÁN ANDRÉS GUIRAL – Neuropsychological dimensions related to alterations of verbal self-monitoring neural networks in schizophrenic language: systematic review

Although schizophrenia has traditionally been interpreted as a disorder of thought, contemporary perspectives suggest that it may be more appropriate to conceptualize it as a disorder of language connectivity. The linguistic anomalies present in schizophrenia possess distinctive characteristics that, despite certain connections, are not comparable to aphasic disorders. It is proposed that these anomalies are the result of dysfunctions in verbal self-monitoring mechanisms, which may influence other neuropsychological dimensions. This study set out to examine the neuropsychological dimensions associated with alterations in the neural networks of verbal self-monitoring in schizophrenic language, based on the scientific evidence published to date. Exhaustive searches were conducted in PubMed, Web of Science, and Scopus to identify magnetic resonance studies that evaluated verbal self-monitoring mechanisms in schizophrenia. Of a total of 133 articles identified, 22 were selected for qualitative analysis. The general findings indicated alterations in frontotemporoparietal networks and in systems such as the insula, amygdala, anterior cingulate cortex, putamen, and hippocampus. Despite the heterogeneity of the data, it is concluded that language plays a fundamental role in schizophrenia and that its alterations are linked with other neuropsychological dimensions, particularly emotional and perceptual ones.
https://www.frontiersin.org/journals/psychiatry/articles/10.3389/fpsyt.2024.1356726/full

iScience

PAPERS

JUDIT INKELLER et al with PÉTER KOVÁCS – Intrinsic anticipatory motives in non-human primate food consumption behaviour

Future-oriented behaviour is regarded as a cornerstone of human cognition. One key phenomenon through which future-orientation can be studied is the delay of gratification, when consumption of an immediate reward is withstanded to achieve a larger reward later. The delays used in animal delay of gratification paradigms are rather short to be considered relevant for studying human-like future-orientation. Here, for the first time, we show that rhesus macaques exhibit human-relevant future-orientation downregulating their operant food consumption in anticipation of a nutritionally equivalent but more palatable food with an unprecedentedly long delay of approx. 2.5 hours. Importantly, this behaviour is not a result of conditioning but intrinsic to the animals. Our results show that the cognitive time horizon of primates, when tested in ecologically valid foraging-like experiments, extends much further into the future than previously considered, opening up new avenues for translational biomedical research.
https://www.cell.com/iscience/fulltext/S2589-0042(24)00680-1

HUGO POTEL et al – Lethal combats in the forest among wild western gorillas

Lethal inter-group encounters occur in many species because of sexual selection. While documented in mountain gorillas, they are absent in western gorillas as instead it is predicted by their higher feeding (frugivory) and mate competition (single- vs. multi-male groups). We investigate whether the injuries on three dead silverbacks and one adult female from four groups of western gorillas in Central African Republic, resulted from interactions with gorillas or leopards. We identified two distinct injury patterns caused by gorillas (isolated lacerations, round wounds) and leopards (punctures clustered on head/neck) by analysing injuries caused by mountain gorillas and leopards to gorillas and non-gorilla species, respectively. The western gorilla injury pattern is similar to that of mountain gorillas suggesting that lethal encounters occur, albeit infrequently, as predicted by sexual selection in one-male society. While sexual dimorphism and polygynous sociality favoured the evolution of violent encounters, multiple males in groups may influence their frequency.
https://www.cell.com/iscience/fulltext/S2589-0042(24)00658-8

Mind & Language

PAPERS

MATHEW HENDERSON et al with CATHERINE HOBAITER – Shared semantics: Exploring the interface between human and chimpanzee gestural communication

Striking similarities across ape gestural repertoires suggest shared phylogenetic origins that likely provided a foundation for the emergence of language. We pilot a novel approach for exploring possible semantic universals across human and nonhuman ape species. In a forced-choice task, n = 300 participants watched 10 chimpanzee gesture forms performed by a human and chose from responses that paralleled inferred meanings for chimpanzee gestures. Participants agreed on a single meaning for nine gesture forms; in six of these the agreed form-meaning pair response(s) matched those established for chimpanzees. Such shared understanding suggests apes' (including humans') gesturing shares deep evolutionary origins.
https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12500

Nature

ARTICLES

ALEX THORNTON – Bees and chimpanzees learn from others what they cannot learn alone

It has been argued that human culture rests on a unique ability to learn from others more than we could possibly learn alone in a lifetime. Two studies show that we share this ability with bumblebees and chimpanzees.
https://www.nature.com/articles/d41586-024-00427-8

GIORGIA GUGLIELMI – Oldest stone tools in Europe hint at ancient humans' route there

Dating of artefacts found at a site in western Ukraine suggests that archaic humans had entered Europe's eastern gate by 1.4 million years ago.
https://www.nature.com/articles/d41586-024-00627-2

PAPERS

R. GARBA et al – East-to-west human dispersal into Europe 1.4 million years ago

Stone tools stratified in alluvium and loess at Korolevo, western Ukraine, have been studied by several research groups since the discovery of the site in the 1970s. Although Korolevo's importance to the European Palaeolithic is widely acknowledged, age constraints on the lowermost lithic artefacts have yet to be determined conclusively. Here, using two methods of burial dating with cosmogenic nuclides, we report ages of 1.42 ± 0.10 million years and 1.42 ± 0.28 million years for the sedimentary unit that contains Mode-1-type lithic artefacts. Korolevo represents, to our knowledge, the earliest securely dated hominin presence in Europe, and bridges the spatial and temporal gap between the Caucasus (around 1.85–1.78 million years ago) and southwestern Europe (around 1.2–1.1 million years ago). Our findings advance the hypothesis that Europe was colonized from the east, and our analysis of habitat suitability suggests that early hominins exploited warm interglacial periods to disperse into higher latitudes and relatively continental sites—such as Korolevo—well before the Middle Pleistocene Transition.
https://www.nature.com/articles/s41586-024-07151-3

ALICE D. BRIDGES et al with LARS CHITTKA – Bumblebees socially learn behaviour too complex to innovate alone

Culture refers to behaviours that are socially learned and persist within a population over time. Increasing evidence suggests that animal culture can, like human culture, be cumulative: characterized by sequential innovations that build on previous ones1. However, human cumulative culture involves behaviours so complex that they lie beyond the capacity of any individual to independently discover during their lifetime1,2,3. To our knowledge, no study has so far demonstrated this phenomenon in an invertebrate. Here we show that bumblebees can learn from trained demonstrator bees to open a novel two-step puzzle box to obtain food rewards, even though they fail to do so independently. Experimenters were unable to train demonstrator bees to perform the unrewarded first step without providing a temporary reward linked to this action, which was removed during later stages of training. However, a third of naive observer bees learned to open the two-step box from these demonstrators, without ever being rewarded after the first step. This suggests that social learning might permit the acquisition of behaviours too complex to 're-innovate' through individual learning. Furthermore, naive bees failed to open the box despite extended exposure for up to 24 days. This finding challenges a common opinion in the field: that the capacity to socially learn behaviours that cannot be innovated through individual trial and error is unique to humans.
https://www.nature.com/articles/s41586-024-07126-4

Nature Communications

PAPERS

NOGA LARRY, GIL ZUR & MATI JOSHUA – Organization of reward and movement signals in the basal ganglia and cerebellum

The basal ganglia and the cerebellum are major subcortical structures in the motor system. The basal ganglia have been cast as the reward center of the motor system, whereas the cerebellum is thought to be involved in adjusting sensorimotor parameters. Recent findings of reward signals in the cerebellum have challenged this dichotomous view. To compare the basal ganglia and the cerebellum directly, we recorded from oculomotor regions in both structures from the same monkeys. We partitioned the trial-by-trial variability of the neurons into reward and eye-movement signals to compare the coding across structures. Reward expectation and movement signals were the most pronounced in the output structure of the basal ganglia, intermediate in the cerebellum, and the smallest in the input structure of the basal ganglia. These findings suggest that reward and movement information is sharpened through the basal ganglia, resulting in a higher signal-to-noise ratio than in the cerebellum.

https://www.nature.com/articles/s41467-024-45921-9

Nature Communications Biology

PAPERS

CATHERINE CHEN et al – The cortical representation of language timescales is shared between reading and listening

Language comprehension involves integrating low-level sensory inputs into a hierarchy of increasingly high-level features. Prior work studied brain representations of different levels of the language hierarchy, but has not determined whether these brain representations are shared between written and spoken language. To address this issue, we analyze fMRI BOLD data that were recorded while participants read and listened to the same narratives in each modality. Levels of the language hierarchy are operationalized as timescales, where each timescale refers to a set of spectral components of a language stimulus. Voxelwise encoding models are used to determine where different timescales are represented across the cerebral cortex, for each modality separately. These models reveal that between the two modalities timescale representations are organized similarly across the cortical surface. Our results suggest that, after low-level sensory processing, language integration proceeds similarly regardless of stimulus modality.

https://www.nature.com/articles/s42003-024-05909-z

CAMILLE GIACOMETTI et al – Differential functional organization of amygdala-medial prefrontal cortex networks in macaque and human

Over the course of evolution, the amygdala (AMG) and medial frontal cortex (mPFC) network, involved in behavioral adaptation, underwent structural changes in the old-world monkey and human lineages. Yet, whether and how the functional organization of this network differs remains poorly understood. Using resting-state functional magnetic resonance imagery, we show that the functional connectivity (FC) between AMG nuclei and mPFC regions differs between humans and awake macaques. In humans, the AMG-mPFC FC displays U-shaped pattern along the corpus callosum: a positive FC with the ventromedial prefrontal (vmPFC) and anterior cingulate cortex (ACC), a negative FC with the anterior mid-cingulate cortex (MCC), and a positive FC with the posterior MCC. Conversely, in macaques, the negative FC shifted more ventrally at the junction between the vmPFC and the ACC. The functional organization divergence of AMG-mPFC network between humans and macaques might help understanding behavioral adaptation abilities differences in their respective socio-ecological niches.

https://www.nature.com/articles/s42003-024-05918-y

Nature Human Behaviour

ARTICLES

VERONICA M. LAMARCHE et al – How to give great research talks to any audience

Being able to deliver a persuasive and informative talk is an essential skill for academics, whether speaking to students, experts, grant funders or the public. Yet formal training on how to structure and deliver an effective talk is rare. In this Comment, we give practical tips to help academics to give great talks to a range of different audiences.

https://www.nature.com/articles/s41562-024-01839-2

LINDA THUNSTRÖM – Testing undue incentives

Financial incentives may be offered for risky but potentially life-saving actions, such as donating organs and participation in medical trials. It has been argued that such incentives could distort decision making and lead people to act against their own best interest. However, experimental evidence now suggests that higher financial incentives do not cause harm.

https://www.nature.com/articles/s41562-024-01850-7

PAPERS

EDWIN J. C. VAN LEEUWEN et al with JOSEP CALL – Chimpanzees use social information to acquire a skill they fail to innovate

Cumulative cultural evolution has been claimed to be a uniquely human phenomenon pivotal to the biological success of our species. One plausible condition for cumulative cultural evolution to emerge is individuals' ability to use social learning to acquire know-how that they cannot easily innovate by themselves. It has been suggested that chimpanzees may be capable of such know-how social learning, but this assertion remains largely untested. Here we show that chimpanzees use social learning to acquire a skill that they failed to independently innovate. By teaching chimpanzees how to solve a sequential task (one chimpanzee in each of the two tested groups, n = 66) and using network-based diffusion analysis, we found that 14 naive chimpanzees learned to operate a puzzle box that they failed to operate during the preceding three months of exposure to all necessary materials. In conjunction, we present evidence for the hypothesis that social learning in chimpanzees is necessary and sufficient to acquire a new, complex skill after the initial innovation.
https://www.nature.com/articles/s41562-024-01836-5

NORI JACOBY et mul – Commonality and variation in mental representations of music revealed by a cross-cultural comparison of rhythm priors in 15 countries

Music is present in every known society but varies from place to place. What, if anything, is universal to music cognition? We measured a signature of mental representations of rhythm in 39 participant groups in 15 countries, spanning urban societies and Indigenous populations. Listeners reproduced random 'seed' rhythms; their reproductions were fed back as the stimulus (as in the game of 'telephone'), such that their biases (the prior) could be estimated from the distribution of reproductions. Every tested group showed a sparse prior with peaks at integer-ratio rhythms. However, the importance of different integer ratios varied across groups, often reflecting local musical practices. Our results suggest a common feature of music cognition: discrete rhythm 'categories' at small-integer ratios. These discrete representations plausibly stabilize musical systems in the face of cultural transmission but interact with culture-specific traditions to yield the diversity that is evident when mental representations are probed across many cultures.
https://www.nature.com/articles/s41562-023-01800-9

SANDRO AMBUEHL – An experimental test of whether financial incentives constitute undue inducement in decision-making

Around the world, laws limit the incentives that can be paid for transactions such as human research participation, egg donation or gestational surrogacy. A key reason is concerns about 'undue inducement'—the influential but empirically untested hypothesis that incentives can cause harm by distorting individual decision-making. Here I present two experiments (n = 671 and n = 406), including one based on a highly visceral transaction (eating insects). Incentives caused biased information search—participants offered a higher incentive to comply more often sought encouragement to do so. However, I demonstrate theoretically that such behaviour does not prove that incentives have harmful effects; it is consistent with Bayesian rationality. Empirically, although a substantial minority of participants made bad decisions, incentives did not magnify them in a way that would suggest allowing a transaction but capping incentives. Under the conditions of this experiment, there was no evidence that higher incentives could undermine welfare for transactions that are permissible at low incentives.
https://www.nature.com/articles/s41562-024-01817-8

Nature Humanities & Social Sciences Communications

PAPERS

YONG HUANG – A theory of emotion based on a universal model

The complexity of emotions has thus far limited our understanding of them. To obtain a clear understanding of the nature of emotion, this paper proposes a novel emotion theory and establishes a universal model of the conscious world in the human brain, the substanguage and interaction model (SIM). Based on an analysis of the possibilities of the interaction process in the SIM, two basic emotions that are indecomposable factors within all emotions—hope and fear—are identified. A questionnaire survey reveals that this basic emotion exhibits high acceptability. Based on emotion theory, this paper reasonably explains the phenomena of facial attraction and infantile facial preference and discusses the psychological reasons for phonocentrism, the phenomenon of preferring the spoken word over the written word. In addition, this paper explores the possibility of artificial intelligence possessing self-emotions. Emotions are relevant to many areas of human knowledge, as well as to everyone's daily lives, and the simple, clear way to understand emotions provided in this paper may be instructive for everyone.
{Substanguage? Apparently, it is a blend of substance and language. After perusing this paper – the word is used 57 times – I can offer no further clarification. The references offer only one other paper including "substanguage" in the title, written by Yong Huang.}
https://www.nature.com/articles/s41599-024-02869-x

Nature Molecular Psychiatry

PAPERS

CORAL DEL VAL et al – Gene expression networks regulated by human personality

Genome-wide association studies of human personality have been carried out, but transcription of the whole genome has not been studied in relation to personality in humans. We collected genome-wide expression profiles of adults to characterize the regulation of expression and function in genes related to human personality. We devised an innovative multi-omic approach to network analysis to identify the key control elements and interactions in multi-modular networks. We identified sets of transcribed genes that were co-expressed in specific brain regions with genes known to be associated with personality. Then we identified the minimum networks for the co-localized genes using bioinformatic resources. Subjects were 459 adults from the Young Finns Study who completed the Temperament and Character Inventory and provided peripheral blood for genomic and transcriptomic analysis. We identified an extrinsic network of 45 regulatory genes from seed genes in brain regions involved in self-regulation of emotional reactivity to extracellular stimuli (e.g., self-regulation of anxiety) and an intrinsic network of 43 regulatory genes from seed genes in brain regions involved in self-regulation of interpretations of meaning (e.g., production of concepts and language). We discovered that interactions between the two networks were coordinated by a control hub of 3 miRNAs and 3 protein-coding genes shared by both. Interactions of the control hub with proteins and ncRNAs identified more than 100 genes that overlap directly with known personality-related genes and more than another 4000 genes that interact indirectly. We conclude that the six-gene hub is the crux of an integrative network that orchestrates information-transfer throughout a multi-modular system of over 4000 genes enriched in liquid-liquid-phase-separation (LLPS)-related RNAs, diverse transcription factors, and hominid-specific miRNAs and lncRNAs. Gene expression networks associated with human personality regulate neuronal plasticity, epigenesis, and adaptive functioning by the interactions of salience and meaning in self-awareness.
https://www.nature.com/articles/s41380-024-02484-x

Nature Neuroscience

PAPERS

NEDA SHAHIDI et al – Population coding of strategic variables during foraging in freely moving macaques

Until now, it has been difficult to examine the neural bases of foraging in naturalistic environments because previous approaches have relied on restrained animals performing trial-based foraging tasks. Here we allowed unrestrained monkeys to freely interact with concurrent reward options while we wirelessly recorded population activity in the dorsolateral prefrontal cortex. The animals decided when and where to forage based on whether their prediction of reward was fulfilled or violated. This prediction was not solely based on a history of reward delivery, but also on the understanding that waiting longer improves the chance of reward. The task variables were continuously represented in a subspace of the high-dimensional population activity, and this compressed representation predicted the animal's subsequent choices better than the true task variables and as well as the raw neural activity. Our results indicate that monkeys' foraging strategies are based on a cortical model of reward dynamics as animals freely explore their environment.
https://www.nature.com/articles/s41593-024-01575-w

Nature Scientific Reports

PAPERS

PER A. ANDERSSON et mul – Anger and disgust shape judgments of social sanctions across cultures, especially in high individual autonomy societies

When someone violates a social norm, others may think that some sanction would be appropriate. We examine how the experience of emotions like anger and disgust relate to the judged appropriateness of sanctions, in a pre-registered analysis of data from a large-scale study in 56 societies. Across the world, we find that individuals who experience anger and disgust over a norm violation are more likely to endorse confrontation, ostracism and, to a smaller extent, gossip. Moreover, we find that the experience of anger is consistently the strongest predictor of judgments of confrontation, compared to other emotions. Although the link between state-based emotions and judgments may seem universal, its strength varies across countries. Aligned with theoretical predictions, this link is stronger in societies, and among individuals, that place higher value on individual autonomy. Thus, autonomy values may increase the role that emotions play in guiding judgments of social sanctions.
https://www.nature.com/articles/s41598-024-55815-x

FELIX HAIDUK et al – Spectrotemporal cues and attention jointly modulate fMRI network topology for sentence and melody perception

Speech and music are two fundamental modes of human communication. Lateralisation of key processes underlying their perception has been related both to the distinct sensitivity to low-level spectrotemporal acoustic features and to top-down attention. However, the interplay between bottom-up and top-down processes needs to be clarified. In the present study, we investigated the contribution of acoustics and attention to melodies or sentences to lateralisation in fMRI functional network topology. We used sung speech stimuli selectively filtered in temporal or spectral modulation domains with crossed

and balanced verbal and melodic content. Perception of speech decreased with degradation of temporal information, whereas perception of melodies decreased with spectral degradation. Applying graph theoretical metrics on fMRI connectivity matrices, we found that local clustering, reflecting functional specialisation, linearly increased when spectral or temporal cues crucial for the task goal were incrementally degraded. These effects occurred in a bilateral fronto-temporo-parietal network for processing temporally degraded sentences and in right auditory regions for processing spectrally degraded melodies. In contrast, global topology remained stable across conditions. These findings suggest that lateralisation for speech and music partially depends on an interplay of acoustic cues and task goals under increased attentional demands.
https://www.nature.com/articles/s41598-024-56139-6

INBAL ARNON & SIMON KIRBY – Cultural evolution creates the statistical structure of language
Human language is unique in its structure: language is made up of parts that can be recombined in a productive way. The parts are not given but have to be discovered by learners exposed to unsegmented wholes. Across languages, the frequency distribution of those parts follows a power law. Both statistical properties—having parts and having them follow a particular distribution—facilitate learning, yet their origin is still poorly understood. Where do the parts come from and why do they follow a particular frequency distribution? Here, we show how these two core properties emerge from the process of cultural evolution with whole-to-part learning. We use an experimental analog of cultural transmission in which participants copy sets of non-linguistic sequences produced by a previous participant: This design allows us to ask if parts will emerge purely under pressure for the system to be learnable, even without meanings to convey. We show that parts emerge from initially unsegmented sequences, that their distribution becomes closer to a power law over generations, and, importantly, that these properties make the sets of sequences more learnable. We argue that these two core statistical properties of language emerge culturally both as a cause and effect of greater learnability.
https://www.nature.com/articles/s41598-024-56152-9

SANGYUB KIM, KICHUN NAM & EUN-HA LEE – The interplay of semantic and syntactic processing across hemispheres
The current study investigated the hemispheric dynamics underlying semantic and syntactic priming in lexical decision tasks. Utilizing primed-lateralized paradigms, we observed a distinct pattern of semantic priming contingent on the priming hemisphere. The right hemisphere (RH) exhibited robust semantic priming irrespective of syntactic congruency between prime and target, underscoring its proclivity for semantic processing. Conversely, the left hemisphere (LH) demonstrated slower response times for semantically congruent yet syntactically incongruent word pairs, highlighting its syntactic processing specialization. Additionally, nonword data revealed a hemispheric divergence in syntactic processing, with the LH showing significant intrahemispheric syntactic priming. These findings illuminate the intrinsic hemispheric specializations for semantic and syntactic processing, offering empirical support for serial processing models. The study advances our understanding of the complex interplay between semantic and syntactic factors in hemispheric interactions.
https://www.nature.com/articles/s41598-024-51793-2

VLADYSLAV IVANOV et al – Decision-making processes in perceptual learning depend on effectors
Visual perceptual learning is traditionally thought to arise in visual cortex. However, typical perceptual learning tasks also involve systematic mapping of visual information onto motor actions. Because the motor system contains both effector-specific and effector-unspecific representations, the question arises whether visual perceptual learning is effector-specific itself, or not. Here, we study this question in an orientation discrimination task. Subjects learn to indicate their choices either with joystick movements or with manual reaches. After training, we challenge them to perform the same task with eye movements. We dissect the decision-making process using the drift diffusion model. We find that learning effects on the rate of evidence accumulation depend on effectors, albeit not fully. This suggests that during perceptual learning, visual information is mapped onto effector-specific integrators. Overlap of the populations of neurons encoding motor plans for these effectors may explain partial generalization. Taken together, visual perceptual learning is not limited to visual cortex, but also affects sensorimotor mapping at the interface of visual processing and decision making.
https://www.nature.com/articles/s41598-024-55508-5

Neuron

PAPERS

SEBASTIAN OCKLENBURG & ZENGCAI V. GUO – Cross-hemispheric communication: Insights on lateralized brain functions
On the surface, the two hemispheres of vertebrate brains look almost perfectly symmetrical, but several motor, sensory, and cognitive systems show a deeply lateralized organization. Importantly, the two hemispheres are connected by various commissures, white matter tracts that cross the brain's midline and enable cross-hemispheric communication. Cross-hemispheric communication has been suggested to play an important role in the emergence of lateralized brain functions. Here, we review current advances in understanding cross-hemispheric communication that have been made using modern neuroscientific tools in rodents and other model species, such as genetic labeling, large-scale recordings of neuronal activity, spatiotemporally precise perturbation, and quantitative behavior analyses. These findings suggest that the emergence of lateralized brain functions cannot be fully explained by largely static factors such as genetic variation and differences in

structural brain asymmetries. In addition, learning-dependent asymmetric interactions between the left and right hemispheres shape lateralized brain functions.
https://www.cell.com/neuron/abstract/S0896-6273(24)00120-X

JOHAN F. STORM et al with MARCELLO MASSIMINI – An integrative, multiscale view on neural theories of consciousness
How is conscious experience related to material brain processes? A variety of theories aiming to answer this age-old question have emerged from the recent surge in consciousness research, and some are now hotly debated. Although most researchers have so far focused on the development and validation of their preferred theory in relative isolation, this article, written by a group of scientists representing different theories, takes an alternative approach. Noting that various theories often try to explain different aspects or mechanistic levels of consciousness, we argue that the theories do not necessarily contradict each other. Instead, several of them may converge on fundamental neuronal mechanisms and be partly compatible and complementary, so that multiple theories can simultaneously contribute to our understanding. Here, we consider unifying, integration-oriented approaches that have so far been largely neglected, seeking to combine valuable elements from various theories.
https://www.cell.com/neuron/fulltext/S0896-6273(24)00088-6

New Scientist

NEWS

Pythagoras was wrong about the maths behind pleasant music
It is said that the ancient Greek philosopher Pythagoras came up with the idea that musical note combinations sound best in certain mathematical ratios, but that doesn't seem to be true.
https://www.newscientist.com/article/2419442-pythagoras-was-wrong-about-the-maths-behind-pleasant-music/

ARTICLES

KIRSTY SEDGMAN – How manners can be a weapon to divide and disempower
Living in close proximity to strangers requires shared social norms – but manners can also be used to divide us.
https://www.newscientist.com/article/mg26134810-100-how-manners-can-be-a-weapon-to-divide-and-disempower/

PLoS One

PAPERS

XIN DAPHNE HOU et al – A cross-cultural examination of temporal orientation through everyday language on social media
Past research has shown that culture can form and shape our temporal orientation–the relative emphasis on the past, present, or future. However, there are mixed findings on how temporal orientations vary between North American and East Asian cultures due to the limitations of survey methodology and sampling. In this study, we applied an inductive approach and leveraged big data and natural language processing between two popular social media platforms–Twitter and Weibo–to assess the similarities and differences in temporal orientation in the United States of America and China, respectively. We first established predictive models from annotation data and used them to classify a larger set of English Twitter sentences (NTW = 1,549,136) and a larger set of Chinese Weibo sentences (NWB = 95,181) into four temporal catetories–past, future, atemporal present, and temporal present. Results show that there is no significant difference between Twitter and Weibo on past or future orientations; the large temporal orientation difference between North Americans and Chinese derives from their different prevailing focus on atemporal (e.g., facts, ideas) present (Twitter) or temporal present (e.g., the “here” and “now”) (Weibo). Our findings contribute to the debate on cultural differences in temporal orientations with new perspectives following a new methodological approach. The study’s implications call for a reevaluation of how temporal orientation is measured in cross-cultural studies, emphasizing the use of large-scale language data and acknowledging the atemporal present category. Understanding temporal orientations can guide effective cross-cultural communication strategies to tailor approaches for different audience based on temporal orientations, enhancing intercultural understanding and engagement.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0292963

SANDRA WELTZIEN et al with BRUCE HOOD – Young dictators—Speaking about oneself decreases generosity in children from two cultural contexts
Sharing of resources is a common feature of human societies. Yet, there is substantial societal variation in children’s generosity, and this variation emerges during middle childhood. Societal differences in self-construal orientation may be one factor influencing the ontogeny of generosity. Here, we examine anonymous Dictator Game sharing in 7-and-8-year-olds from two distinct societies: India and the UK (N = 180). We used self-construal manipulations to investigate whether priming self- or other-focused conversations would differentially influence children’s generosity. There were no differences in generosity between populations. While a significant reduction in generosity was found following self-priming in both

societies, other-priming was ineffectual. The findings are discussed in relation to experimental features and the role of anonymity and reputational concerns.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0300200

PNAS

ARTICLES

PETER ROWLEY-CONWY – Hunter-gatherers and earliest farmers in western Europe
No summary available.
https://www.pnas.org/doi/abs/10.1073/pnas.2322683121

Prospect

ARTICLES

PETER HOSKIN – Before Man: Interview with Ludovic Slimak
More on 'The Naked Neanderthal: A new understanding of the human creature' by Ludovic Slimak, Pegasus (2024).
https://www.prospectmagazine.co.uk/views/people/64630/neanderthal-hunter-ludovic-slimak-each-site-is-a-miracle

Science

ARTICLES

STEFFEN R. HAGE – Breathing control of vocalization
A crucial brainstem circuit for vocal-respiratory coordination of the larynx is revealed.
https://www.science.org/doi/10.1126/science.ado2114

PAPERS

JAEHONG PARK et al – Brainstem control of vocalization and its coordination with respiration
Phonation, the pivotal process governing vocalization and speech, requires two simultaneous actions of narrowing the larynx (vocal cord adduction) and exhaling air from the lungs. Speech cannot occur during inhalation, because inspiration dominantly inhibits vocalization. This breathing primacy is crucial for survival. Although prior studies have identified neurons in the midbrain periaqueductal gray (PAG) as a permissive gate for eliciting vocalizations, the alternating patterns of inspiration and vocalization are not changed by PAG stimulation in experimental animals. This prompted our investigation to identify a neural population directly driving phonation and to elucidate its interactions with the breathing circuit that ensure vocal-respiratory coordination and prioritize breathing. To this end, we used mouse ultrasonic vocalizations (USVs) as a model, in which vocal cord adduction is required for USVs and USV syllables are periodically interrupted by inspirations.
Our hypothesis centers on laryngeal premotor neurons in the brainstem as being key controllers of vocal cord adduction and its coordination with breathing. Whereas past literature has identified the nucleus of retroambiguus (RAm) in the caudal hindbrain as a critical node for vocalization, its heterogeneity, including neurons modulating respirations and other orofacial movements, necessitates precise targeting of vocalization-specific premotor neurons within the RAm to unravel the mechanistic intricacies of vocal cord control. Using monosynaptic rabies virus–mediated transsynaptic tracing, we labeled a population of excitatory laryngeal premotor neurons in the RAm in adult mice. Furthermore, courtship USVs induced robust expression of the immediate early gene Fos in these rabies-traced RAm neurons (RAmVOC), leading us to use a Fos-based targeting method (CANE) to label and manipulate RAmVOC neurons and examine their role in phonation and the vocal-respiration interaction.
Silencing RAmVOC neurons using tetanus toxin light chain abolished courtship USVs and pain-elicited audible squeaks in adult mice, along with a lack of phonation-related abdominal muscle activity, indicating that RAmVOC neurons are necessary for phonation. Optogenetic activation of RAmVOC was sufficient to induce vocal cord closure and to elicit USVs, with the duration of activation influencing USV syllable lengths and concurrent expiration periods. Inspiration needs could override RAmVOC-mediated vocal cord closure. Both laryngeal motoneurons and RAmVOC neurons receive inhibitory inputs from the preBötzinger complex (preBötC), which is known for containing inspiration rhythm-generating neurons. Ablating inhibitory synapses in RAmVOC neurons compromised the inspiration gating of vocal cord adduction, resulting in abnormal hoarse vocalizations during inspiration periods upon PAG stimulation. Additionally, disinhibited RAmVOC led to spontaneous USVs in the absence of a social context.
Our study unveils the circuits and mechanisms underlying phonation and vocal-respiration interaction (see the figure). RAmVOC forms the critical premotor node downstream of PAG necessary for all phonations by driving vocal cord adduction and coordinating expiratory muscle activity. Furthermore, inhibitory inputs from the preBötC to both RAmVOC and laryngeal motoneurons enable rhythmic inspiration to gate and pace vocalization, thereby ensuring breathing primacy.
{Yes, this really is the abstract. Books have been summarised with less. So remind me: what is it that editors do?}
https://www.science.org/doi/10.1126/science.adi8081

Trends in Cognitive Sciences

PAPERS

NICHOLAS BUTTRICK – Studying large language models as compression algorithms for human culture

Large language models (LLMs) extract and reproduce the statistical regularities in their training data. Researchers can use these models to study the conceptual relationships encoded in this training data (i.e., the open internet), providing a remarkable opportunity to understand the cultural distinctions embedded within much of recorded human communication.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00001-9

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