EAORC BULLETIN 1,091 – 12 May 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.

ACADEMIA.EDU – Symbolism and Sacrifice at Göbekli Tepe

Phenomenology and the Cognitive Sciences (2024)

PAUL GIFFORD & PIERPAOLO ANTONELLO – Rethinking the Neolithic Revolution: Symbolism and Sacrifice at Göbekli Tepe

Çatalhöyük, dating from 6,400 to 6,200 bce, presents evidence of one of the earliest human settlements: its construction, its social organization, its symbolic, artistic, and ritual life. A lesser known, but much earlier and potentially even more significant link in the evidential chain of the story of "how we became human" is provided by another archaeological site, situated some 450 miles east-southeast of Çatalhöyük. his site, generally recognized to be a temple complex, has been discovered at Göbekli Tepe (literal translation: "Potbelly Hill") in southeastern Turkey, near the present-day frontier with Syria. It lies about fifteen kilometers northeast of the present-day city of Şanlıurfa, at the highest point of an extended mountain range that can be seen from many kilometers away. To this day, it is a landmark visible from afar. Looking toward the Middle East's fertile crescent, it may be said to be sited at a nodal point of the great migration "out of Africa." Crucially, it has been authoritatively dated to the astonishingly early period of 9,600–8,200 bce, corresponding to the Epipaleolithic, or Pre-Pottery Neolithic A (PPNA). It dates, that is, from some three millennia before Çatalhöyük. According to the late director of excavations, Klaus Schmidt of the German Archaeological Institute (DAI), is that the still unexplored deeper layers of this nine-hectare site will show that "the place has a history stretching back over several thousand years to the Old Stone Age [that is, to before the Ice Age, which lasted from c. 10,800 to 9,600 bce]" (Schmidt
2010, 245).

https://www.academia.edu/11367318/Rethinking_the_Neolithic_Revolution_Symbolism_and_Sacrifice_at_G%C3%B6bekli_Tepe

ACADEMIA.EDU – The Cooperative Body Hypothesis

Phenomenology and the Cognitive Sciences (2024)

HAYDEN KEE – Between social cognition and material engagement: the cooperative body hypothesis

In recent years, social cognition approaches to human evolution and Material Engagement Theory have offered new theoretical resources to advance our understanding of the prehistoric hominin mind. To date, however, these two approaches have developed largely in isolation from one another. I argue that there is a gap between social- and material-centred approaches, and that this is precisely the sociomateriality of the appearance of ancestral hominin bodies, which evolved under selective pressure to develop increasingly complex, cooperative sociality. To get this socio-material body in focus, I develop an esthesiological framework, appropriated from Merleau-Ponty (2003), for interpreting the expressive body in an evolutionary and comparative context. The guiding hypothesis of esthesiology is that before being rationality (social or material), "humanity is another corporeity" (Merleau-Ponty, 2003, p. 208). Esthesiology studies the appearance of the body and its sense organs as an intertwining locus of a sensing power (the ability to see, to touch, etc.) and a sensible character (the visible, touchable body). It is this dual-aspect character of the body that facilitates the most basic affective and sensorimotor modes of sociality. Examining these features from a comparative perspective, we find that the human body is distinctively suited to prosocial communication and cooperation: a more cooperative eye, an exposed and communicative skin. I thus propose a cooperative body hypothesis, by analogy with the cooperative eye hypothesis (Tomasello et al., 2007). Esthesiology provides a framework for integrating and interpreting a wide range of otherwise disconnected facts concerning human and nonhuman animal bodies, forms of life, cognition, and evolution, thereby bridging the gap between social cognition and material engagement perspectives. In doing so, however, it not only solves problems and proposes new directions of investigation, but also demands theoretical revisions from each.

https://www.academia.edu/118609641/Between_social_cognition_and_material_engagement_the_cooperative_body_hypothesis

NEWS

SCIENCE.ORG NEWS – Could a newly discovered sperm whale 'alphabet' be deciphered by humans?

Discovery of potentially complex communication could reveal way to interpret what these marine mammals are saying—but not everyone is convinced.

https://www.science.org/content/article/could-newly-discovered-sperm-whale-alphabet-be-deciphered-humans

SCIENCE.ORG NEWS – New animal dads often kill their stepchildren. These parrots adopt them instead

Green-rumped parrotlet stepfathers still get their DNA into the gene pool when they spare their adoptive chicks' lives.

https://www.science.org/content/article/new-animal-dads-often-kill-their-stepchildren-these-parrots-adopt-them-instead

SCIENCE.ORG NEWS – Psychology study participants recruited online may provide nonsensical answers

Data quality suffers in some studies using the MTurk platform—but participant screening and other safeguards can help.

https://www.science.org/content/article/psychology-study-participants-recruited-online-may-provide-nonsensical-answers

SCIENCE.ORG NEWS – Elephants know their audience. Watch them greet one another in the wild

Decoding the gestures the animals use when interacting with one another could help researchers better understand elephant communication.
https://www.science.org/content/article/elephants-know-their-audience-watch-them-greet-one-another-wild

THE CONVERSATION – There's a problem with making a 75ky-old Neanderthal woman look quite friendly

Scientists can't yet tell how soft tissue overlayed bones, so this reconstruction is inevitably based on artistic licence.
{But without expression, would she look human?}
https://theconversation.com/the-reconstruction-of-a-75-000-year-old-neanderthal-womans-face-makes-her-look-quite-friendly-theres-a-problem-with-that-229324

PUBLICATIONS

Current Biology

ARTICLES

TIMOTHY M. SCHAERF – Collective behaviour: Stingless bees are self-organised nest builders
A new study compiles compelling evidence that stingless bees construct their brood combs in a self-organised manner in which local modification of a structure stimulates further modifications, a process known as stigmergy.
https://www.cell.com/current-biology/abstract/S0960-9822(24)00386-5

SONIA TURRINI & ALESSIO AVENANTI – Cerebellum function: The chronometry of social perception
The posterior cerebellum is emerging as a key structure for social cognition. A new study causally demonstrates its early involvement during emotion perception and functional connectivity with the posterior superior temporal sulcus, a cortical hub of the social brain.
https://www.cell.com/current-biology/abstract/S0960-9822(24)00367-1

MICAH M. MURRAY, NAOMI K. MIDDELMANN & KARA D. FEDERMEIER – Animal cognition: Dogs build semantic expectations between spoken words and objects
A recent study has used scalp-recorded electroencephalography to obtain evidence of semantic processing of human speech and objects by domesticated dogs. The results suggest that dogs do comprehend the meaning of familiar spoken words, in that a word can evoke the mental representation of the object to which it refers.
https://www.cell.com/current-biology/abstract/S0960-9822(24)00385-3

JOAN B. SILK – Animal behavior: A tale of two apes
A new paper shows that rates of aggression are higher, and rates of coalition formation are lower, among male bonobos than among male chimpanzees. These findings are noteworthy because they challenge the view that female bonobos' preferences for less aggressive males favored a reduction in male aggression and an increase in social tolerance.
https://www.cell.com/current-biology/abstract/S0960-9822(24)00396-8

PAPERS

STEFAN M. LEMKE et al – Information flow between motor cortex and striatum reverses during skill learning
The coordination of neural activity across brain areas during a specific behavior is often interpreted as neural communication involved in controlling the behavior. However, whether information relevant to the behavior is actually transferred between areas is often untested. Here, we used information-theoretic tools to quantify how motor cortex and striatum encode and exchange behaviorally relevant information about specific reach-to-grasp movement features during skill learning in rats. We found a temporal shift in the encoding of behaviorally relevant information during skill learning, as well as a reversal in the primary direction of behaviorally relevant information flow, from cortex-to-striatum during naive movements to striatum-to-cortex during skilled movements. Standard analytical methods that quantify the evolution of overall neural activity during learning—such as changes in neural signal amplitude or the overall exchange of information between areas—failed to capture these behaviorally relevant information dynamics. Using these standard methods, we instead found a consistent coactivation of overall neural signals during movement production and a bidirectional increase in overall information propagation between areas during learning. Our results show that skill learning is achieved through a transformation in how behaviorally relevant information is routed across cortical and subcortical brain areas and that isolating the components of neural activity relevant to and informative about behavior is critical to uncover directional interactions within a coactive and coordinated network.
https://www.cell.com/current-biology/fulltext/S0960-9822(24)00320-8

ANDREA CIRICUGNO et al – A chronometric study of the posterior cerebellum's function in emotional processing
The posterior cerebellum is a recently discovered hub of the affective and social brain, with different subsectors contributing to different social functions. However, very little is known about when the posterior cerebellum plays a critical role in social processing. Due to its location and anatomy, it has been difficult to use traditional approaches to directly study the chronometry of the cerebellum. To address this gap in cerebellar knowledge, here we investigated the causal contribution of the posterior cerebellum to social processing using a chronometric transcranial magnetic stimulation (TMS) approach. We show that the posterior cerebellum is recruited at an early stage of emotional processing (starting from 100 ms after stimulus onset), simultaneously with the posterior superior temporal sulcus (pSTS), a key node of the social brain. Moreover, using a condition-and-perturb TMS approach, we found that the recruitment of the pSTS in emotional processing is dependent on cerebellar activation. Our results are the first to shed light on chronometric aspects of cerebellar function and its causal functional connectivity with other nodes of the social brain.
https://www.cell.com/current-biology/abstract/S0960-9822(24)00310-5

VIVIANA DI PIETRO et al – The inheritance of alternative nest architectural traditions in stingless bees
The transmission of complex behavior and culture in humans has long been attributed to advanced forms of social learning, which play a crucial role in our technological advancement. While similar phenomena of behavioral traditions and cultural inheritance have been observed in animals, including in primates, whales, birds, and even insects, the underlying mechanisms enabling the persistence of such animal traditions, particularly in insects, are less well understood. This study introduces pioneering evidence of enduring architectural traditions in the stingless bee Scaptotrigona depilis, which are maintained without any evidence for social learning. We demonstrate that S. depilis exhibits two distinct nest architectures, comprising either helicoidal or flat, stacked horizontal combs, which are transmitted across generations through stigmergy—an environmental feedback mechanism whereby the presence of the existing comb structures guides subsequent construction behaviors—thereby leading to a form of environmental inheritance. Cross-fostering experiments further show that genetic factors or prior experience does not drive the observed variation in nest architecture. Moreover, the experimental introduction of corkscrew dislocations within the combs prompted helicoidal building, confirming the use of stigmergic building rules. At a theoretical level, we establish that the long-term equilibrium of building in the helicoidal pattern fits with the expectations of a two-state Markov chain model. Overall, our findings provide compelling evidence for the persistence of behavioral traditions in an insect, based on a simple mechanism of environmental inheritance and stigmergic interactions, without requiring any sophisticated learning mechanism, thereby expanding our understanding of how traditions can be maintained in non-human species.
https://www.cell.com/current-biology/abstract/S0960-9822(24)00255-0

eLife

PAPERS

ANJA T. ZAI et al – Goal-directed vocal planning in a songbird
Songbirds' vocal mastery is impressive, but to what extent is it a result of practice? Can they, based on experienced mismatch with a known target, plan the necessary changes to recover the target in a practice-free manner without intermittently singing? In adult zebra finches, we drive the pitch of a song syllable away from its stable (baseline) variant acquired from a tutor, then we withdraw reinforcement and subsequently deprive them of singing experience by muting or deafening. In this deprived state, birds do not recover their baseline song. However, they revert their songs towards the target by about one standard deviation of their recent practice, provided the sensory feedback during the latter signaled a pitch mismatch with the target. Thus, targeted vocal plasticity does not require immediate sensory experience, showing that zebra finches are capable of goal-directed vocal planning.
https://elifesciences.org/reviewed-preprints/90445

Frontiers in Computational Neuroscience

PAPERS

HOWARD SCHNEIDER – The emergence of enhanced intelligence in a brain-inspired cognitive architecture
The Causal Cognitive Architecture is a brain-inspired cognitive architecture developed from the hypothesis that the navigation circuits in the ancestors of mammals duplicated to eventually form the neocortex. Thus, millions of neocortical minicolumns are functionally modeled in the architecture as millions of "navigation maps." An investigation of a cognitive architecture based on these navigation maps has previously shown that modest changes in the architecture allow the ready emergence of human cognitive abilities such as grounded, full causal decision-making, full analogical reasoning, and near-full compositional language abilities. In this study, additional biologically plausible modest changes to the architecture are considered and show the emergence of super-human planning abilities. The architecture should be considered as a viable alternative pathway toward the development of more advanced artificial intelligence, as well as to give insight into the emergence of natural human intelligence.
https://www.frontiersin.org/articles/10.3389/fncom.2024.1367712/full

Frontiers in Environmental Archaeology

PAPERS

ZVI BEN-AVRAHAM et al – Did plate tectonic changes lead to the emergence of hominid bipedalism?

When early hominids began walking upright around 6 Ma, their evolutionary course took a sharp turn. The new posture enabled physical and mental developments that had not been possible before. The factors driving the transition from quadrupedalism to bipedalism remain open. Most studies have linked this fundamental transition to environmental, topographical, geomorphological, and climatic changes that progressively transformed jungle- and forest-dominated areas of southern and eastern Africa into vast savannas, thus partitioning ecological niches. During the same timeframe, major tectonic events occurred worldwide within a relatively short geological period, due to a significant and sudden shift in the motion of the Pacific plate. In our previous work, we coined the term ripple tectonics to link a major tectonic impact to the short-term local events it caused worldwide. The ripple tectonic cascade in the Pacific around 6 Ma instigated significant environmental transformations in Africa, which ultimately catalyzed the biological evolution of early hominids towards a bipedal posture.
https://www.frontiersin.org/articles/10.3389/fearc.2024.1381510/full

EBONI WESTBURY et al – Neanderthal resilience and adaptability: insights from the Abric Pizarro faunal assemblage during the MIS 4

The examination of faunal assemblages through zooarchaeological analyses constitutes a fundamental approach for gaining insight into the intricate behaviours of Neanderthals. Previous investigations have primarily focused on periods of relative environmental stability, and this has provided a wealth of relevant archaeological data. However, our understanding of Neanderthal resilience during the MIS 4, a period presumably characterised by harsh environmental conditions, remains limited. This study presents the first comprehensive analysis of the faunal assemblages from Levels M and P at Abric Pizarro. The geographic location of Abric Pizarro in the southeast Pre-Pyrenees, combined with chronometric dating, offers a unique opportunity to explore Neanderthal behaviours during a poorly known chronological period. The detailed zooarchaeological analysis comprised taxonomic identification, taphonomic analysis and age-at-death profiling to explore the adaptability and flexibility in the Neanderthal diet. The findings indicate that Neanderthal groups incorporated a diverse range of protein resources from small herbivores (e.g., caprids) to very large herbivores (e.g., Bos/Bison). These results not only demonstrate an adaptability to changing environments in an area traditionally deemed unsuitable for long-term occupation, but also contributes significantly to our understanding of the complex behaviours exhibited by Neanderthals.
https://www.frontiersin.org/articles/10.3389/fearc.2024.1405535/full

Frontiers in Psychology

PAPERS

ZIJUAN SHI et al – The effect of music therapy on language communication and social skills in children with autism spectrum disorder: a systematic review and meta-analysis

Studies have shown that music therapy can be used as a therapeutic aid for clinical disorders. To evaluate the effects of music therapy (MT) on language communication and social skills in children with autism spectrum disorder (ASD), a meta-analysis was performed on eligible studies in this field.

A systematic search was conducted in eight databases: PubMed, Embase, Web of Science, Cochrane Library databases, the China National Knowledge Infrastructure (CNKI), Wanfang Data, the Chinese Biomedical Literature (CBM) Database, and the VIP Chinese Science and Technology Periodicals Database. The standard mean difference (SMD) values were used to evaluate outcomes, and the pooled proportions and SMD with their 95% confidence intervals (CIs) were also calculated.

Eighteen randomized controlled trial (RCT) studies were included, with a total of 1,457 children with ASD. This meta-analysis revealed that music therapy improved their language communication [SMD = −1.20; 95%CI –1.45, −0.94; $\chi2$ (17) = 84.17, I2 = 80%, $p < 0.001$] and social skills [SMD = −1. 13; 95%CI –1.49, −0.78; $\chi2$ (17) = 162.53, I2 = 90%, $p < 0.001$]. In addition, behavior [SMD = −1.92; 94%CI –2.56, −1.28; $\chi2$ (13) = 235.08, I2 = 95%, $p < 0.001$], sensory perception [SMD = −1.62; 95%CI –2.17, −1.08; $\chi2$ (16) = 303.80, I2 = 95%, $p < 0.001$], self-help [SMD = −2. 14; 95%CI –3.17, −1.10; $\chi2$ (6) = 173.07, I2 = 97%, $p < 0.001$] were all improved.

Conclusion: Music therapy has a positive effect on the improvement of symptoms in children with ASD.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1336421/full

Heliyon

PAPERS

WANG ZHENG et al – Filial beliefs reduce aggression in different cultures: a conditional process model

The dual filial piety model divides filial piety beliefs into two types: reciprocal and authoritarian filial piety beliefs (RFP vs. AFP) in terms of attitude, emotion, and obligation towards parents. Previous studies have shown that these two types of filial piety beliefs related to different psychological outcomes. Literature also suggests that some aspects of the function of filial piety beliefs may be a cultural universal. This research aimed to test the effects of filial piety beliefs on aggression using participants from two cultures (Chinese vs. Islamic). We further explored the mediating role of moral disengagement,

forgiveness, and self-control between filial piety beliefs and aggression, and the moderating role of culture. The results showed that moral disengagement, forgiveness, and self-control played mediating roles in the relationship between filial piety beliefs and aggression. The functions of filial piety beliefs showed both similarities and differences across cultures. (1) RFP was negatively associated with aggression in both cultures, while AFP was negatively associated with aggression only among Muslim participants. (2) RFP can reduce the aggression of Chinese participants through moral disengagement, forgiveness, and self-control; while the RFP of Muslim participants can reduce their aggressiveness only through forgiveness. (3) AFP enhanced aggression via moral disengagement and reduced self-control among; Chinese participants, but reduced aggression via self-control among Muslim participants. Findings of this study confirmed that the functions of RFP show more similarities than differences across cultures, while functions of AFP do the opposite.
https://www.cell.com/heliyon/fulltext/S2405-8440(24)07026-9

iScience

PAPERS

FEDERICO CURZEL et al – Enhancing musical pleasure through shared musical experience

Music and social interactions represent two of the most important sources of pleasure in our lives, both engaging the mesolimbic dopaminergic system. However, there is limited understanding regarding whether and how sharing a musical activity in a social context influences and modifies individuals' rewarding experiences. Here we aimed at (1) modulating the pleasure derived from music under different social scenarios, and (2) further investigating its impact on reward-related prosocial behaviour and memory. Across three online experiments, we simulated a socially shared music listening and found that participants' music reward was significantly modulated by the social context, with higher reported pleasure for greater levels of social sharing. Furthermore, the increased pleasure reported by the participants positively influenced prosocial behaviour and memory outcomes, highlighting the facilitating role of socially boosted reward. These findings provide evidence on the rewarding nature of socially-driven music experiences, with important potential implications in educational and clinical settings.
https://www.cell.com/iscience/fulltext/S2589-0042(24)01186-6

Nature Communications

PAPERS

MARTIN H. TRAUTH et al – Early warning signals of the termination of the African Humid Period(s)

The transition from a humid green Sahara to today's hyperarid conditions in northern Africa ~5.5 thousand years ago shows the dramatic environmental change to which human societies were exposed and had to adapt to. In this work, we show that in the 620,000-year environmental record from the Chew Bahir basin in the southern Ethiopian Rift, with its decadal resolution, this one thousand year long transition is particularly well documented, along with 20–80 year long droughts, recurring every ~160 years, as possible early warnings. Together with events of extreme wetness at the end of the transition, these droughts form a pronounced climate "flickering", which can be simulated in climate models and is also present in earlier climate transitions in the Chew Bahir environmental record, indicating that transitions with flickering are characteristic of this region.
https://www.nature.com/articles/s41467-024-47921-1

SAM PASSMORE et al with QUENTIN D. ATKINSON – Global musical diversity is largely independent of linguistic and genetic histories

Music is a universal yet diverse cultural trait transmitted between generations. The extent to which global musical diversity traces cultural and demographic history, however, is unresolved. Using a global musical dataset of 5242 songs from 719 societies, we identify five axes of musical diversity and show that music contains geographical and historical structures analogous to linguistic and genetic diversity. After creating a matched dataset of musical, genetic, and linguistic data spanning 121 societies containing 981 songs, 1296 individual genetic profiles, and 121 languages, we show that global musical similarities are only weakly and inconsistently related to linguistic or genetic histories, with some regional exceptions such as within Southeast Asia and sub-Saharan Africa. Our results suggest that global musical traditions are largely distinct from some non-musical aspects of human history.
https://www.nature.com/articles/s41467-024-48113-7

BEAU SIEVERS et al – Consensus-building conversation leads to neural alignment

Conversation is a primary means of social influence, but its effects on brain activity remain unknown. Previous work on conversation and social influence has emphasized public compliance, largely setting private beliefs aside. Here, we show that consensus-building conversation aligns future brain activity within groups, with alignment persisting through novel experiences participants did not discuss. Participants watched ambiguous movie clips during fMRI scanning, then conversed in groups with the goal of coming to a consensus about each clip's narrative. After conversation, participants' brains were scanned while viewing the clips again, along with novel clips from the same movies. Groups that reached consensus showed greater similarity of brain activity after conversation. Participants perceived as having high social status spoke more and

signaled disbelief in others, and their groups had unequal turn-taking and lower neural alignment. By contrast, participants with central positions in their real-world social networks encouraged others to speak, facilitating greater group neural alignment. Socially central participants were also more likely to become neurally aligned to others in their groups.
https://www.nature.com/articles/s41467-023-43253-8

Nature Communications Biology

PAPERS

YAZHENG DI et al – Genetic association analysis of human median voice pitch identifies a common locus for tonal and non-tonal languages

The genetic influence on human vocal pitch in tonal and non-tonal languages remains largely unknown. In tonal languages, such as Mandarin Chinese, pitch changes differentiate word meanings, whereas in non-tonal languages, such as Icelandic, pitch is used to convey intonation. We addressed this question by searching for genetic associations with interindividual variation in median pitch in a Chinese major depression case-control cohort and compared our results with a genome-wide association study from Iceland. The same genetic variant, rs11046212-T in an intron of the ABCC9 gene, was one of the most strongly associated loci with median pitch in both samples. Our meta-analysis revealed four genome-wide significant hits, including two novel associations. The discovery of genetic variants influencing vocal pitch across both tonal and non-tonal languages suggests the possibility of a common genetic contribution to the human vocal system shared in two distinct populations with languages that differ in tonality (Icelandic and Mandarin).
https://www.nature.com/articles/s42003-024-06198-2

VESTA ELEUTERI et al with CATHERINE HOBAITER – Multimodal communication and audience directedness in the greeting behaviour of semi-captive African savannah elephants

Many species communicate by combining signals into multimodal combinations. Elephants live in multi-level societies where individuals regularly separate and reunite. Upon reunion, elephants often engage in elaborate greeting rituals, where they use vocalisations and body acts produced with different body parts and of various sensory modalities (e.g., audible, tactile). However, whether these body acts represent communicative gestures and whether elephants combine vocalisations and gestures during greeting is still unknown. Here we use separation-reunion events to explore the greeting behaviour of semi-captive elephants (Loxodonta africana). We investigate whether elephants use silent-visual, audible, and tactile gestures directing them at their audience based on their state of visual attention and how they combine these gestures with vocalisations during greeting. We show that elephants select gesture modality appropriately according to their audience's visual attention, suggesting evidence of first-order intentional communicative use. We further show that elephants integrate vocalisations and gestures into different combinations and orders. The most frequent combination consists of rumble vocalisations with ear-flapping gestures, used most often between females. By showing that a species evolutionarily distant to our own primate lineage shows sensitivity to their audience's visual attention in their gesturing and combines gestures with vocalisations, our study advances our understanding of the emergence of first-order intentionality and multimodal communication across taxa.
https://www.nature.com/articles/s42003-024-06133-5

Nature Communications Psychology

PAPERS

TIMOTHY W. BROOM et al – Loneliness corresponds with neural representations and language use that deviate from shared cultural perceptions

The word zeitgeist refers to common perceptions shared in a given culture. Meanwhile, a defining feature of loneliness is feeling that one's views are not shared with others. Does loneliness correspond with deviating from the zeitgeist? Across two independent brain imaging datasets, lonely participants' neural representations of well-known celebrities strayed from group-consensus neural representations in the medial prefrontal cortex—a region that encodes and retrieves social knowledge (Studies 1 A/1B: N = 40 each). Because communication fosters social connection by creating shared reality, we next asked whether lonelier participants' communication about well-known celebrities also deviates from the zeitgeist. Indeed, when a strong group consensus exists, lonelier individuals use idiosyncratic language to describe well-known celebrities (Study 2: N = 923). Collectively, results support lonely individuals' feeling that their views are not shared. This suggests loneliness may not only reflect impoverished relationships with specific individuals, but also feelings of disconnection from prevalently shared views of contemporary culture.
https://www.nature.com/articles/s44271-024-00088-3

Nature Reviews Psychology

PAPERS

JOEL S. SNYDER, REYNA L. GORDON & ERIN E. HANNON – Theoretical and empirical advances in understanding musical rhythm, beat and metre

The rhythmic elements of music are integral to experiences such as singing, musical emotions, the urge to dance and playing a musical instrument. Thus, studies of musical rhythm are an especially fertile ground for the development of innovative theories of complex naturalistic behaviour. In this Review, we first synthesize behavioural and neural studies of musical rhythm, beat and metre perception. Then, we describe key theories and models of these abilities, including nonlinear oscillator models and predictive-coding models, to clarify the extent to which they overlap in their mechanistic proposals and make distinct testable predictions. Next, we review studies of development and genetics to shed further light on the psychological and neural basis of rhythmic abilities and provide insight into the evolutionary and cultural origins of music. Last, we outline future research opportunities to integrate behavioural and genetics studies with computational modelling and neuroscience studies to better understand musical behaviour.
https://www.nature.com/articles/s44159-024-00315-y

Nature Scientific Reports

PAPERS

ELANA R. HOBKIRK & SEAN D. TWISS – Domestication constrains the ability of dogs to convey emotions via facial expressions in comparison to their wolf ancestors

Dogs (Canis lupus familiaris) are the domestically bred descendant of wolves (Canis lupus). However, selective breeding has profoundly altered facial morphologies of dogs compared to their wolf ancestors. We demonstrate that these morphological differences limit the abilities of dogs to successfully produce the same affective facial expressions as wolves. We decoded facial movements of captive wolves during social interactions involving nine separate affective states. We used linear discriminant analyses to predict affective states based on combinations of facial movements. The resulting confusion matrix demonstrates that specific combinations of facial movements predict nine distinct affective states in wolves; the first assessment of this many affective facial expressions in wolves. However, comparative analyses with kennelled rescue dogs revealed reduced ability to predict affective states. Critically, there was a very low predictive power for specific affective states, with confusion occurring between negative and positive states, such as Friendly and Fear. We show that the varying facial morphologies of dogs (specifically non-wolf-like morphologies) limit their ability to produce the same range of affective facial expressions as wolves. Confusion among positive and negative states could be detrimental to human–dog interactions, although our analyses also suggest dogs likely use vocalisations to compensate for limitations in facial communication.
https://www.nature.com/articles/s41598-024-61110-6

TATIANE VALENÇA, GABRIELA OLIVEIRA AFFONÇO & TIAGO FALÓTICO – Wild capuchin monkeys use stones and sticks to access underground food

Primates employ different tools and techniques to overcome the challenges of obtaining underground food resources. Humans and chimpanzees are known to tackle this problem with stick tools and one population of capuchin monkeys habitually uses stone tools. Although early hominids could have used stones as digging tools, we know little about when and how these could be useful. Here, we report a second primate population observed using stone tools and the first capuchin monkey population to habitually use the 'stick-probing' technique for obtaining underground resources. The bearded capuchin monkeys (Sapajus libidinosus) from Ubajara National Park, Brazil, use 'hands-only' and 'stone-digging' techniques for extracting underground storage organs and trapdoor spiders. Males also use 'stick-probing' and 'stone-stick' techniques for capturing trapdoor spiders. Tool use does not increase success in obtaining these resources. Stone-digging is less frequent in this population than in the only other known population that uses this technique. Females use stones in a lower proportion of their digging episodes than males in both populations. Ecological and cultural factors potentially influence technique choice and sex differences within and between populations. This population has a different pattern of underground food exploration using tools. Comparing this population with others and exploring the ecological and cultural factors under which capuchin monkeys employ different tools and techniques will allow us to better understand the pressures that may have shaped the evolution of those behaviors in primates.
https://www.nature.com/articles/s41598-024-61243-8

COMMENTARIES

PATRICK SCHMIDT & CLAUDIO TENNIE – Problems with two recent Petri net analyses of Neanderthal adhesive technology

Birch tar making by Neanderthals was one of the first transformative processes in human history. It has implications for our understanding of the cognitive capacity and cultures of early humans. However, it has been shown that birch tar finds cannot be standalone proxies for these processes. This is so because birch tar may be the result of condensation from burning bark onto flat stone surfaces, which can happen even in fortuitous accidents. Thus, the tar making techniques actually used must be investigated and their specific implications for cognition and culture must be properly understood. It is therefore generally

welcome that Kozowyk et al. intend an interpretation of the condensation method's implications. They do so for a specific application: the case where three cobbles act as condensation centers. Using the same approach, Fajardo et al. interpret the meaning of several birch tar making techniques. There are several problems with their approach, and here we will address three of them.
https://www.nature.com/articles/s41598-024-60793-1

SEBASTIAN FAJARDO, PAUL R. B. KOZOWYK & GEESKE H. J. LANGEJANS – Reply to: Problems with two recent Petri net analyses of Neanderthal adhesive technology
In two recent publications we introduce Petri nets as a new method to model ancient technological systems and their complexity. We use previously proposed methods of prehistoric tar production as case studies and apply three different metrics that each rely on unique definitions of complexity: (1) The density metric considers the interconnectedness between events and resources and can be related to requirements of simultaneous information processing; (2) The extended cyclomatic metric concerns the likelihood of errors throughout the process, and the potential need for planning and inhibition control; (3) The structuredness metric relates to the effort to understand abstract information about the materials, product templates and the process itself, and thus to learning. The results can therefore be interpreted along behavioural and cognitive lines. Our application of Petri net modelling to different tar production methods demonstrates that there is much variation in complexity between tar technologies. Moreover, we can indicate where these differences stem from. This is relevant to debates where technology is a proxy for cognition. Schmidt and Tennie misinterpret our work. They claim it is subjective, and not rooted in reality. Here we take the opportunity to address any misinterpretation.
https://www.nature.com/articles/s41598-024-60674-7

New Scientist

ARTICLES

ALISON GEORGE – Astonishing images show how female Neanderthal may have looked
The skull of Shanidar Z was found in the Shanidar cave in the Kurdistan region of Iraq, and has been painstakingly put back together.
https://www.newscientist.com/article/2429497-astonishing-images-show-how-female-neanderthal-may-have-looked/

PLoS One

PAPERS

FATEMEH TABARI et al – Speech, voice, and language outcomes following deep brain stimulation: A systematic review
Deep brain stimulation (DBS) reliably ameliorates cardinal motor symptoms in Parkinson's disease (PD) and essential tremor (ET). However, the effects of DBS on speech, voice and language have been inconsistent and have not been examined comprehensively in a single study.
We conducted a systematic analysis of literature by reviewing studies that examined the effects of DBS on speech, voice and language in PD and ET.
A total of 675 publications were retrieved from PubMed, Embase, CINHAL, Web of Science, Cochrane Library and Scopus databases. Based on our selection criteria, 90 papers were included in our analysis. The selected publications were categorized into four subcategories: Fluency, Word production, Articulation and phonology and Voice quality.
The results suggested a long-term decline in verbal fluency, with more studies reporting deficits in phonemic fluency than semantic fluency following DBS. Additionally, high frequency stimulation, left-sided and bilateral DBS were associated with worse verbal fluency outcomes. Naming improved in the short-term following DBS-ON compared to DBS-OFF, with no long-term differences between the two conditions. Bilateral and low-frequency DBS demonstrated a relative improvement for phonation and articulation. Nonetheless, long-term DBS exacerbated phonation and articulation deficits. The effect of DBS on voice was highly variable, with both improvements and deterioration in different measures of voice.
This was the first study that aimed to combine the outcome of speech, voice, and language following DBS in a single systematic review. The findings revealed a heterogeneous pattern of results for speech, voice, and language across DBS studies, and provided directions for future studies.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0302739

HEATHER A. HANSEN, ANDREW B. LEBER & ZEYNEP M. SAYGIN – The effect of misophonia on cognitive and social judgments
Misophonia, a heightened aversion to certain sounds, turns common cognitive and social exercises (e.g., paying attention during a lecture near a pen-clicking classmate, coexisting at the dinner table with a food-chomping relative) into challenging endeavors. How does exposure to triggering sounds impact cognitive and social judgments? We investigated this question in a sample of 65 participants (26 misophonia, 39 control) from the general population. In Phase 1, participants saw faces paired with auditory stimuli while completing a gender judgment task, then reported sound discomfort and identification. In Phase 2, participants saw these same faces with novel ones and reported face likeability and memory. For both oral and non-oral triggers, misophonic participants gave higher discomfort ratings than controls did–especially when identification was

correct–and performed slower on the gender judgment. Misophonic participants rated lower likeability than controls did for faces they remembered with high discomfort sounds, and face memory was worse overall for faces originally paired with high discomfort sounds. Altogether, these results suggest that misophonic individuals show impairments on social and cognitive judgments if they must endure discomforting sounds. This experiment helps us better understand the day-to-day impact of misophonia and encourages usage of individualized triggers in future studies.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0299698

AIMIE-LEE JUTEAU et al – Do children interpret informants' confidence as person-specific or situational?
Children prefer to learn from confident rather than hesitant informants. However, it is unclear how children interpret confidence cues: these could be construed as strictly situational indicators of an informant's current certainty about the information they are conveying, or alternatively as person-specific indicators of how "knowledgeable" someone is across situations. In three studies, 4- and 5-year-olds (Experiment 1: N = 51, Experiment 3: N = 41) and 2- and 3-year-olds (Experiment 2: N = 80) saw informants differing in confidence. Each informant's confidence cues either remained constant throughout the experiment, changed between the history and test phases, or were present during the history but not test phase. Results suggest that 4- and 5-year-olds primarily treat confidence cues as situational, whereas there is uncertainty around younger preschoolers' interpretation due to low performance.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0298183

CORRECTIONS

ELHAM GHASIDIAN et al – Correction: Modelling Neanderthals' dispersal routes from Caucasus towards east
There are errors in author affiliations. The correct affiliations are as follows.
Elham Ghasidian1,2,3, Anooshe Kafash4, Martin Kehl5, Masoud Yousefi4, Saman Heydari-Guran1,2,3
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https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0303722

Proceedings of the Royal Society B

PAPERS

MARCUS J. HAMILTON, ROBERT S. WALKER & BRIGGS BUCHANAN – Institutional complexity emerges from socioecological complexity in small-scale human societies
Human lifestyles vary enormously over time and space and so understanding the origins of this diversity has always been a central focus of anthropology. A major source of this cultural variation is the variation in institutional complexity: the cultural packages of rules, norms, ontologies and expectations passed down through societies across generations. In this article, we study the emergence of institutions in small-scale societies. There are two primary schools of thought. The first is that institutions emerge top-down as rules are imposed by elites on their societies in order to gain asymmetrical access to power, resources and influence over others through coercion. The second is that institutions emerge bottom-up to facilitate interactions within populations as they seek collective solutions to adaptive problems. Here, we use Bayesian networks to infer the causal structure of institutional complexity in 172 small-scale societies across ethnohistoric western North America reflecting the wide diversity of indigenous lifestyles across this vast region immediately prior to European colonization. Our results suggest that institutional complexity emerges from underlying socioecological complexity because institutions are solutions to coordination problems in more complex environments where human–environment interactions require increased management.
https://royalsocietypublishing.org/doi/10.1098/rspb.2024.0246

TSHEPISO LESEDI MAJELANTLE et al – The dissection of a despotic society: exploration, dominance and hormonal traits
Naked mole-rats (Heterocephalus glaber) live in large colonies with one breeding female (queen), one to three breeding males (BMs) and the remainder are non-reproductive subordinates. The animals have a linear dominance rank with the breeders at the top of the hierarchy. We investigated how dominance rank in naked mole-rats differs with exploration (the propensity to explore a novel environment) and related endocrine markers. Exploration behaviour, faecal progestagen metabolite (fPM), faecal glucocorticoid metabolite (fGCM), faecal androgen metabolite (fAM) and plasma prolactin concentrations were quantified in breeding, high-, middle- and low-ranked females and males from five naked mole-rat colonies. There were no significant differences between the dominance rank and exploration behaviour. Interestingly, the queens and high-ranking females had higher fGCM and fAM concentrations compared with middle- and low-ranked females. The queens had significantly higher fPM concentrations than all other ranked females, since they are responsible for procreation. In the males, the BMs had higher fGCM concentrations compared with high- and low-ranked males. In addition, BMs and middle-ranking males had overall higher prolactin levels than all other ranked males, which could be linked to cooperative care. Overall, the results suggest that physiological reproductive suppression is linked to high dominance rank.
https://royalsocietypublishing.org/doi/10.1098/rspb.2024.0371

Royal Society Open Science

PAPERS

SHOTA SHIBASAKI, RYOSUKE NAKADAI & YO NAKAWAKE – Biogeographical distributions of trickster animals

Human language encompasses almost endless potential for meaning, and folklore can theoretically incorporate themes beyond time and space. However, actual distributions of the themes are not always universal and their constraints remain unclear. Here, we specifically focused on zoological folklore and aimed to reveal what restricts the distribution of trickster animals in folklore. We applied the biogeographical methodology to 16 taxonomic categories of trickster (455 data) and real (93 090 848 data) animals obtained from large databases. Our analysis revealed that the distribution of trickster animals was restricted by their presence in the vicinity and, more importantly, the presence of their corresponding real animals. Given that the distributions of real animals are restricted by the annual mean temperature and annual precipitation, these climatic conditions indirectly affect the distribution of trickster animals. Our study, applying biogeographical methods to culture, paves the way to a deeper understanding of the interactions between ecology and culture.
https://royalsocietypublishing.org/doi/10.1098/rsos.231577

Trends in Cognitive Sciences

PAPERS

JANICE CHEN & AARON M. BORNSTEIN – The causal structure and computational value of narratives

Many human behavioral and brain imaging studies have used narratively structured stimuli (e.g., written, audio, or audiovisual stories) to better emulate real-world experience in the laboratory. However, narratives are a special class of real-world experience, largely defined by their causal connections across time. Much contemporary neuroscience research does not consider this key property. We review behavioral and neuroscientific work that speaks to how causal structure shapes comprehension of and memory for narratives. We further draw connections between this work and reinforcement learning, highlighting how narratives help link causes to outcomes in complex environments. By incorporating the plausibility of causal connections between classes of actions and outcomes, reinforcement learning models may become more ecologically valid, while simultaneously elucidating the value of narratives.
https://www.cell.com/trends/cognitive-sciences/abstract/S1364-6613(24)00082-2

SHAUN GALLAGHER, ANTONINO RAFFONE & SALVATORE M. AGLIOTI – The pattern theory of compassion

Concepts of empathy, sympathy and compassion are often confused in a variety of literatures. This article proposes a pattern-theoretic approach to distinguishing compassion from empathy and sympathy. Drawing on psychology, Western philosophy, affective neuroscience, and contemplative science, we clarify the nature of compassion as a specific pattern of dynamically related factors that include physiological, cognitive, and affective processes, relational/intersubjective processes, and motivational/action tendencies. We also show that the dynamic nature of the compassion pattern is reflected in neuroscientific findings, as well as in compassion practice. The pattern theory of compassion allows us to make several clear distinctions between compassion, empathy, and sympathy.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(24)00084-6

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