EAORC BULLETIN 886 – 7 June 2020

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, do 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, do let me know.
And if you have any other ideas for extending the "EAORC experience", please contact me.

BREAKING SCIENCE – Extended Parental Care Helps Siberian Jays & New Caledonian Crows Grow Smarter

New research on two corvid species, Siberian jays (Perisoreus infaustus) and New Caledonian crows (Corvus moneduloides), shows that extended family life is crucial to provide the social learning opportunities where juveniles acquire vital skills; the study authors propose that extended parenting could well have led to the extended, lifelong learning found in humans.
http://feedproxy.google.com/~r/BreakingScienceNews/~3/50-Z5VQo8hQ/extended-parenting-juvenile-siberian-jays-new-caledonian-crows-08494.html?utm_source=feedburner&utm_medium=email

BREAKING SCIENCE – Archaeologists Discover Largest and Oldest-Known Maya Monument

An international team of archaeologists has discovered an artificial structure — which is 1,400 m in length, 10-15 m in height, has 9 causeways radiating out from it, and is about 3,000 years old — at the archaeological site of Aguada Fénix in Tabasco, Mexico, near the northwestern border of Guatemala.
http://feedproxy.google.com/~r/BreakingScienceNews/~3/9LpPXFcaXgY/aguada-fenix-monument-08503.html?utm_source=feedburner&utm_medium=email

SCIENCE DAILY – Heightened interaction between neolithic migrants & hunter-gatherers in W. Europe

This study reports new genome-wide data for 101 prehistoric individuals from 12 archaeological sites in today's France and Germany, dating from 7000-3000 BCE, and documents levels of admixture between expanding early Neolithic farmers and local hunter-gatherers seen nowhere else in Europe.

https://www.sciencedaily.com/releases/2020/05/200529150654.htm

SCIENCE DAILY – Social status, not size, determines reproductive success for female mountain gorillas

Dominance rank among female mountain gorillas is not related to body size but does increase their reproductive output according to new research.
https://www.sciencedaily.com/releases/2020/06/200603144331.htm

SCIENCE DAILY – Largest, oldest Maya monument suggests importance of communal work

A new discovery suggests that the Maya civilization developed more rapidly than archaeologists once thought and hints at less social inequality than later periods.
https://www.sciencedaily.com/releases/2020/06/200603120538.htm

SCIENCE DAILY – DNA increases our understanding of contact between Stone Age cultures

What kind of interactions did the various Stone Age cultures have with one another? In a new interdisciplinary study, researchers have combined archaeological and genetic information to better understand Battle Axe cultural influences discovered in graves of the Pitted Ware culture.
https://www.sciencedaily.com/releases/2020/06/200605132436.htm

SCIENCE DAILY – New Papua New Guinea research solves archaeological mysteries

New research which 'fills in the blanks' on what ancient Papuan New Guineans ate, and how they processed food, has ended decades-long speculation on tool use and food stables in the highlands of New Guinea several thousand years ago.
https://www.sciencedaily.com/releases/2020/06/200604095639.htm

NATURE BRIEFING – Oldest Mayan monument ever found

A huge artificial plateau that is 1.4 kilometres long and 10–15 metres high has been discovered in Mexico. Archaeologists spotted the monumental construction from the air using lidar, a remote-sensing method that maps the ground using lasers. Dubbed Aguada Fénix, the extensive structure was built between 1000 and 800 BC, and precedes the peak of the Maya empire by more than a millennium.
https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=10f8bc55ca&e=1db4b9a19b

PUBLICATIONS

American Journal of Physical Anthropology

PAPERS

MARINE CAZENAVE et al – Reassessment of the TM 1517 odonto-postcranial assemblage from Kromdraai B, South Africa, and the maturational pattern of Paranthropus robustus

The Pleistocene taxon Paranthropus robustus was established in 1938 following the discovery at Kromdraai B, South Africa, of the partial cranium TM 1517a and associated mandible TM 1517b. Shortly thereafter, a distal humerus (TM 1517g), a proximal ulna (TM 1517e), and a distal hallucial phalanx (TM 1517k) were collected nearby at the site, and were considered to be associated with the holotype. TM 1517a-b represents an immature individual; however, no analysis of the potentially associated postcranial elements has investigated the presence of any endostructural remnant of recent epiphyseal closure. This study aims at tentatively detecting such traces in the three postcranial specimens from Kromdraai B.
In the hominin fossil record, there are few unambiguously associated craniodental and postcranial remains sampling immature individuals, an essential condition for assessing the taxon-specific maturational patterns. Our findings corroborate the original association of the craniodental and postcranial remains representing the P. robustus type specimen. As with other Plio-Pleistocene hominins, the odonto-postcranial maturational pattern of TM 1517 more closely fits an African great ape rather than the extant human pattern.
https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24082?campaign=wolearlyview

Animal Behaviour

PAPERS

COLIN BEER – Niko Tinbergen and questions of instinct

Niko Tinbergen characterized ethology as ‘the biological study of behaviour’ involving four kinds of question: causation, ontogeny, adaptive function and phyletic evolution (Tinbergen, 1963; Zeitschrift für Tierpsychologie, 20, 410–433). He said the science should give equal attention to each and to their integration. This division was prefigured in his book ‘The study of instinct’ (Tinbergen, 1951; Oxford University Press). The book offered a conception of instinct as a built-in motivational system analogous to a hydraulic mechanism. The assumption of innateness and the lack of physiological credibility of the instinct model met with adverse criticism, which Tinbergen conceded to a large extent. His later work concentrated on

functional issues, which anticipated the direction dominating subsequent ethological studies. Nevertheless Tinbergen's four questions, and his insistence that they be given equal attention continue to present an agenda for ethological aspiration.
https://www.sciencedirect.com/science/article/abs/pii/S0003347219302507?dgcid=raven_sd_via_email

THEODORA J. KALIKOW – Konrad Lorenz on human degeneration and social decline: a chronic preoccupation
Throughout his career, Konrad Lorenz, co-founder of ethology, extrapolated from animal behaviour to humans – especially concerning degeneration as a result of domestication – and then prescribed for the allegedly resulting ills of society. The descriptions were constant. Lorenz had observed that wild animals subjected to and bred in captivity often underwent various abnormal physical and behavioural changes, such as changes in stature and coloration, and also in instinctive behaviour patterns – mating, eating, raising young, and so on. He went on to posit that the same sorts of 'degeneration' of human individuals were due to overcrowding, race mixing, poor nutrition, overbreeding, etc. – any kind of human society being equated with captivity – and claimed that faults in human society arose from these sorts of individual degeneration effects. Then, of course, as a physician, he prescribed for how society might be cured. Since he came to scientific prominence during the Nazi era, there have been constant criticisms and accusations that Lorenz must have been a Nazi and that Nazi ideology underlay many of his ideas about humanity and ethology. The thesis of this paper is that Lorenz had accepted the truth of human degeneration and social decline before the rise of Nazism. While he adopted Nazi-type terminology, prescriptions and arguments during the early stages of his career (which coincided with the rise and fall of the Third Reich), he dropped them as soon as the end of World War II rendered them unacceptable. Thereafter Lorenz retained the belief in human degeneration and social decline, but chose other arguments and prescriptions based in part on popular theories of the day, e.g. capitalism, and later ecology.
https://www.sciencedirect.com/science/article/abs/pii/S0003347220300129?dgcid=raven_sd_via_email

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Mind & Language

COMMENTARIES

STEVEN GROSS – Probabilistic representations in perception: Are there any, and what would they be?
Nick Shea's Representation in cognitive science commits him to representations in perceptual processing that are about probabilities. This commentary concerns how to adjudicate between this view and an alternative that locates the probabilities rather in the representational states' associated "attitudes." As background and motivation, evidence for probabilistic representations in perceptual processing is adduced, and it is shown how, on either conception, one can address a specific challenge Ned Block has raised to this evidence.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12280?campaign=wolearlyview

FRANCES EGAN – Content is pragmatic: Comments on Nicholas Shea's Representation in cognitive science
Nicholas Shea offers what he takes to be a naturalistic account of representational content in cognitive science. I argue that the account secures determinate content only by appeal to pragmatic considerations, and so it fails to respect naturalism. But that is fine, because representational content is not, strictly speaking, necessary for explanation in cognitive science. Even in Shea's own account, content serves only a variety of heuristic functions.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12276?campaign=wolearlyview

CHARLES R. GALLISTEL – Where meanings arise and how: Building on Shannon's foundations
Information theory provides a quantitative conceptual framework for understanding the flow of information from the world into and through brains. It focuses our attention on the sets of possible messages a brain's anatomy and physiology enable it to receive. The meanings of the messages arise from the inferences licensed by the brain's processing of them. Different meanings arise at different levels because different representations of the input license different inferences.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12289?campaign=wolearlyview

NICHOLAS SHEA – Representation in Cognitive Science: Replies
In their constructive reviews, Frances Egan, Randy Gallistel and Steven Gross have raised some important problems for the account of content advanced by Nicholas Shea in Representation in Cognitive Science. Here the author addresses their main challenges. Egan argues that the account includes an unrecognised pragmatic element; and that it makes contents explanatorily otiose. Gallistel raises questions about homomorphism and correlational information. Gross puts the account to work to resolve a dispute about probabilistic contents in perception, but argues that a question remains about whether probabilities are found in the content or instead in the manner of representation.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12285?campaign=wolearlyview

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Nature

ARTICLES

PATRICIA A. MCANANY – Large-scale early Maya sites in Mexico revealed by lidar mapping technology
Archaeology is transforming our view of how ancient Maya societies developed. Use of lidar technology has now led to the discovery that large, monumental structures that aid naked-eye astronomy were built unexpectedly early.

https://www.nature.com/articles/d41586-020-01570-8

PAPERS

TAKESHI INOMATA et al – Monumental architecture at Aguada Fénix and the rise of Maya civilization
Archaeologists have traditionally thought that the development of Maya civilization was gradual, assuming that small villages began to emerge during the Middle Preclassic period (1000–350 bc; dates are calibrated throughout) along with the use of ceramics and the adoption of sedentism1. Recent finds of early ceremonial complexes are beginning to challenge this model. Here we describe an airborne lidar survey and excavations of the previously unknown site of Aguada Fénix (Tabasco, Mexico) with an artificial plateau, which measures 1,400 m in length and 10 to 15 m in height and has 9 causeways radiating out from it. We dated this construction to between 1000 and 800 bc using a Bayesian analysis of radiocarbon dates. To our knowledge, this is the oldest monumental construction ever found in the Maya area and the largest in the entire pre-Hispanic history of the region. Although the site exhibits some similarities to the earlier Olmec centre of San Lorenzo, the community of Aguada Fénix probably did not have marked social inequality comparable to that of San Lorenzo. Aguada Fénix and other ceremonial complexes of the same period suggest the importance of communal work in the initial development of Maya civilization.
https://www.nature.com/articles/s41586-020-2343-4

LAURITS SKOV et al – The nature of Neanderthal introgression revealed by 27,566 Icelandic genomes
Human evolutionary history is rich with the interbreeding of divergent populations. Most humans outside of Africa trace about 2% of their genomes to admixture from Neanderthals, which occurred 50–60 thousand years ago1. Here we examine the effect of this event using 14.4 million putative archaic chromosome fragments that were detected in fully phased whole-genome sequences from 27,566 Icelanders, corresponding to a range of 56,388–112,709 unique archaic fragments that cover 38.0–48.2% of the callable genome. On the basis of the similarity with known archaic genomes, we assign 84.5% of fragments to an Altai or Vindija Neanderthal origin and 3.3% to Denisovan origin; 12.2% of fragments are of unknown origin. We find that Icelanders have more Denisovan-like fragments than expected through incomplete lineage sorting. This is best explained by Denisovan gene flow, either into ancestors of the introgressing Neanderthals or directly into humans. A within-individual, paired comparison of archaic fragments with syntenic non-archaic fragments revealed that, although the overall rate of mutation was similar in humans and Neanderthals during the 500 thousand years that their lineages were separate, there were differences in the relative frequencies of mutation types—perhaps due to different generation intervals for males and females. Finally, we assessed 271 phenotypes, report 5 associations driven by variants in archaic fragments and show that the majority of previously reported associations are better explained by non-archaic variants.
https://www.nature.com/articles/s41586-020-2225-9

Nature Communications

PAPERS

MALINDA J. MCPHERSON et al – Perceptual fusion of musical notes by native Amazonians suggests universal representations of musical intervals
Music perception is plausibly constrained by universal perceptual mechanisms adapted to natural sounds. Such constraints could arise from our dependence on harmonic frequency spectra for segregating concurrent sounds, but evidence has been circumstantial. We measured the extent to which concurrent musical notes are misperceived as a single sound, testing Westerners as well as native Amazonians with limited exposure to Western music. Both groups were more likely to mistake note combinations related by simple integer ratios as single sounds ('fusion'). Thus, even with little exposure to Western harmony, acoustic constraints on sound segregation appear to induce perceptual structure on note combinations. However, fusion did not predict aesthetic judgments of intervals in Westerners, or in Amazonians, who were indifferent to consonance/dissonance. The results suggest universal perceptual mechanisms that could help explain cross-cultural regularities in musical systems, but indicate that these mechanisms interact with culture-specific influences to produce musical phenomena such as consonance.
https://www.nature.com/articles/s41467-020-16448-6

Nature Ecology & Evolution

PAPERS

WILLIAM E. BANKS – Puzzling out the Middle-to-Upper Palaeolithic transition
Homo sapiens remains, molecular data and a revised chronology for the Bulgarian site of Bacho Kiro document the earliest known presence of our species in Europe, representing an important jigsaw piece in the Middle-to-Upper Palaeolithic transition.
https://www.nature.com/articles/s41559-020-1162-1

Nature Scientific Reports

PAPERS

LARISA R. G. DESANTIS et al – Clarifying relationships between cranial form and function in tapirs, with implications for the dietary ecology of early hominins

Paleontologists and paleoanthropologists have long debated relationships between cranial morphology and diet in a broad diversity of organisms. While the presence of larger temporalis muscle attachment area (via the presence of sagittal crests) in carnivorans is correlated with durophagy (i.e. hard-object feeding), many primates with similar morphologies consume an array of tough and hard foods—complicating dietary inferences of early hominins. We posit that tapirs, large herbivorous mammals showing variable sagittal crest development across species, are ideal models for examining correlations between textural properties of food and sagittal crest morphology. Here, we integrate dietary data, dental microwear texture analysis, and finite element analysis to clarify the functional significance of the sagittal crest in tapirs. Most notably, pronounced sagittal crests are negatively correlated with hard-object feeding in extant, and several extinct, tapirs and can actually increase stress and strain energy. Collectively, these data suggest that musculature associated with pronounced sagittal crests—and accompanied increases in muscle volume—assists with the processing of tough food items in tapirs and may yield similar benefits in other mammals including early hominins.
https://www.nature.com/articles/s41598-020-65586-w

New Scientist

NEWS

We've found the oldest, largest Mayan monument

The 3000-year-old site of Aguada Fénix in Mexico is the oldest known monument built by the Mayan civilisation. The huge raised platform is 1.4 kilometres long, also making it the largest.
https://newscientist.us3.list-manage.com/track/click?u=6710b48697068ec8e08d69abf&id=6b0a141b05&e=c07cfd7395

Philosophical Transactions of the Royal Society B

PAPERS

DOMINIK DEFFNER & RICHARD MCELREATH – The importance of life history and population regulation for the evolution of social learning

Social learning and life history interact in human adaptation, but nearly all models of the evolution of social learning omit age structure and population regulation. Further progress is hindered by a poor appreciation of how life history affects selection on learning. We discuss why life history and age structure are important for social learning and present an exemplary model of the evolution of social learning in which demographic properties of the population arise endogenously from assumptions about per capita vital rates and different forms of population regulation. We find that, counterintuitively, a stronger reliance on social learning is favoured in organisms characterized by 'fast' life histories with high mortality and fertility rates compared to 'slower' life histories typical of primates. Long lifespans make early investment in learning more profitable and increase the probability that the environment switches within generations. Both effects favour more individual learning. Additionally, under fertility regulation (as opposed to mortality regulation), more juveniles are born shortly after switches in the environment when many adults are not adapted, creating selection for more individual learning. To explain the empirical association between social learning and long life spans and to appreciate the implications for human evolution, we need further modelling frameworks allowing strategic learning and cumulative culture.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0492

NATALIE UOMINI et al – Extended parenting and the evolution of cognition

Traditional attempts to understand the evolution of human cognition compare humans with other primates. This research showed that relative brain size covaries with cognitive skills, while adaptations that buffer the developmental and energetic costs of large brains (e.g. allomaternal care), and ecological or social benefits of cognitive abilities, are critical for their evolution. To understand the drivers of cognitive adaptations, it is profitable to consider distant lineages with convergently evolved cognitions. Here, we examine the facilitators of cognitive evolution in corvid birds, where some species display cultural learning, with an emphasis on family life. We propose that extended parenting (protracted parent–offspring association) is pivotal in the evolution of cognition: it combines critical life-history, social and ecological conditions allowing for the development and maintenance of cognitive skillsets that confer fitness benefits to individuals. This novel hypothesis complements the extended childhood idea by considering the parents' role in juvenile development. Using phylogenetic comparative analyses, we show that corvids have larger body sizes, longer development times, extended parenting and larger relative brain sizes than other passerines. Case studies from two corvid species with different ecologies and social systems highlight the critical role of life-history features on juveniles' cognitive development: extended parenting provides a safe haven, access to tolerant role models, reliable learning opportunities and food, resulting in higher survival. The benefits of extended juvenile learning periods, over evolutionary time, lead to selection for expanded cognitive skillsets. Similarly, in our ancestors, cooperative breeding and increased group sizes facilitated learning and teaching. Our analyses highlight the critical role of life-history, ecological and social factors that underlie both extended parenting and expanded cognitive skillsets.

https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0495

SUSAN PERRY – Behavioural variation and learning across the lifespan in wild white-faced capuchin monkeys
Natural selection has evidently mediated many species characteristics relevant to the evolution of learning, including longevity, length of the juvenile period, social organization, timing of cognitive and motor development, and age-related shifts in behavioural propensities such as activity level, flexibility in problem-solving and motivation to seek new information. Longitudinal studies of wild populations can document such changes in behavioural propensities, providing critical information about the contexts in which learning strategies develop, in environments similar to those in which learning strategies evolved. The Lomas Barbudal Monkey Project provides developmental data for the white-faced capuchin, Cebus capucinus, a species that has converged with humans regarding many life-history and behavioural characteristics. In this dataset, focused primarily on learned aspects of foraging behaviour, younger capuchins are more active overall, more curious and opportunistic, and more prone to inventing new investigative and foraging-related behaviours. Younger individuals more often seek social information by watching other foragers (especially older foragers). Younger individuals are more creative, playful and inventive, and less neophobic, exhibiting a wider range of behaviours when engaged in extractive foraging. Whereas adults more often stick with old solutions, younger individuals often incorporate recently acquired experience (both social and asocial) when foraging.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0494

MICHAEL TOMASELLO – The adaptive origins of uniquely human sociality
Humans possess some unique social-cognitive skills and motivations, involving such things as joint attention, cooperative communication, dual-level collaboration and cultural learning. These are almost certainly adaptations for humans' especially complex sociocultural lives. The common assumption has been that these unique skills and motivations emerge in human infancy and early childhood as preparations for the challenges of adult life, for example, in collaborative foraging. In the current paper, I propose that the curiously early emergence of these skills in infancy—well before they are needed in adulthood—along with other pieces of evidence (such as almost exclusive use with adults not peers) suggests that aspects of the evolution of these skills represent ontogenetic adaptations to the unique socio-ecological challenges human infants face in the context of a regime of cooperative breeding and childcare.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0493

SARAH BLAFFER HRDY & JUDITH M. BURKART – The emergence of emotionally modern humans: implications for language and learning
According to the Cooperative Breeding Hypothesis, apes with the life-history attributes of those in the line leading to the genus Homo could not have evolved unless male and female allomothers had begun to help mothers care for and provision offspring. As proposed elsewhere, the unusual way hominins reared their young generated novel phenotypes subsequently subjected to Darwinian social selection favouring those young apes best at monitoring the intentions, mental states and preferences of others and most motivated to attract and appeal to caretakers. Not only were youngsters acquiring information in social contexts different from those of other apes, but they would also have been emotionally and neurophysiologically different from them in ways that are relevant to how humans learn. Contingently delivered rewards to dependents who attracted and ingratiated themselves with allomothers shaped their behaviours and vocalizations and transformed the way developing youngsters learned from others and internalized their preferences.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0499

KRISTEN HAWKES – Cognitive consequences of our grandmothering life history: cultural learning begins in infancy
Postmenopausal longevity distinguishes humans from our closest living evolutionary cousins, the great apes, and may have evolved in our lineage when the economic productivity of grandmothers allowed mothers to wean earlier and overlap dependents. Since increased longevity retards development and expands brain size across the mammals, this hypothesis links our slower developing, bigger brains to ancestral grandmothering. If foraging interdependence favoured postmenopausal longevity because grandmothers' subsidies reduced weaning ages, then ancestral infants lost full maternal engagement while their slower developing brains were notably immature. With survival dependent on social relationships, sensitivity to reputations is wired very early in neural ontogeny, beginning our lifelong preoccupation with shared intentionality.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0501

KIM STERELNY – Innovation, life history and social networks in human evolution
There is a famous puzzle about the first 3 million years of archaeologically visible human technological history. The pace of change, of innovation and its uptake, is extraordinarily slow. In particular, the famous handaxes of the Acheulian technological tradition first appeared about 1.7 Ma, and persisted with little change until about 800 ka, perhaps even longer. In this paper, I will offer an explanation of that stasis based in the life history and network characteristics that we infer (on phylogenetic grounds) to have characterized earlier human species. The core ideas are that (i) especially in earlier periods of hominin evolution, we are likely to find archaeological traces only of widespread and persisting technologies and practices; (ii) the record is not a record of the rate of innovation, but the rate of innovations establishing in a landscape; (iii) innovations are extremely vulnerable to stochastic loss while confined to the communities in which they are made and established; (iv)

the export of innovation from the local group is sharply constrained if there is a general pattern of hostility and suspicion between groups, or even if there is just little contact between adults of adjoining groups. That pattern is typical of great apes and likely, therefore, to have characterized at least early hominin social lives. Innovations are unlikely to spread by adult-to-adult interactions across community boundaries. (v) Chimpanzees and bonobos are characterized by male philopatry and subadult female dispersal; that is, therefore, the most likely early hominin pattern. If so, the only innovations at all likely to expand beyond the point of origin are those acquired by subadult females, and ones that can be expressed by those females, at high enough frequency and salience for them to spread, in the bands that the females join. These are very serious filters on the spread of innovation.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0497

PETER J. RICHERSON & ROBERT BOYD – The human life history is adapted to exploit the adaptive advantages of culture
Humans evolved from an ape ancestor that was highly intelligent, moderately social and moderately dependent on cultural adaptations for subsistence technology (tools). By the late Pleistocene, humans had become highly dependent on culture for subsistence and for rules to organize a complex social life. Adaptation by cultural traditions transformed our life history, leading to an extended juvenile period to learn subsistence and social skills, post-reproductive survival to help conserve and transmit skills, a dependence on social support for mothers of large-brained, very dependent and nutrient-demanding offspring, males devoting substantial effort to provisioning rather than mating, and the cultivation of large social networks to tap pools in information unavailable to less social species. One measure of the success of the exploitation of culture is that the minimum inter-birth interval of humans is nearly half that of our ape relatives. Another measure is the wide geographical distribution of humans compared with other apes, based on subsistence systems adapted to fine-scale spatial environmental variation. An important macro-evolutionary question is why our big-brained, culture-intensive life-history strategy evolved so recently and in only our lineage. We suggest that increasing spatial and temporal variation in the Pleistocene favoured cultural adaptations.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0498

MADDIE PELZ & CELESTE KIDD – The elaboration of exploratory play
We apply a new quantitative method for investigating how children's exploration changes across age in order to gain insight into how exploration unfolds over the course of a human life from a life-history perspective. In this study, different facets of exploratory play were quantified using a novel touchscreen environment across a large sample and wide age range of children in the USA (n = 105, ages = 1 year and 10 months to 12 years and 2 months). In contrast with previous theories that have suggested humans transition from more exploratory to less throughout maturation, we see children transition from less broadly exploratory as toddlers to more efficient and broad as adolescents. Our data cast doubt on the picture of human life history as involving a linear transition from more curious in early childhood to less curious with age. Instead, exploration appears to become more elaborate throughout human childhood.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0503

ALISON GOPNIK – Childhood as a solution to explore–exploit tensions
I argue that the evolution of our life history, with its distinctively long, protected human childhood, allows an early period of broad hypothesis search and exploration, before the demands of goal-directed exploitation set in. This cognitive profile is also found in other animals and is associated with early behaviours such as neophilia and play. I relate this developmental pattern to computational ideas about explore–exploit trade-offs, search and sampling, and to neuroscience findings. I also present several lines of empirical evidence suggesting that young human learners are highly exploratory, both in terms of their search for external information and their search through hypothesis spaces. In fact, they are sometimes more exploratory than older learners and adults.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0502

MICHAEL D. GURVEN, RAZIEL J. DAVISON & THOMAS S. KRAFT – The optimal timing of teaching and learning across the life course
The evolutionary biologist W. D. Hamilton (Hamilton 1966 J. Theor. Biol.12, 12–45. (doi:10.1016/0022-5193(66)90184-6)) famously showed that the force of natural selection declines with age, and reaches zero by the age of reproductive cessation. However, in social species, the transfer of fitness-enhancing resources by postreproductive adults increases the value of survival to late ages. While most research has focused on intergenerational food transfers in social animals, here we consider the potential fitness benefits of information transfer, and investigate the ecological contexts where pedagogy is likely to occur. Although the evolution of teaching is an important topic in behavioural biology and in studies of human cultural evolution, few formal models of teaching exist. Here, we present a modelling framework for predicting the timing of both information transfer and learning across the life course, and find that under a broad range of conditions, optimal patterns of information transfer in a skills-intensive ecology often involve postreproductive aged teachers. We explore several implications among human subsistence populations, evaluating the cost of hunting pedagogy and the relationship between activity skill complexity and the timing of pedagogy for several subsistence activities. Long lifespan and extended juvenility

that characterize the human life history likely evolved in the context of a skills-intensive ecological niche with multi-stage pedagogy and multigenerational cooperation.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0500

THOMAS J. H. MORGAN, JORDAN W. SUCHOW & THOMAS L. GRIFFITHS – Experimental evolutionary simulations of learning, memory and life history
Humans possess an unusual combination of traits, including our cognition, life history, demographics and geographical distribution. Many theories propose that these traits have coevolved. Such hypotheses have been explored both theoretically and empirically, with experiments examining whether human behaviour meets theoretical expectations. However, theory must make assumptions about the human mind, creating a potentially problematic gap between models and reality. Here, we employ a series of 'experimental evolutionary simulations' to reduce this gap and to explore the coevolution of learning, memory and childhood. The approach combines aspects of theory and experiment by inserting human participants as agents within an evolutionary simulation. Across experiments, we find that human behaviour supports the coevolution of learning, memory and childhood, but that this is dampened by rapid environmental change. We conclude by discussing both the implications of these findings for theories of human evolution and the utility of experimental evolutionary simulations more generally.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0504

PLoS Biology

PAPERS

JÉRÔME SALLET et al – Behavioral flexibility is associated with changes in structure and function distributed across a frontal cortical network in macaques
THIS IS AN UNCORRECTED PROOF.
One of the most influential accounts of central orbitofrontal cortex—that it mediates behavioral flexibility—has been challenged by the finding that discrimination reversal in macaques, the classic test of behavioral flexibility, is unaffected when lesions are made by excitotoxin injection rather than aspiration. This suggests that the critical brain circuit mediating behavioral flexibility in reversal tasks lies beyond the central orbitofrontal cortex. To determine its identity, a group of nine macaques were taught discrimination reversal learning tasks, and its impact on gray matter was measured. Magnetic resonance imaging scans were taken before and after learning and compared with scans from two control groups, each comprising 10 animals. One control group learned discrimination tasks that were similar but lacked any reversal component, and the other control group engaged in no learning. Gray matter changes were prominent in posterior orbitofrontal cortex/anterior insula but were also found in three other frontal cortical regions: lateral orbitofrontal cortex (orbital part of area 12 [12o]), cingulate cortex, and lateral prefrontal cortex. In a second analysis, neural activity in posterior orbitofrontal cortex/anterior insula was measured at rest, and its pattern of coupling with the other frontal cortical regions was assessed. Activity coupling increased significantly in the reversal learning group in comparison with controls. In a final set of experiments, we used similar structural imaging procedures and analyses to demonstrate that aspiration lesion of central orbitofrontal cortex, of the type known to affect discrimination learning, affected structure and activity in the same frontal cortical circuit. The results identify a distributed frontal cortical circuit associated with behavioral flexibility.
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000605

PLoS One

PAPERS

EMILY M. THORNTON & LARA B. AKNIN – Assessing the validity of the Self versus other interest implicit association test
There is great variability in the ways that humans treat one another, ranging from extreme compassion (e.g., philanthropy, organ donation) to self-interested cruelty (e.g., theft, murder). What underlies and explains this variability? Past research has primarily examined human prosociality using explicit self-report scales, which are susceptible to self-presentation biases. However, these concerns can be alleviated with the use of implicit attitude tests that assess automatic associations. Here, we introduce and assess the validity of a new test of implicit prosociality–the Self versus Other Interest Implicit Association Test (SOI-IAT)–administered to two samples in pre-registered studies: regular blood donors (Study 1; N = 153) and a nationally representative sample of Americans (Study 2; N = 467). To assess validity, we investigated whether SOI-IAT scores were correlated with explicit measures of prosociality within each sample and compared SOI-IAT scores of the control sample (representative sample of Americans) with the prosocial sample (blood donors). While SOI-IAT scores were higher in the prosocial blood donor sample, SOI-IAT scores were generally uncorrelated with explicit measures and actual prosocial behaviour. Thus, the SOI-IAT may be able to detect group differences in everyday prosociality, but future testing is needed for a more robust validation of the SOI-IAT. These unexpected findings underscore the importance of sharing null and mixed results to fill gaps in the scientific record and highlight the challenges of conducting research on implicit processes.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0234032

CRISTÓBAL PAGÁN CÁNOVAS et al – Quantifying the speech-gesture relation with massive multimodal datasets: Informativity in time expressions
The development of large-scale corpora has led to a quantum leap in our understanding of speech in recent years. By contrast, the analysis of massive datasets has so far had a limited impact on the study of gesture and other visual communicative behaviors. We utilized the UCLA-Red Hen Lab multi-billion-word repository of video recordings, all of them showing communicative behavior that was not elicited in a lab, to quantify speech-gesture co-occurrence frequency for a subset of linguistic expressions in American English. First, we objectively establish a systematic relationship in the high degree of co-occurrence between gesture and speech in our subset of expressions, which consists of temporal phrases. Second, we show that there is a systematic alignment between the informativity of co-speech gestures and that of the verbal expressions with which they co-occur. By exposing deep, systematic relations between the modalities of gesture and speech, our results pave the way for the data-driven integration of multimodal behavior into our understanding of human communication.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0233892

J. JOBU BABIN – Linguistic signaling, emojis, and skin tone in trust games
This paper reports the results of an experiment involving text-messaging and emojis in laboratory trust games executed on mobile devices. Decomposing chat logs, I find that trust increases dramatically with the introduction of emojis to one-shot games, while reciprocation increases only modestly. Skin tones embedded in emojis impact sharing and resulting gains—to the benefit of some and detriment to others. Both light and dark skin players trust less on receipt of a dark skin tone emoji—suggestive of statistical discrimination. In this way, computer-mediated communication leads to reduced gains for dark-skinned persons. These results highlight the complex social judgment that motivates trust in an anonymous counterpart.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0233277

ROSÂNGELA SCHWARZ RODRIGUES, ERNEST ABADAL & BRENO KRICHELDORF HERMES DE ARAÚJO – Open access publishers: The new players
The essential role of journals as registries of scientific activity in all areas of knowledge justifies concern about their ownership and type of access. The purpose of this research is to analyze the main characteristics of publishers with journals that have received the DOAJ Seal. The specific objectives are a) to identify publishers and journals registered with the DOAJ Seal; b) to characterize those publishers; and c) to analyze their article processing fees. The research method involved the use of the DOAJ database, the Seal option and the following indicators: publisher, title, country, number of articles, knowledge area, article processing charges in USD, time for publication in weeks, and year of indexing in DOAJ. The results reveal a fast-rising oligopoly, dominated by Springer with 35% of the titles and PLOS with more than 20% of the articles. We've identified three models of expansion: a) a few titles with hundreds of articles; b) a high number of titles with a mix of big and small journals; and c) a high number of titles with medium-size journals. We identify a high number of titles without APCs (27%) in all areas while medicine was found to be the most expensive area. Commercial publishers clearly exercise control over the scope of journals and the creation of new titles, according to the interests of their companies, which are not necessarily the same as those of the scientific community or of society in general.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0233432

PNAS

PAPERS

PAULA RUBIO-FERNANDEZ & JULIAN JARA-ETTINGER – Incrementality and efficiency shape pragmatics across languages
To correctly interpret a message, people must attend to the context in which it was produced. Here we investigate how this process, known as pragmatic reasoning, is guided by two universal forces in human communication: incrementality and efficiency, with speakers of all languages interpreting language incrementally and making the most efficient use of the incoming information. Crucially, however, the interplay between these two forces results in speakers of different languages having different pragmatic information available at each point in processing, including inferences about speaker intentions. In particular, the position of adjectives relative to nouns (e.g., "black lamp" vs. "lamp black") makes visual context information available in reverse orders. In an eye-tracking study comparing four unrelated languages that have been understudied with regard to language processing (Catalan, Hindi, Hungarian, and Wolof), we show that speakers of languages with an adjective–noun order integrate context by first identifying properties (e.g., color, material, or size), whereas speakers of languages with a noun–adjective order integrate context by first identifying kinds (e.g., lamps or chairs). Most notably, this difference allows listeners of adjective–noun descriptions to infer the speaker's intention when using an adjective (e.g., "the black…" as implying "not the blue one") and anticipate the target referent, whereas listeners of noun–adjective descriptions are subject to temporary ambiguity when deriving the same interpretation. We conclude that incrementality and efficiency guide pragmatic reasoning across languages, with different word orders having different pragmatic affordances.
https://www.pnas.org/content/early/2020/05/29/1922067117.abstract?etoc

Science Advances

PAPERS

ELENA MIU et al with KEVIN N. LALAND – Flexible learning, rather than inveterate innovation or copying, drives cumulative knowledge gain

Human technology is characterized by cumulative cultural knowledge gain, yet researchers have limited knowledge of the mix of copying and innovation that maximizes progress. Here, we analyze a unique large-scale dataset originating from collaborative online programming competitions to investigate, in a setting of real-world complexity, how individual differences in innovation, social-information use, and performance generate technological progress. We find that cumulative knowledge gain is primarily driven by pragmatists, willing to copy, innovate, explore, and take risks flexibly, rather than by pure innovators or habitual copiers. Our study also reveals a key role for prestige in information transfer.
https://advances.sciencemag.org/content/6/23/eaaz0286?utm_campaign=toc_advances_2020-06-05&et_rid=17774313&et_cid=3353618

DAVID MELAMED, BRENT SIMPSON & JERED ABERNATHY – The robustness of reciprocity: experimental evidence that each form of reciprocity is robust to the presence of other forms of reciprocity

Prosocial behavior is paradoxical because it often entails a cost to one's own welfare to benefit others. Theoretical models suggest that prosociality is driven by several forms of reciprocity. Although we know a great deal about how each of these forms operates in isolation, they are rarely isolated in the real world. Rather, the topological features of human social networks are such that people are often confronted with multiple types of reciprocity simultaneously. Does our current understanding of human prosociality break down if we account for the fact that the various forms of reciprocity tend to co-occur in nature? Results of a large experiment show that each basis of human reciprocity is remarkably robust to the presence of other bases. This lends strong support to existing models of prosociality and puts theory and research on firmer ground in explaining the high levels of prosociality observed in human social networks.
https://advances.sciencemag.org/content/6/23/eaba0504?utm_campaign=toc_advances_2020-06-05&et_rid=17774313&et_cid=3353618

Trends in Cognitive Sciences

PAPERS

NATALIE BIDERMAN, AKRAM BAKKOUR & DAPHNA SHOHAMY – What Are Memories For? The Hippocampus Bridges Past Experience with Future Decisions

Many decisions require flexible reasoning that depends on inference, generalization, and deliberation. Here, we review emerging findings indicating that the hippocampus, known for its role in long-term memory, contributes to these flexible aspects of value-based decision-making. This work offers new insights into the role of memory in decision-making and suggests that memory may shape decisions even in situations that do not appear, at first glance, to depend on memory at all. Uncovering the pervasive role of memory in decision-making challenges the way we define what memory is and what it does, suggesting that memory's primary purpose may be to guide future behavior and that storing a record of the past is just one way to do so.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(20)30106-6?dgcid=raven_jbs_aip_email

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