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NOTICES

PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, 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.

EAORC NEWS – Sorry about the size

This is probably the biggest EAORC bulletin ever, boosted by monthly publications, Month-end summaries and massive files from Frontiers after some weeks of silence (likely caused by illness). Hopefully it won't prove too daunting, because there is a lot of interesting stuff coming out currently.

ACADEMIA.EDU – The Evolution of Human Brain Development

Evolutionary Biology 39, 568-586, (2012)

SIMON NEUBAUER & JEAN-JACQUES HUBLIN – The Evolution of Human Brain Development

The human brain is a large and complex organ, setting us apart from other primates. It allows us to exhibit highly sophisticated cognitive and behavioral abilities. Therefore, our brain's size and morphology are defining features of our species and our fossil ancestors and relatives. Endocasts, i.e., internal casts of the bony braincase, provide evidence about brain size and morphology in fossils. Based on endocasts, we know that our ancestors' brains increased overall in size and underwent several reorganizational changes. However, it is difficult to relate evolutionary changes of size and shape of endocasts to evolutionary changes of cognition and behavior. We argue here that an understanding of the tempo and mode of brain development can help to interpret the evolution of our brain and the associated cognitive and behavioral changes. To do so, we review structural brain development, cognitive development, and ontogenetic changes of endocranial size and shape in living individuals on the one hand, and ontogenetic patterns (size increase and shape change) in fossil hominins and their evolutionary change on the other hand. Tightly integrating our knowledge on these different levels will be the key of future work on the evolution of human brain development.

https://www.academia.edu/2284325/Neubauer_S_and_J_J_Hublin_2012_The_Evolution_of_Human_Brain_Development_Evolutionary_Biology_39_4_568_586

RESEARCHGATE – Coevolution of language/cognition and tool production

Preprint (2021).

PETAR GABRIĆ, MARKO BANDA & IVOR KARAVANIĆ – Cognitive performance and specific aspects of language processing are associated with Oldowan-like chert flaking and retouch

A vast amount of literature suggests a co-evolutionary relationship between Palaeolithic stone toolmaking, and cognition and specifically language. However, empirical data remain limited to indirect findings of neurophysiological studies. Furthermore, most Oldowan studies have used chert and have not investigated retouch, even though quartz and lava were predominant raw materials during periods of chert unavailability, and even though chert was disproportionately more frequently used for retouch compared to other raw materials during periods of chert availability, at least in the Olduvai Gorge.

The study recruited 13 young adults with no prior experience in knapping. Subjects were taught by an experienced knapper to produce quartz choppers and chert sidescrapers in either a verbal or gestural condition. Two raters rated on a 5-point scale the subjects' performances on specific steps of the two stone toolmaking tasks. In a post-experimental interview, subjects stated which aspects of the tasks they preferred or disfavored. Subjects also performed on a neuropsychological battery encompassing visuospatial, executive functioning, and linguistic tasks.

Given the small sample size, the results should be regarded as exploratory and preliminary. Our results are further limited to the early acquisition phase and may not reflect processes in modern experienced knappers. Descriptive data suggested better performance across all stone toolmaking variables in the verbal compared to gestural condition, but only flake quality on the sidescraper task was significantly different between groups. Analyses of the stone toolmaking variables suggested subjects perceived quartz and chert flaking very differently. Correlational and other analyses suggested that quartz chopper manufacture was not associated with cognitive performance. Conversely, chert flaking and retouch were strongly associated with visuospatial working memory, showing that subjects with a higher memory span produced better chert flakes and retouch. Retouch only was moderately associated with executive functioning measures, showing subjects who made fewer errors on the tasks were better on retouch. Specific aspects of chert flaking were also associated with verbal fluency performance, showing, among others, moderate and strong positive associations with the productivity and rate of production of syntactically transitive verbs on action fluency.

Evolutionary implications can be drawn from our research only if we controversially assume similar results would have been obtained had we tested early hominins and not modern humans. Following this axiom, our results suggest that Oldowan hominins relied on modern-like visuospatial working memory during chert flaking and retouch, and, to a lesser degree, modern-like executive functioning during chert retouch. This is contrary to previous Oldowan studies suggesting no involvement of executive functioning during Oldowan-like flaking. Results from the linguistic tasks controversially suggest that some of the prerequisites for aspects of action language and syntactic transitivity (verb-object phrases) in modern humans were to some degree present in Oldowan hominin populations. Because Olduvai Gorge hominins readily incorporated chert for stone toolmaking in periods of chert availability, our results suggest that these cognitive capacities were phylogenetically not related to chert knapping. Finally, we propose that the quality of performance on Oldowan flaking and retouch may not reflect the full level of cognitive capacities of Oldowan populations.

https://www.researchgate.net/publication/351287544_Cognitive_performance_and_specific_aspects_of_language_processing_are_associated_with_Oldowan-like_chert_flaking_and_retouch

SCIENCEDIRECT – Body mass estimates of the earliest hominins & implications for last common ancestor

Journal of Human Evolution 122 (2018), 84-92

MARK GRABOWSKI, KEVIN G. HATALA & WILLIAM L. JUNGERS – Body mass estimates of the earliest possible hominins and implications for the last common ancestor

Many hypotheses regarding the paleobiology of the earliest possible hominins, *Orrorin tugenensis* and *Ardipithecus ramidus*, are dependent upon accurate body mass estimates for these taxa. While we have previously published body mass predictions for *Orrorin* and *Ardipithecus*, the accuracies of those estimates depend on the assumption that the postcranial skeletal dimensions and body masses of these taxa followed scaling patterns that were similar to those observed in modern humans. This assumption may not be correct because certain aspects of postcranial morphology in *Orrorin* and *Ardipithecus* differ from modern humans, and suggest that their overall body plans might be unique but more similar to modern non-human great apes than to modern humans. Here we present individual body mass predictions for *O. tugenensis* and *Ar. ramidus* assuming that they followed postcranial scaling patterns similar to those of chimpanzees. All estimates include individual prediction intervals as measures of uncertainty. In addition, we provide equations for predicting body mass from univariate postcranial measurements based on the largest sample ($n = 25$) yet compiled of common chimpanzee skeletons with known body masses, which is vital for calculating prediction intervals for individual fossils. Our results show that estimated body masses in *Orrorin* and *Ardipithecus* are generally larger when derived from a chimpanzee-like scaling pattern compared to estimates that assume a human-like pattern, though the prediction intervals of the two sets of estimates overlap. In addition, the more complete of the two known *Orrorin* femora has an overall scaling pattern that is more similar to common chimpanzees than to modern humans, supporting the application of a non-human great ape comparative model. Our new estimates fall near the male (*Ardipithecus*) average and in between the male and female averages (*Orrorin*) for wild-caught common chimpanzees. If a chimpanzee-like pattern of scaling between postcranial dimensions and body mass did exist in these earliest hominins, our results suggest the large body masses found in some early australopiths were already present in taxa near the origins of our lineage, and perhaps also in the Pan-Homo last common ancestor.

<https://www.sciencedirect.com/science/article/abs/pii/S0047248417302361>

OTHER PUBLICATIONS – Routledge Classics – 2021 Chapter Sampler

Routledge Classics series

FRANCES TUSTIN, FRANZ BOAS, JUDITH BUTLER

As part of our 20 Years of Routledge Classics series, we're offering a chapter sampler featuring selections from three of our leading Routledge Classics titles, including:

1. *Autistic States in Children* by Frances Tustin
2. *Anthropology and Modern Life* by Franz Boas
3. *Excitable Speech* by Judith Butler

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<https://click.email.taylorandfrancis.com/?qs=9f106087da9333bd87ff57ae76bdfeaf82e4d9445cac1f4e242d554aa7448ad5b79d0706ac4694f4cdc0c28fa57360cd7d5c380b5973e708>

EMPLOYMENT/ROLE ALERT – Editor or Co-Editors For Time and Mind Journal (Routledge)

Time and Mind: The Journal of Archaeology, Consciousness and Culture is seeking a new Editor or Co-Editors with an academic background in Archaeology or Anthropology, and an interest in related fields such as Heritage and Folklore, to work on activities that will ensure the Journal's continued success as a platform for authors to publish new perspectives on archaeological sites, landscapes and worldviews.

The Editor or Co-Editors will be responsible for editorial oversight, decision making on the Journal and communication with authors and the editorial board. They will be required to oversee the publication of four issues per annual volume, by soliciting and developing papers, and overseeing submissions and peer review via the Journal's ScholarOne Manuscript submission site.

Submitting your Application

Interested candidates are requested to email a CV and a short statement outlining their interest in the position (c. 300 words) to the Portfolio Manager at Routledge, Taylor & Francis, Emma Lockwood (Emma.Lockwood@tandf.co.uk) by Friday 31st May.

Find out more about the role: <https://think.taylorandfrancis.com/rtam-callforeditor/>

NEWS

BREAKING SCIENCE – Hominins Originated in Africa from Ape Ancestors Unlike Any Living Species

Understanding the origins of the human lineage (hominins) requires reconstructing the morphology, behavior, and environment of the chimpanzee-human last common ancestor. In new research, paleoanthropologists from the American Museum of Natural History and elsewhere looked at the major discoveries in this area since Charles Darwin's works and

concluded that the morphology of fossil apes was varied and that it is likely that the last shared ape ancestor had its own set of traits, different from those of modern humans and modern apes.

http://feedproxy.google.com/~r/BreakingScienceNews/~3/mFqA0orsgpl/hominin-origins-09634.html?utm_source=feedburner&utm_medium=email

NATURE BRIEFING – Migration routes of ancient Australians

Scientists have traced the paths that ancient Indigenous Australians probably took as they moved through the mega continent of Sahul some 60,000 years ago. Their models suggest that the first visitors arrived on the shores of western Australia and, within 6,000 years, settled across the entire continent — from the tropical north, now Papua New Guinea, to as far south as Tasmania. Many of the ancient migration routes they modelled seem to match up closely with nineteenth century stock routes and Aboriginal trade lines.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=c21e9cfea1&e=1db4b9a19b>

NATURE BRIEFING – Arabian structures predate the pyramids

More than 1,000 ancient stone structures dating back 7,000 years have been located in the north-west corner of Saudi Arabia, more than twice the number thought to exist in the area. Mustatil monuments — named after the Arabic word for rectangle — were first identified in the 1970s, but received little academic attention at the time. The structures are between 20 and 600 metres long and might have been used for rituals. If so, the area is the oldest large-scale ritual landscape in the world, predating both Stonehenge and the Egyptian pyramids by thousands of years.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=d8ee38fa93&e=1db4b9a19b>

NATURE BRIEFING – Podcast: Earliest known burial in Africa

The discovery of the burial of a young child in a cave in Kenya around 78,000 years ago sheds light on the role of symbolism in the treatment of the dead during the Middle Stone Age. Plus, a metal-free rechargeable battery and the Arctic bird that maintains a circadian rhythm despite living in 24-hour sunlight.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=ab2647eb36&e=1db4b9a19b>

SCIENCE DAILY – Mating with relatives? Not a big deal in nature

The idea that animals should avoid mating with relatives has been the starting point for hundreds of scientific studies performed among many species. But new research shows that there is little support for this assumption. The study provides a synthesis of 139 experimental studies in 88 species and 40 years of research, settling the debate about if and when animals should avoid inbreeding.

<https://www.sciencedaily.com/releases/2021/05/210503144729.htm>

SCIENCE DAILY – Three ways to improve scholarly writing to get more citations

To make a greater impact, scholars need to overcome the curse of knowledge so they can package their ideas with concrete, technical, and active writing.

<https://www.sciencedaily.com/releases/2021/05/210502083238.htm>

SCIENCE DAILY – Being around children makes adults more generous

New psychology research suggests adults are more compassionate and donate more to charity when they are in the presence of children.

<https://www.sciencedaily.com/releases/2021/05/210504191559.htm>

SCIENCE DAILY – Study reveals the gateway to conscious awareness

Researchers identify a key area in the cortex that appears to be the gate of conscious awareness.

<https://www.sciencedaily.com/releases/2021/05/210504112556.htm>

SCIENCE DAILY – New bonobo genome fine tunes great ape evolution studies

A new, high-quality bonobo genome assembly has been constructed. It is allowing scientists to more accurately compare the bonobo genome to that of other great apes - the gorilla, orangutan, chimpanzee - and to the modern human. This analysis is revealing new information about hominid evolution, distinctions between chimps and bonobos and genetic relations among present-day hominids, and predicts a greater fraction of the human genome is genetically closer to chimps and bonobos.

<https://www.sciencedaily.com/releases/2021/05/210505113659.htm>

SCIENCE DAILY – The oldest human burial in Africa

A new study details the earliest modern human burial in Africa. The remains of a 2.5 to 3 year-old child were found in a flexed position, deliberately buried in a shallow grave directly under the sheltered overhang of the cave. The interment at Panga ya Saidi joins increasing evidence of early complex social behaviors in Homo sapiens.

<https://www.sciencedaily.com/releases/2021/05/210505111340.htm>

SCIENCE DAILY – New study deconstructs Dunbar's number (number of friends)

An individual human can maintain stable social relationships with about 150 people, not more. This is the proposition known as 'Dunbar's number' - that the architecture of the human brain sets an upper limit on our social lives. A new study indicates that a cognitive limit on human group sizes cannot be derived in this manner.

<https://www.sciencedaily.com/releases/2021/05/210504211054.htm>

SCIENCE DAILY – Scrap for cash before coins

How did people living in the Bronze Age manage their finances before money became widespread? Researchers have discovered that bronze scrap found in hoards in Europe circulated as a currency. These pieces of scrap -- which might include swords, axes, and jewellery broken into pieces -- were used as cash in the late Bronze Age, and in fact complied with a weight system used across Europe.

<https://www.sciencedaily.com/releases/2021/05/210506174103.htm>

SCIENCE DAILY – Most human origins stories are not compatible with known fossils

In the 150 years since Charles Darwin speculated that humans originated in Africa, the number of species in the human family tree has exploded, but so has the level of dispute concerning early human evolution. A new review looks at the major discoveries in hominin origins since Darwin's works and argues that fossil apes can inform us about essential aspects of ape and human evolution, including the nature of our last common ancestor.

<https://www.sciencedaily.com/releases/2021/05/210506142133.htm>

SCIENCE DAILY – The cerebellum may have played an important role in the evolution of the human brain

The cerebellum -- a part of the brain once recognized mainly for its role in coordinating movement -- underwent evolutionary changes that may have contributed to human culture, language and tool use, according to a new study.

<https://www.sciencedaily.com/releases/2021/05/210506142039.htm>

SCIENCE DAILY – Shining new light on step-parent fairy-tale stereotype

Although the fairy tale of the wicked stepmother is a tale as old as time, the effects of blending children with their new stepfamilies may not be as grim as once thought. In fact, new research shows that stepchildren are not at a disadvantage compared to their peers from single-parent households and actually experience better outcomes than their half-siblings -- good news for the more than 113 million Americans that are part of a step-relationship.

<https://www.sciencedaily.com/releases/2021/05/210506125738.htm>

SCIENCE DAILY – Earliest evidence of humans changing ecosystems with fire

A new study provides the earliest evidence to date of ancient humans significantly altering entire ecosystems with flames. The study combines archaeological evidence -- dense clusters of stone artifacts dating as far back as 92,000 years ago -- with paleoenvironmental data on the northern shores of Lake Malawi in eastern Africa to document that early humans were ecosystem engineers.

<https://www.sciencedaily.com/releases/2021/05/210505145542.htm>

SCIENCE NEWS – Ancient Australian 'superhighways' suggested by massive supercomputing study

When humans first set foot in Australia more than 65,000 years ago, they faced the perilous task of navigating a landscape they'd never seen. Now, researchers have used supercomputers to simulate 125 billion possible travel routes and reconstruct the most likely "superhighways" these ancient immigrants used as they spread across the continent. The project offers new insight into how landmarks and water supplies shape human migrations, and provides archaeologists with clues for where to look for undiscovered ancient settlements.

<https://www.sciencemag.org/news/2021/05/ancient-australian-superhighways-suggested-massive-supercomputing-study>

SCIENCE NEWS – Scientists unearth Africa's oldest burial: a small child, laid to rest 78,000 years ago

Some 78,000 years ago, a community in East Africa laid to rest a child of about 3 years old. Its caretakers dug a shallow pit, curled its small body, and may have rested its head on a pillow before committing the body to the earth. A new study describing the excavation of the child's grave reveals the oldest known evidence of modern humans in Africa burying their dead.

<https://www.sciencemag.org/news/2021/05/scientists-unearth-africa-s-oldest-burial-small-child-laid-rest-78000-years-ago>

SOCIETY FOR SCIENCE – Little Foot's shoulders hint at how a human-chimp common ancestor climbed

The shape of the 3.67-million-year-old hominid's shoulder blades suggests it had a gorilla-like ability to climb trees.

<http://click.societyforscience-email.com/?qs=b282a089af54303e84dc3980f45bf8ec5af560685ef98c752741fb7d4ff848a936f0bd8aeb0e578dd960dc5229176d9426d12308aa0e8944>

SOCIETY FOR SCIENCE – A child's 78,000-year-old grave marks Africa's oldest known human burial

Cave excavation of a youngster's grave pushes back the date of the first human burial identified in the continent by at least a few thousand years.

<http://click.societyforscience-email.com/?qs=887f7a09cf616ead416a9fe5c4afa370ddd147746ed2b02331d7eb1a86de511302c931000f79c7c3d73e78652f2056a796a8ffecaee001a233d55651d407d5ab>

SOCIETY FOR SCIENCE – A few simple tricks make fake news stories stick in the brain

Human brains rely on shortcuts to be efficient. But these shortcuts leave us vulnerable to false information.

<http://click.societyforscience-email.com/?qs=887f7a09cf616ead99c6cfe7134d4df02472fa76c692c7aab29657b987fe6b83a56dfcc66691aa38396e0fc602cda9ce3a2375803431658b4a70127516e42715>

SOCIETY FOR SCIENCE – How to detect, resist and counter the flood of fake news

Misinformation about health is drowning out the facts and putting us at risk. Researchers are learning why bad information spreads and how to protect yourself.

<http://click.societyforscience-email.com/?qs=b55d073fde871277c37a1ad76b211667fda33ffd5fc7998fd1665f23fd9f55696686adaca85949e623f3dae0695b2f0666231c7715e256d7>

THE CONVERSATION – How we discovered the oldest human burial in Africa – and what it tells us about our ancestors

Burials seem to have been uncommon in Africa some 80,000 years ago, although they were widespread in Eurasia.

<https://theconversationuk.cmail20.com/t/r-l-tltdkrjk-khhliiah-x/>

THE CONVERSATION – Adults are more generous in the presence of children

The findings suggest adults feel more prosocial with children around – even if they don't have any themselves.

<https://theconversationuk.cmail20.com/t/r-l-tltdkrjk-khhliiah-g/>

PUBLICATIONS

Biology Letters

PAPERS

PATRIK LINDENFORS, ANDREAS WARTEL & JOHAN LIND – ‘Dunbar's number’ deconstructed

A widespread and popular belief posits that humans possess a cognitive capacity that is limited to keeping track of and maintaining stable relationships with approximately 150 people. This influential number, ‘Dunbar's number’, originates from an extrapolation of a regression line describing the relationship between relative neocortex size and group size in primates. Here, we test if there is statistical support for this idea. Our analyses on complementary datasets using different methods yield wildly different numbers. Bayesian and generalized least-squares phylogenetic methods generate approximations of average group sizes between 69–109 and 16–42, respectively. However, enormous 95% confidence intervals (4–520 and 2–336, respectively) imply that specifying any one number is futile. A cognitive limit on human group size cannot be derived in this manner.

<https://royalsocietypublishing.org/doi/10.1098/rsbl.2021.0158>

eLife

NEWS

The cost of social status

Rising to the top in baboon society makes alpha males age faster.

<https://elifesciences.org/digests/66128/the-cost-of-social-status>

ARTICLES

CALEN P RYAN & CHRISTOPHER W KUZAWA – Aging: The temporary cost of dominance

In a population of wild baboons, a new way to assess biological age reveals a surprising effect of social hierarchy.

<https://elifesciences.org/articles/68790>

PAPERS

JORDAN A ANDERSON et al – High social status males experience accelerated epigenetic aging in wild baboons

Aging, for virtually all life, is inescapable. However, within populations, biological aging rates vary. Understanding sources of variation in this process is central to understanding the biodemography of natural populations. We constructed a DNA methylation-based age predictor for an intensively studied wild baboon population in Kenya. Consistent with findings in humans, the resulting ‘epigenetic clock’ closely tracks chronological age, but individuals are predicted to be somewhat older or younger than their known ages. Surprisingly, these deviations are not explained by the strongest predictors of lifespan in this population, early adversity and social integration. Instead, they are best predicted by male dominance rank: high-ranking males are predicted to be older than their true ages, and epigenetic age tracks changes in rank over time. Our results argue that achieving high rank for male baboons – the best predictor of reproductive success – imposes costs consistent with a ‘live fast, die young’ life-history strategy.

<https://elifesciences.org/articles/66128>

VITA STEPANOVA et al with SVANTE PÄÄBO – Reduced purine biosynthesis in humans after their divergence from Neandertals

We analyze the metabolomes of humans, chimpanzees and macaques in muscle, kidney and three different regions of the brain. Whereas several compounds in amino acid metabolism occur at either higher or lower concentrations in humans than in the other primates, metabolites downstream of adenylosuccinate lyase, which catalyzes two reactions in purine synthesis, occur at lower concentrations in humans. This enzyme carries an amino acid substitution that is present in all humans today but absent in Neandertals. By introducing the modern human substitution into the genomes of mice, as well as the ancestral, Neandertal-like substitution into the genomes of human cells, we show that this amino acid substitution contributes to much or all of the reduction of de novo synthesis of purines in humans.

<https://elifesciences.org/articles/58741>

Evolutionary Anthropology

PAPERS

CARA OCOBOCK, SARAH LACY & ALEXANDRA NICLOU – Between a rock and a cold place: Neanderthal biocultural cold adaptations

A large body of work focuses on the unique aspects of Neanderthal anatomy, inferred physiology, and behavior to test the assumption that Neanderthals were hyper-adapted to living in cold environments. This research has expanded over the years to include previously unexplored and potentially adaptive features such as brown adipose tissue and fire-usage. Here we review the current state of knowledge of Neanderthal cold adaptations along morphological, physiological, and behavioral lines. While highlighting foundational as well as recent work, we also emphasize key areas for future research. Despite thriving in a variety of climates, it is well-accepted that Neanderthals appear to be the most cold-adapted of known fossil hominin groups; however, there are still many unknowns. There is a great deal yet to be uncovered about the nature and manifestation of Neanderthal adaptation and how the synergy of biology and culture helped buffer them against extreme and variable environments.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21894>

Frontiers in Communication

PAPERS

FREDERICK J. NEWMAYER – Complexity and Relative Complexity in Generative Grammar

The notions of “complexity” and its antonym “simplicity” have played an important role in the history of generative grammar. However, these terms have been used in different ways. There have been discussions about whether the raw data is complex (or not), about whether a particular theory is complex (or not), and about whether a particular analysis is complex (or not). This article both sorts out the various uses of these terms in the history of generative grammar and demonstrates that motivations have changed over time for whether a complex theory or a simple theory is more desirable. The article concludes with a discussion of the issue of relative complexity in generative grammar, that is, whether the theory embodies the possibility that a grammar of one language can be more or less complex than the grammar of another.

<https://www.frontiersin.org/articles/10.3389/fcomm.2021.614352/full>

KENSY COOPERRIDER et al with SUSAN GOLDIN-MEADOW – How Pointing is Integrated into Language: Evidence From Speakers and Signers

When people speak or sign, they not only describe using words but also depict and indicate. How are these different methods of communication integrated? Here, we focus on pointing and, in particular, on commonalities and differences in how pointing is integrated into language by speakers and signers. One aspect of this integration is semantic—how pointing is integrated with the meaning conveyed by the surrounding language. Another aspect is structural—how pointing as a manual signal is integrated with other signals, vocal in speech, or manual in sign. We investigated both of these aspects of integration in a novel pointing elicitation task. Participants viewed brief live-action scenarios and then responded to questions about the locations and objects involved. The questions were designed to elicit utterances in which pointing would serve different

semantic functions, sometimes bearing the full load of reference ('load-bearing points') and other times sharing this load with lexical resources ('load-sharing points'). The elicited utterances also provided an opportunity to investigate issues of structural integration. We found that, in both speakers and signers, pointing was produced with greater arm extension when it was load bearing, reflecting a common principle of semantic integration. However, the duration of the points patterned differently in the two groups. Speakers' points tended to span across words (or even bridge over adjacent utterances), whereas signers' points tended to slot in between lexical signs. Speakers and signers thus integrate pointing into language according to common principles, but in a way that reflects the differing structural constraints of their language. These results shed light on how language users integrate gradient, less conventionalized elements with those elements that have been the traditional focus of linguistic inquiry.

<https://www.frontiersin.org/articles/10.3389/fcomm.2021.567774/full>

ANNE REBOUL – Truthfully Misleading: Truth, Informativity, and Manipulation in Linguistic Communication

Linguistic communication is geared toward the exchange of information, i.e., changing the addressee's world views. In other words, persuasion is the goal of speakers and the force of the speaker's commitment as indicated in the utterance is an important factor in persuasion. Other things being equal, the stronger the speaker's commitment, the easier the persuasion. However, if deception is detected, the stronger the speaker's commitment, the harsher the punishment, i.e., the damage to his or her reputation. One way for cheaters to avoid detection and/or to mitigate punishment is to downplay their commitment to what they mean through the utterance by making its content less informative, i.e., by producing underinformative utterances. Underinformativity is also a powerful way of triggering context-dependent and inference-based interpretation that goes beyond what is said. This allows speakers to indirectly communicate false content while producing an utterance that is literally true. This phenomenon of truthfully misleading is the topic of the present paper. As will be seen, it allows speakers to leave part of the responsibility for the false content to their hearers, with the triple effect that they can claim to have been misunderstood (plausible denial), claim that what they said was literally true, and explain the underinformativity of the utterance through ignorance.

<https://www.frontiersin.org/articles/10.3389/fcomm.2021.646820/full>

JAMES MCELVENNY – Language Complexity in Historical Perspective: The Enduring Tropes of Natural Growth and Abnormal Contact

Focusing on the work of John McWhorter and, to a lesser extent, Peter Trudgill, this paper critically examines some common themes in language complexity research from the perspective of intellectual history. The present-day conception that increase in language complexity is somehow a "natural" process which is disturbed under the "abnormal" circumstances of language contact is shown to be a recapitulation of essentially Romantic ideas that go back to the beginnings of disciplinary linguistic errors. A similar genealogy is demonstrated for the related notion that grammatical complexity is a kind of "ornament" on language, surplus to the needs of "basic communication." The paper closes by examining the implications of these ideas for linguistic scholarship.

<https://www.frontiersin.org/articles/10.3389/fcomm.2021.621712/full>

JOHN E. JOSEPH – Why Does Language Complexity Resist Measurement?

Insofar as linguists operate with a conception of languages as closed and self-contained systems, there should be no obstacle to comparing those systems in terms of simplicity and complexity. Even if complexity 'trade-offs' between sub-systems of phonology, morphology and syntax are considered, it ought to be relatively straightforward to quantify constitutive elements and rules, and assign each language system its place on a complexity scale. In practice, however, such attempts have turned up a series of problems and paradoxes, which can be seen in work by Peter Trudgill and Johanna Nichols; the latter has proposed an alternative means of measuring complexity which presents new problems of its own. This paper makes the case that overcoming the difficulty of measuring simplicity and complexity requires confronting the normative and interpretative judgments that enter into how language systems are conceived, identified and analysed.

<https://www.frontiersin.org/articles/10.3389/fcomm.2021.624855/full>

Frontiers in Ecology and Evolution

PAPERS

DONG-PO XIA et al – Effects of Hierarchical Steepness on Grooming Patterns in Female Tibetan Macaques (*Macaca thibetana*)

Hierarchical steepness, defined as status asymmetries among conspecifics living in the same group, is not only used as a main characteristic of animal social relationships, but also represents the degree of discrepancy between supply and demand within the framework of biological market theory. During September and December 2011, we studied hierarchical steepness by comparing variation in grooming patterns in two groups of Tibetan macaques (*Macaca thibetana*), a primate species characterized by a linear dominance hierarchy. Using a focal sampling method, we collected behavioral data from two provisioned, free-ranging groups (YA1 and YA2) at Mt. Huangshan, China. We found that female dominance hierarchies were steeper in the YA1 group (0.81 based on the proportion of wins-losses and 0.66 based on dyadic dominance indices) than among members of the YA2 group (0.76 based on the proportion of wins-losses and 0.56 based on dyadic dominance indices). Females in the YA1 group groomed more frequently and for longer duration than females in YA2. Further analysis

showed that grooming patterns of high- and low-ranking females did not differ between the two groups. However, middle-ranking females in YA1 groomed conspecifics more frequently and for longer duration than middle-ranking females in YA2. Our results suggest that the steepness of a dominance hierarchy plays an important role in the set of social strategies used by middle-ranking females to avoid a reduction in rank, as well as to increase their rank (the dilemma of middle class hypothesis). We suggest that future studies focus on individuals of middle-rank in order to better understand how the dynamics of rank stability and rank changes influence social relationships, and affiliative and competitive interactions in non-human primates.

<https://www.frontiersin.org/articles/10.3389/fevo.2021.631417/full>

JOANA BESSA, KIMBERLEY HOCKINGS & DORA BIRO – First Evidence of Chimpanzee Extractive Tool Use in Cantanhez, Guinea-Bissau: Cross-Community Variation in Honey Dipping

Wild chimpanzee tool use is highly diverse and, in many cases, exhibits cultural variation: tool-use behaviours and techniques differ between communities and are passed down generations through social learning. Honey dipping – the use of sticks or leaves to extract honey from hives – has been identified across the whole species' range. Nonetheless, there seems to be marked variation in honey dipping at a species level, with most descriptions originating from central Africa, and involving the use of complex tool sets, or even multifunctional tools. In West Africa, while honey consumption is common, in most cases tools are not used. We document, for the first time, the use of honey dipping tools in unhabituated chimpanzee (*Pan troglodytes verus*) communities at Cantanhez National Park (CNP), Guinea-Bissau. Over a 23-month period we employed a combination of direct (camera traps, $n = 1944$ camera trap days) and indirect (1000km of reconnaissance walks, collection of abandoned tools) methods to study four neighbouring communities in central CNP. Fluid dipping tools were found in three of the four communities; here we analyse 204 individual stick tools from the 70 tool-use ateliers found. In addition to documenting individual tool dimensions and raw materials, we adopt methods from primate archaeology to describe the typology of different tools based on use-wear patterns. We describe differences in tools used for different honey types, between communities, and tools and tool kits that show an unexpected degree of complexity. Our data also suggest the use of tool sets, i.e., tools with different functions used sequentially toward the same goal; as well as possible multifunction tools (pounding and dipping), never before described for western chimpanzees. Our study fills gaps in our knowledge of the wild chimpanzee cultural repertoire and highlights how chimpanzee tool manufacture and use can vary even at local scales.

<https://www.frontiersin.org/articles/10.3389/fevo.2021.625303/full>

Frontiers in Psychology

PAPERS

FRANCESCA PANZERI & FRANCESCA FOPPOLO – Children's and Adults' Sensitivity to Gricean Maxims and to the Maximize Presupposition Principle

Up to age 5, children are known to experience difficulties in the derivation of implicitly conveyed content, sticking to literally true, even if underinformative, interpretation of sentences. The computation of implicated meanings is connected to the (apparent or manifest) violation of Gricean conversational maxims. We present a study that tests unmotivated violations of the maxims of Quantity, Relevance, and Manner and of the Maximize Presupposition principle, with a Truth Value Judgment task with three options of response. We tested pre-schoolers and school-aged children, with adults as controls, to verify at which age these pragmatic rules are recognized and to see whether there is a difference among these tenets. We found an evolutionary trend and that, in all age groups, violations of the maxims of Quantity and of Relation are sanctioned to a higher degree compared to infringements of the Maim of Manner and of the Maximize Presupposition principle. We conjecture that this relates to the effects that the violation of a certain maxim or principle has on the goals of the exchange: listeners are less tolerant with statements that transmit inaccurate or incomplete information, while being more tolerant with those that still permit to understand what has happened.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.624628/full>

VEENA D. DWIVEDI & JANAHAN SELVANAYAGAM – Effects of Dispositional Affect on the N400: Language Processing and Socially Situated Context

We examined whether the N400 Event-Related Potential (ERP) component would be modulated by dispositional affect during sentence processing. In this study, 33 participants read sentences manipulated by direct object type (congruent vs. incongruent) and object determiner type (definite vs. demonstrative). We were particularly interested in sentences of the form: (i) The connoisseur tasted the wine on the tour vs. (ii) The connoisseur tasted the # roof... We expected that processing incongruent direct objects (#roof) vs. congruent objects (wine) would elicit N400 effects. Previous ERP language experiments have shown that participants in (induced) positive and negative moods were differentially sensitive to semantic anomaly, resulting in different N400 effects. Presently, we ask whether individual dispositional affect scores (as measured by the Positive and Negative Affect Schedule; PANAS) would modulate N400 effects as shown previously. Namely, previous results showed larger N400 effects associated with happy moods and attenuated amplitudes associated with sad moods. Results revealed significant N400 effects, driven by the #roof vs. the wine, where larger amplitude differences were found for individuals showing smaller negative affect (NA) scores, thus partially replicating previous findings. We discuss our results in terms of theories of local (lexical) inhibition, such that low NA promotes stronger lexico-semantic links in sentences. Finally,

our results support accounts of language processing that include social and biological characteristics of individuals during real-time sentence comprehension.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.566894/full>

KOBIE VAN KRIEKEN & JOSÉ SANDERS – Storytelling on Oral Grounds: Viewpoint Alignment and Perspective Taking in Narrative Discourse

In this paper, we seek to explain the power of perspective taking in narrative discourse by turning to research on the oral foundations of storytelling in human communication and language. We argue that narratives function through a central process of alignment between the viewpoints of narrator, hearer/reader, and character and develop an analytical framework that is capable of generating general claims about the processes and outcomes of narrative discourse while flexibly accounting for the great linguistic variability both across and within stories. The central propositions of this viewpoint alignment framework are that the distance between the viewpoints of participants in the narrative construal – narrator, character, reader – is dynamic and regulated by linguistic choices as well as contextual factors. Fundamentally, viewpoint alignment is grounded in oral narrative interaction and, from this conversation, transferred to the written narrative situation, varying between demonstration and invasion of the narrative subjects and guiding readers' route of processing the narrative (experiential versus reflective). Our claim is that variations in viewpoint alignment are functional to the communicative context and intended outcomes of narratives. This is illustrated with the analysis of a corporate journalistic narrative that comprises both interactional and non-interactional aspects of storytelling. The concept of viewpoint alignment further explains the oral fundamentals of narrative discourse in conversational storytelling and poses new questions on the relation between the dynamic processing of stories on the one hand and their static outcomes on the other.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.634930/full>

KEVIN L. BLANKENSHIP, TRACI Y. CRAIG & MARIELLE G. MACHACEK – The Interplay Between Absolute Language and Moral Reasoning on Endorsement of Moral Foundations

Morality – the subjective sense that humans discern between right and wrong – plays a ubiquitous role in everyday life. Deontological reasoning conceptualizes moral decision-making as rigid, such that many moral choices are forbidden or required. Not surprisingly, the language used in measures of deontological reasoning tends to be rigid, including phrases such as “always” and “never.” Two studies (N = 553) drawn from two different populations used commonly used measures of moral reasoning and measures of morality to examine the link between individual differences in deontological reasoning and language on the endorsement of moral foundations. Participants low on deontological reasoning generally showed less endorsement for moral principles when extreme language was used in the measures (relative to less extreme language).

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.569380/full>

ERICA M. ELLIS et al – Toddlers' Ability to Leverage Statistical Information to Support Word Learning

This study investigated whether the ability to utilize statistical regularities from fluent speech and map potential words to meaning at 18-months predicts vocabulary at 18- and again at 24-months.

Eighteen-month-olds (N = 47) were exposed to an artificial language with statistical regularities within the speech stream, then participated in an object-label learning task. Learning was measured using a modified looking-while-listening eye-tracking design. Parents completed vocabulary questionnaires when their child was 18-and 24-months old.

Ability to learn the object-label pairing for words after exposure to the artificial language predicted productive vocabulary at 24-months and amount of vocabulary change from 18- to 24 months, independent of non-verbal cognitive ability, socio-economic status (SES) and/or object-label association performance.

The findings support the hypothesis that statistical word segmentation is one of the important aspects of word learning and vocabulary acquisition in toddlers.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.600694/full>

ANA MINEIRO et al – Disentangling Pantomime From Early Sign in a New Sign Language: Window Into Language Evolution Research

In this study, we aim to disentangle pantomime from early signs in a newly-born sign language: Sao Tome and Principe Sign Language. Our results show that within 2 years of their first contact with one another, a community of 100 participants interacting everyday was able to build a shared language. The growth of linguistic systematicity, which included a decrease in use of pantomime, reduction of the amplitude of signs and an increase in articulation economy, showcases a learning, and social interaction process that constitutes a continuum and not a cut-off system. The human cognitive system is endowed with mechanisms for symbolization that allow the process of arbitrariness to unfold and the expansion of linguistic complexity. Our study helps to clarify the role of pantomime in a new sign language and how this role might be linked with language itself, showing implications for language evolution research.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.640057/full>

GUILLERMO MONTERO-MELIS – Consistency In Motion Event Encoding Across Languages

Syntactic templates serve as schemas, allowing speakers to describe complex events in a systematic fashion. Motion events have long served as a prime example of how different languages favor different syntactic frames, in turn biasing their

speakers toward different event conceptualizations. However, there is also variability in how motion events are syntactically framed within languages. Here, we measure the consistency in event encoding in two languages, Spanish and Swedish. We test a dominant account in the literature, namely that variability within a language can be explained by specific properties of the events. This event-properties account predicts that descriptions of one and the same event should be consistent within a language, even in languages where there is overall variability in the use of syntactic frames. Spanish and Swedish speakers (N = 84) described 32 caused motion events. While the most frequent syntactic framing in each language was as expected based on typology (Spanish: verb-framed, Swedish: satellite-framed, cf. Talmy, 2000), Swedish descriptions were substantially more consistent than Spanish descriptions. Swedish speakers almost invariably encoded all events with a single syntactic frame and systematically conveyed manner of motion. Spanish descriptions, in contrast, varied much more regarding syntactic framing and expression of manner. Crucially, variability in Spanish descriptions was not mainly a function of differences between events, as predicted by the event-properties account. Rather, Spanish variability in syntactic framing was driven by speaker biases. A similar picture arose for whether Spanish descriptions expressed manner information or not: Even after accounting for the effect of syntactic choice, a large portion of the variance in Spanish manner encoding remained attributable to differences among speakers. The results show that consistency in motion event encoding starkly differs across languages: Some languages (like Swedish) bias their speakers toward a particular linguistic event schema much more than others (like Spanish). Implications of these findings are discussed with respect to the typology of event framing, theories on the relationship between language and thought, and speech planning. In addition, the tools employed here to quantify variability can be applied to other domains of language.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.625153/full>

HEATHER WILLIAMS – Mechanisms of Cultural Evolution in the Songs of Wild Bird Populations

Young songbirds draw the source material for their learned songs from parents, peers, and unrelated adults, as well as from innovation. These learned songs are used for intraspecific communication, and have well-documented roles for such functions as territory maintenance and mate attraction. The songs of wild populations differ, forming local “dialects” that may shift over time, suggesting that cultural evolution is at work. Recent work has focused on the mechanisms responsible for the cultural evolution of bird songs within a population, including drift, learning biases (such as conformity and rare-form copying), and selection (including sexual selection). In many songs or song repertoires, variability is partitioned, with some songs or song segments being stable and consistent, while others vary within the population and across time, and still others undergo population-wide transitions over time. This review explores the different mechanisms that shape the cultural evolution of songs in wild populations, with specific reference to a long-term investigation of a single population of philopatric Savannah sparrows. Males learn a single four-segment song during their 1st year and sing the same song thereafter. Within this song, the buzz segment is a population marker, and may be stable for decades – variant forms occur but eventually disappear. In contrast, the middle segment is highly variable both within the population and over time; changes in relative prevalence of different forms may be due to cultural drift or a rare-form learning bias. Within the introductory segment, a high note cluster was replaced by a click train between 1982 and 2010, following an S-shaped trajectory characteristic of both selective sweeps in population genetics and the replacement of one form by another in human language. In the case of the Savannah sparrows, this replacement may have been due to sexual selection. In subsequent generations, the number of clicks within trains increased, a form of cultural directional selection. In contrast to the narrowing of a trait’s range during directional selection in genetic systems, variation in the number of clicks in a train increased as the mean value shifted because improvisation during song learning allowed the range of the trait to expand. Thus, in the single short song of the Savannah sparrow, at least four different mechanisms appear to contribute to three different types of cultural evolutionary outcomes. In the future, it will be important to explore the conditions that favor the application of specific (and perhaps conditional) learning rules, and studies such as the ongoing song seeding experiment in the Kent Island Savannah sparrow population will help in understanding the mechanisms that promote or repress changes in a population’s song.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.643343/full>

POOJA PARISHAR, ALOK NATH MOHAPATRA & SOUMYA IYENGAR – Investigating Behavioral Responses to Mirrors and the Mark Test in Adult Male Zebra Finches and House Crows

Earlier evidence suggests that besides humans, some species of mammals and birds demonstrate visual self-recognition, assessed by the controversial “mark” test. Whereas, there are high levels of inter-individual differences amongst a single species, some species such as macaques and pigeons which do not spontaneously demonstrate mirror self-recognition (MSR) can be trained to do so. We were surprised to discover that despite being widely used as a model system for avian research, the performance of zebra finches (*Taenopygia guttata*) on the mark test had not been studied earlier. Additionally, we studied the behavioral responses of another species of passerine songbirds (Indian house crows; *Corvus splendens*) to a mirror and the MSR mark test. Although a small number of adult male zebra finches appeared to display heightened responses toward the mark while observing their reflections, we could not rule out the possibility that these were a part of general grooming rather than specific to the mark. Furthermore, none of the house crows demonstrated mark-directed behavior or increased self-exploratory behaviors when facing mirrors. Our study suggests that self-directed behaviors need to be tested more rigorously in adult male zebra finches while facing their reflections and these findings need to be replicated in a larger population, given the high degree of variability in mirror-directed behaviors.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.637850/full>

PETER W. HALLIGAN & DAVID A. OAKLEY – Giving Up on Consciousness as the Ghost in the Machine

Consciousness as used here, refers to the private, subjective experience of being aware of our perceptions, thoughts, feelings, actions, memories (psychological contents) including the intimate experience of a unified self with the capacity to generate and control actions and psychological contents. This compelling, intuitive consciousness-centric account has, and continues to shape folk and scientific accounts of psychology and human behavior. Over the last 30 years, research from the cognitive neurosciences has challenged this intuitive social construct account when providing a neurocognitive architecture for a human psychology. Growing evidence suggests that the executive functions typically attributed to the experience of consciousness are carried out competently, backstage and outside subjective awareness by a myriad of fast, efficient non-conscious brain systems. While it remains unclear how and where the experience of consciousness is generated in the brain, we suggested that the traditional intuitive explanation that consciousness is causally efficacious is wrong-headed when providing a cognitive neuroscientific account of human psychology. Notwithstanding the compelling 1st-person experience (inside view) that convinces us that subjective awareness is the mental curator of our actions and thoughts, we argue that the best framework for building a scientific account is to be consistent with the biophysical causal dependency of prior neural processes. From a 3rd person perspective, (outside view), we propose that subjective awareness lacking causal influence, is (no more) than our experience of being aware, our awareness of our psychological content, knowing that we are aware, and the belief that that such experiences are evidence of an agentic capacity shared by others. While the human mind can be described as comprising both conscious and nonconscious aspects, both ultimately depend on neural process in the brain. In arguing for the counter-intuitive epiphenomenal perspective, we suggest that a scientific approach considers all mental aspects of mind including consciousness in terms of their underlying, preceding (causal) biological changes, in the realization that most brain processes are not accompanied by any discernible change in subjective awareness.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.571460/full>

JIAN HAO & XU DU – Preschoolers' Helping Motivations: Altruistic, Egoistic or Diverse?

Based on Eisenberg et al.'s model of prosocial motivations, the present study examined what motivates preschoolers to display instrumental helping and how various motivations develop during the preschool years. The participants were 477 preschoolers aged 3–5 years assigned to one of five groups. In each experimental group, the experimenter emphasized an altruistic or egoistic helping motivation, namely, empathic concern, moral rules, praise or rewards. In the control group, no helping motivations were emphasized. Their instrumental helping was then measured by sorting cards for a sick child to play a game. The results show that each helping motivation had a positive effect on instrumental helping. Most of the motivational effects were similar across age, but the motivational effect of empathic concern increased obviously at the age of 5 years. Therefore, the present study reveals that both altruistic and egoistic motivations motivate preschoolers to help others. Most of the motivations develop steadily during the preschool years, but empathic concern as an altruistic motivation increases greatly at the end of the preschool years. The present study thus confirms the diversity of preschoolers' helping motivations with Eisenberg et al.'s model of prosocial motivations.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.614868/full>

YUNYU XIAO et al – Understanding the Better Than Average Effect on Altruism

Prior research suggests that most people perceive themselves to be more altruistic than the average population, an observation known as the better-than-average (BTA) effect. Understanding the BTA effect carries significant public health implications, as self-perceived altruism is closely related to altruistic behaviors, which plays a significant role in individual and societal well-being. However, little is known about whether subpopulations with specific sociodemographic profiles are more likely to hold BTA altruistic self-perceptions, making it difficult to design targeted programs based on multiple sociodemographic characteristics to promote altruistic behaviors. This study addresses this gap by identifying the sociodemographic profiles of populations who are more likely to exhibit BTA effects on trait altruism. Data were derived from a representative sample of Hong Kong citizens ($n = 1,185$) in the 2017 Hong Kong Altruism Survey. A latent class analysis was performed using four domains of sociodemographic characteristics: sex, age, religion, and socioeconomic status. Multivariate multinomial logistic regressions were conducted to examine associations between class membership, BTA effect, and altruistic behaviors. The results yielded four classes of sociodemographic profiles. Middle-aged, Christian/Catholic, highly educated, and high-income individuals (Class 4, 17.8%) were most likely to exhibit BTA effects and behave altruistically; Class 3 (14.0%) were older, male, no/other religious belief, low education, and least likely to exhibit BTA effects and behave altruistically. Findings improve the understanding of the sociodemographic profiles of people showing BTA effects and facilitate targeted policy development to effectively promote altruism.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2020.562846/full>

WEN YING JIN & MING PENG – The Effects of Social Perception on Moral Judgment

When people express a moral judgment, others make inferences about their personality, such as whether they are warm or competent. People may use this interpersonal process to present themselves in a way that is socially acceptable in the current circumstances. Across four studies, we investigated this hypothesis in Chinese culture and showed that college student participants tended to associate others' deontological moral judgments with warmth and utilitarian moral judgments

with competence (Study 1, $Mage = 21.1$, $SD = 2.45$; Study 2, $Mage = 20.53$, $SD = 1.87$). In addition, participants made more deontological judgments after preparing to be interviewed for a job requiring them to be in a warm social role, and more utilitarian judgments after preparing for a job requiring them to be in a competent social role (Study 3, $Mage = 19.5$, $SD = 1.63$). This effect held true in moral dilemmas involving different degrees of hypothetical personal involvement, and appeared to be mediated by the perception of others' expectations (Study 4, $Mage = 19.92$, $SD = 1.97$). The results suggest an important role for social cognition as an influence on moral judgments in Chinese culture.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2020.557216/full>

MENGFEI HAN et al – Neurobiological Bases of Social Networks

A social network is a web that integrates multiple levels of interindividual social relationships and has direct associations with an individual's health and well-being. Previous research has mainly focused on how brain and social network structures (structural properties) act on each other and on how the brain supports the spread of ideas and behaviors within social networks (functional properties). The structure of the social network is correlated with activity in the amygdala, which links decoding and interpreting social signals and social values. The structure also relies on the mentalizing network, which is central to an individual's ability to infer the mental states of others. Network functional properties depend on multilayer brain-social networks, indicating that information transmission is supported by the default mode system, the valuation system, and the mentalizing system. From the perspective of neuroendocrinology, overwhelming evidence shows that variations in oxytocin, β -endorphin and dopamine receptor genes, including oxytocin receptor (OXTR), mu opioid receptor 1 (OPRM1) and dopamine receptor 2 (DRD2), predict an individual's social network structure, whereas oxytocin also contributes to improved transmission of emotional and behavioral information from person to person. Overall, previous studies have comprehensively revealed the effects of the brain, endocrine system, and genes on social networks. Future studies are required to determine the effects of cognitive abilities, such as memory, on social networks, the characteristics and neural mechanism of social networks in mental illness and how social networks change over time through the use of longitudinal methods.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.626337/full>

ROBERT BROTHERTON & LISA K. SON – Metacognitive Labeling of Contentious Claims: Facts, Opinions, and Conspiracy Theories

Congenial information is often judged to be more valid than uncongenial (but otherwise equivalent) information. The present research explores a related possibility concerning the process by which people label a claim as fundamentally factual (open to proof or disproof) or opinion (a matter of personal preference not amenable to falsification). Rather than merely being more skeptical of uncongenial claims, uncongenial claims may be metacognitively categorized as more opinion than factual, while congenial claims may be more likely to be categorized as factual. The two studies reported here attempt to trace a preliminary outline of how claims are categorized as fact, opinion, or some mix of the two in the context of mundane claims, contentious political issues, and conspiracy theories. The findings suggest that claims are more likely to be labeled factual (and, to a lesser extent, are less likely to be labeled opinion) to the extent that one subjectively agrees with the content of the claim. Conspiracy theories appear to occupy a middle-ground between fact and opinion. This metacognitive approach may help shed light on popular debate about conspiracy theories, as well as seemingly intractable political disagreements more generally, which may reflect fundamental differences in the perceived epistemic foundations of claims rather than simple disagreement over the facts of the matter. Given limitations of the stimuli and participant samples, however, it remains to be seen how generalizable these findings are.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.644657/full>

QIANYING MA et al – Implicit Learning of True and False Belief Sequences

To investigate whether people can implicitly learn regularities in a social context, we developed a new implicit sequence learning task combining elements from classic false belief and serial reaction time tasks. Participants learned that protagonists were offered flowers at four locations. The protagonists' beliefs concerning the flowers were true or false, depending on their orientation, respectively, toward the scene (so that the flowers could be seen) or away from it. Unbeknown to the participants, there was a fixed belief-related sequence involving three dimensions (identity of the two protagonists, true-false belief orientation held by the protagonists, and flower location as believed by the protagonists). Participants had to indicate as fast as possible where the flowers were located (Experiment 1), or how many flowers were given (Experiment 2) according to the protagonists. Experiment 1 combined perceptual and motor processes (as both the belief-related sequence and motor responses referred to location), whereas Experiment 2 unconfounded the sequence and motor responses, allowing to investigate pure perceptual implicit learning. For reasons of comparison, two non-social conditions were created in Experiment 2 by replacing the protagonists with two non-social objects—colored cameras or shapes. Results revealed significant implicit sequence learning of all belief-related dimensions in Experiment 1, and of true-false belief orientation in Experiment 2, even without a motor confound. Importantly, there were faster reaction times and stronger sequence learning effects in the social than in the non-social conditions. The present findings demonstrate for the first time that people are able to implicitly learn belief-related sequences.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.643594/full>

BOJANA M. DINIĆ AND BOJANA BODROŽA – COVID-19 Protective Behaviors Are Forms of Prosocial and Unselfish Behaviors

The aim of this study was to explore the effects of prosocial and antisocial personality tendencies and context-related state factors on compliance with protective behaviors to prevent the spread of coronavirus infections. Six types of prosocial tendencies (altruism, dire, compliant, emotional, public, and anonymous) and selfishness as the antisocial tendency were included as personality factors, while fear related to the pandemic and empathy toward vulnerable groups (i.e., those in forced isolation) were context-related factors. Furthermore, mediation effect of empathy and moderation effect of fear were explored in relations between personality factors and protective behaviors. The sample included 581 participants (78.3% females). The data were collected from March 28 to April 6, 2020, during the emergency state and curfew in Serbia. The results showed that tendency to help anonymously had a positive effect and selfishness had a negative effect on protective behaviors, over and above demographic characteristics and context-related factors. Among context-related factors, only fear related to the pandemic had a significant unique positive effect on protective behaviors, but it had no moderator effect in the relationship between personality traits and protective behaviors. However, empathy acted as a mediator and partly accounted for the negative effect of selfishness and positive effect of tendency to help anonymously on protective behaviors. The results revealed that compliance with protective measures could be seen as prosocial and unselfish form of behavior. Furthermore, these findings have practical implications for shaping public messages and they can help effectively promote health-responsible behaviors.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.647710/full>

Nature

ARTICLES

ALLAN DAFOE et al – Cooperative AI: machines must learn to find common ground

To help humanity solve fundamental problems of cooperation, scientists need to reconceive artificial intelligence as deeply social.

<https://www.nature.com/articles/d41586-021-01170-0>

LOUISE HUMPHREY – A child's grave is the earliest known burial site in Africa

The discovery of the burial of a young child in a cave in Kenya around 78,000 years ago sheds new light on the role of symbolism in the treatment of the dead during the Middle Stone Age.

<https://www.nature.com/articles/d41586-021-00805-6>

PAPERS

YAFEI MAO et mul – A high-quality bonobo genome refines the analysis of hominid evolution

The divergence of chimpanzee and bonobo provides one of the few examples of recent hominid speciation^{1,2}. Here we describe a fully annotated, high-quality bonobo genome assembly, which was constructed without guidance from reference genomes by applying a multiplatform genomics approach. We generate a bonobo genome assembly in which more than 98% of genes are completely annotated and 99% of the gaps are closed, including the resolution of about half of the segmental duplications and almost all of the full-length mobile elements. We compare the bonobo genome to those of other great apes^{1,3,4,5} and identify more than 5,569 fixed structural variants that specifically distinguish the bonobo and chimpanzee lineages. We focus on genes that have been lost, changed in structure or expanded in the last few million years of bonobo evolution. We produce a high-resolution map of incomplete lineage sorting and estimate that around 5.1% of the human genome is genetically closer to chimpanzee or bonobo and that more than 36.5% of the genome shows incomplete lineage sorting if we consider a deeper phylogeny including gorilla and orangutan. We also show that 26% of the segments of incomplete lineage sorting between human and chimpanzee or human and bonobo are non-randomly distributed and that genes within these clustered segments show significant excess of amino acid replacement compared to the rest of the genome.

<https://www.nature.com/articles/s41586-021-03519-x>

MARÍA MARTINÓN-TORRES et mul with FRANCESCO D'ERRICO & JOSÉ MARÍA BERMÚDEZ DE CASTRO – Earliest known human burial in Africa

The origin and evolution of hominin mortuary practices are topics of intense interest and debate^{1,2,3}. Human burials dated to the Middle Stone Age (MSA) are exceedingly rare in Africa and unknown in East Africa^{1,2,3,4,5,6}. Here we describe the partial skeleton of a roughly 2.5- to 3.0-year-old child dating to 78.3 ± 4.1 thousand years ago, which was recovered in the MSA layers of Panga ya Saidi (PYS), a cave site in the tropical upland coast of Kenya^{7,8}. Recent excavations have revealed a pit feature containing a child in a flexed position. Geochemical, granulometric and micromorphological analyses of the burial pit content and encasing archaeological layers indicate that the pit was deliberately excavated. Taphonomical evidence, such as the strict articulation or good anatomical association of the skeletal elements and histological evidence of putrefaction, support the in-place decomposition of the fresh body. The presence of little or no displacement of the unstable joints during decomposition points to an interment in a filled space (grave earth), making the PYS finding the oldest known human burial in Africa. The morphological assessment of the partial skeleton is consistent with its assignment to *Homo sapiens*, although the preservation of some primitive features in the dentition supports increasing evidence for non-gradual assembly of

modern traits during the emergence of our species. The PYS burial sheds light on how MSA populations interacted with the dead.

<https://www.nature.com/articles/s41586-021-03457-8>

Nature Communications

PAPERS

OFER TCHERNICHOVSKI, SOPHIE EISENBERG-EDIDIN & ERICH D. JARVIS – Balanced imitation sustains song culture in zebra finches

Songbirds acquire songs by imitation, as humans do speech. Although imitation should drive convergence within a group and divergence through drift between groups, zebra finch songs sustain high diversity within a colony, but mild variation across colonies. We investigated this phenomenon by analyzing vocal learning statistics in 160 tutor-pupil pairs from a large breeding colony. Song imitation is persistently accurate in some families, but poor in others. This is not attributed to genetic differences, as fostered pupils copied their tutors' songs as accurately or poorly as biological pupils. Rather, pupils of tutors with low song diversity make more improvisations compared to pupils of tutors with high song diversity. We suggest that a frequency dependent balanced imitation prevents extinction of rare song elements and overabundance of common ones, promoting repertoire diversity within groups, while constraining drift across groups, which together prevents the collapse of vocal culture into either complete uniformity or chaos.

<https://www.nature.com/articles/s41467-021-22852-3>

THOMAS O. RICHARDSON et al – Leadership – not followership – determines performance in ant teams

Economic theory predicts that organisations achieve higher levels of productivity when tasks are divided among different subsets of workers. This prediction is based upon the expectation that individuals should perform best when they specialise upon a few tasks. However, in colonies of social insects evidence for a causal link between division of labour and performance is equivocal. To address this issue, we performed a targeted worker removal experiment to disrupt the normal allocation of workers to a cooperative team task – tandem running. During a tandem run a knowledgeable leader communicates the location of a new nest to a follower by physically guiding her there. The targeted removal of prominent leaders significantly reduced tandem performance, whereas removal of prominent followers had no effect. Furthermore, analyses of the experience of both participants in each tandem run revealed that tandem performance was influenced primarily by how consistently the leader acted as a leader when the need arose, but not by the consistency of the follower. Our study shows that performance in ant teams depends largely on whether or not a key role is filled by an experienced individual, and suggests that in animal teams, not all roles are equally important.

<https://www.nature.com/articles/s42003-021-02048-7>

Nature Ecology & Evolution

PAPERS

MERCEDES CONDE-VALVERDE et al with JOSÉ MARÍA BERMÚDEZ DE CASTRO – Neanderthals and Homo sapiens had similar auditory and speech capacities

The study of audition in fossil hominins is of great interest given its relationship with intraspecific vocal communication. While the auditory capacities have been studied in early hominins and in the Middle Pleistocene Sima de los Huesos hominins, less is known about the hearing abilities of the Neanderthals. Here, we provide a detailed approach to their auditory capacities. Relying on computerized tomography scans and a comprehensive model from the field of auditory bioengineering, we have established sound power transmission through the outer and middle ear and calculated the occupied bandwidth in Neanderthals. The occupied bandwidth is directly related to the efficiency of the vocal communication system of a species. Our results show that the occupied bandwidth of Neanderthals was greater than the Sima de los Huesos hominins and similar to extant humans, implying that Neanderthals evolved the auditory capacities to support a vocal communication system as efficient as modern human speech.

<https://www.nature.com/articles/s41559-021-01391-6>

JOÃO C. TEIXEIRA et al with CHRIS STRINGER – Widespread Denisovan ancestry in Island Southeast Asia but no evidence of substantial super-archaic hominin admixture

The hominin fossil record of Island Southeast Asia (ISEA) indicates that at least two endemic 'super-archaic' species—*Homo luzonensis* and *H. floresiensis*—were present around the time anatomically modern humans arrived in the region >50,000 years ago. Intriguingly, contemporary human populations across ISEA carry distinct genomic traces of ancient interbreeding events with Denisovans—a separate hominin lineage that currently lacks a fossil record in ISEA. To query this apparent disparity between fossil and genetic evidence, we performed a comprehensive search for super-archaic introgression in >400 modern human genomes, including >200 from ISEA. Our results corroborate widespread Denisovan ancestry in ISEA populations, but fail to detect any substantial super-archaic admixture signals compatible with the endemic fossil record of ISEA. We discuss the implications of our findings for the understanding of hominin history in ISEA, including future research directions that might help to unlock more details about the prehistory of the enigmatic Denisovans.

<https://www.nature.com/articles/s41559-021-01408-0>

BARBARA FISCHER et al – Sex differences in the pelvis did not evolve de novo in modern humans

It is commonly assumed that the strong sexual dimorphism of the human pelvis evolved for delivering the relatively large human foetuses. Here we compare pelvic sex differences across modern humans and chimpanzees using a comprehensive geometric morphometric approach. Even though the magnitude of sex differences in pelvis shape was two times larger in humans than in chimpanzees, we found that the pattern is almost identical in the two species. We conclude that this pattern of pelvic sex differences did not evolve de novo in modern humans and must have been present in the common ancestor of humans and chimpanzees, and thus also in the extinct Homo species. We further suggest that this shared pattern was already present in early mammals and propose a hypothesis of facilitated variation as an explanation: the conserved mammalian endocrine system strongly constrains the evolution of the pattern of pelvic differences but enables rapid evolutionary change of the magnitude of sexual dimorphism, which in turn facilitated the rapid increase in hominin brain size.

<https://www.nature.com/articles/s41559-021-01425-z>

LIAM R. DOUGHERTY – Meta-analysis reveals that animal sexual signalling behaviour is honest and resource based

Animals often need to signal to attract mates and behavioural signalling may impose substantial energetic and fitness costs to signallers. Consequently, individuals often strategically adjust signalling effort to maximize the fitness payoffs of signalling. An important determinant of these payoffs is individual state, which can influence the resources available to signallers, their likelihood of mating and their motivation to mate. However, empirical studies often find contradictory patterns of state-based signalling behaviour. For example, individuals in poor condition may signal less than those in good condition to conserve resources (ability-based signalling) or signal more to maximize short-term reproductive success (needs-based signalling). To clarify this relationship, I systematically searched for published studies examining animal sexual signalling behaviour in relation to six aspects of individual state: age, mated status, attractiveness, body size, condition and parasite load. Across 228 studies and 147 species, individuals (who were predominantly male) invested more into behavioural signalling when in good condition. Overall, this suggests that animal sexual signalling behaviour is generally honest and ability-based. However, the magnitude of state-dependent plasticity was small and there was a large amount of between-study heterogeneity that remains unexplained.

<https://www.nature.com/articles/s41559-021-01409-z>

RAÏSSA A. DE BOER et al – Meta-analytic evidence that animals rarely avoid inbreeding

Animals are usually expected to avoid mating with relatives (kin avoidance) as incestuous mating can lead to the expression of inbreeding depression. Yet, theoretical models predict that unbiased mating with regards to kinship should be common, and that under some conditions, the inclusive fitness benefits associated with inbreeding can even lead to a preference for mating with kin. This mismatch between empirical and theoretical expectations generates uncertainty as to the prevalence of inbreeding avoidance in animals. Here, we synthesized 677 effect sizes from 139 experimental studies of mate choice for kin versus non-kin in diploid animals, representing 40 years of research, using a meta-analytical approach. Our meta-analysis revealed little support for the widely held view that animals avoid mating with kin, despite clear evidence of publication bias. Instead, unbiased mating with regards to kinship appears widespread across animals and experimental conditions. The significance of a variety of moderators was explored using meta-regressions, revealing that the degree of relatedness and prior experience with kin explained some variation in the effect sizes. Yet, we found no difference in kin avoidance between males and females, choice and no-choice experiments, mated and virgin animals or between humans and animals. Our findings highlight the need to rethink the widely held view that inbreeding avoidance is a given in experimental studies.

<https://www.nature.com/articles/s41559-021-01453-9>

Nature Human Behaviour

PAPERS

MAXWELL N. BURTON-CHELLEW & STUART A. WEST – Payoff-based learning best explains the rate of decline in cooperation across 237 public-goods games

What motivates human behaviour in social dilemmas? The results of public goods games are commonly interpreted as showing that humans are altruistically motivated to benefit others. However, there is a competing ‘confused learners’ hypothesis: that individuals start the game either uncertain or mistaken (confused) and then learn from experience how to improve their payoff (payoff-based learning). Here we (1) show that these competing hypotheses can be differentiated by how they predict contributions should decline over time; and (2) use metadata from 237 published public goods games to test between these competing hypotheses. We found, as predicted by the confused learners hypothesis, that contributions declined faster when individuals had more influence over their own payoffs. This predicted relationship arises because more influence leads to a greater correlation between contributions and payoffs, facilitating learning. Our results suggest that humans, in general, are not altruistically motivated to benefit others but instead learn to help themselves.

<https://www.nature.com/articles/s41562-021-01107-7>

Nature Machine Intelligence

ARTICLES

MARTA R. COSTA-JUSSÀ – Towards universal translation

State of the art neural network approaches enable massive multilingual translation. How close are we to universal translation between any spoken, written or signed language?

<https://www.nature.com/articles/s42256-021-00346-7>

Nature Scientific Reports

PAPERS

CRISTINA BAUS et al – Early detection of language categories in face perception

Does language categorization influence face identification? The present study addressed this question by means of two experiments. First, to establish language categorization of faces, the memory confusion paradigm was used to create two language categories of faces, Spanish and English. Subsequently, participants underwent an oddball paradigm, in which faces that had been previously paired with one of the two languages (Spanish or English), were presented. We measured EEG perceptual differences (vMMN) between standard and two types of deviant faces: within-language category (faces sharing language with standards) or between-language category (faces paired with the other language). Participants were more likely to confuse faces within the language category than between categories, an index that faces were categorized by language. At the neural level, early vMMN were obtained for between-language category faces, but not for within-language category faces. At a later stage, however, larger vMMNs were obtained for those faces from the same language category. Our results showed that language is a relevant social cue that individuals used to categorize others and this categorization subsequently affects face perception.

<https://www.nature.com/articles/s41598-021-89007-8>

N. HOLZ, P. LARROUY-MAESTRI & D. POEPEL – The paradoxical role of emotional intensity in the perception of vocal affect

Vocalizations including laughter, cries, moans, or screams constitute a potent source of information about the affective states of others. It is typically conjectured that the higher the intensity of the expressed emotion, the better the classification of affective information. However, attempts to map the relation between affective intensity and inferred meaning are controversial. Based on a newly developed stimulus database of carefully validated non-speech expressions ranging across the entire intensity spectrum from low to peak, we show that the intuition is false. Based on three experiments (N = 90), we demonstrate that intensity in fact has a paradoxical role. Participants were asked to rate and classify the authenticity, intensity and emotion, as well as valence and arousal of the wide range of vocalizations. Listeners are clearly able to infer expressed intensity and arousal; in contrast, and surprisingly, emotion category and valence have a perceptual sweet spot: moderate and strong emotions are clearly categorized, but peak emotions are maximally ambiguous. This finding, which converges with related observations from visual experiments, raises interesting theoretical challenges for the emotion communication literature.

<https://www.nature.com/articles/s41598-021-88431-0>

RODOLFO CORTES BARRAGAN & ANDREW N. MELTZOFF – Human infants can override possessive tendencies to share valued items with others

Possessiveness toward objects and sharing are competing tendencies that influence dyadic and group interactions within the primate lineage. A distinctive form of sharing in adult Homo sapiens involves active giving of high-valued possessions to others, without an immediate reciprocal benefit. In two Experiments with 19-month-old human infants (N = 96), we found that despite measurable possessive behavior toward their own personal objects (favorite toy, bottle), infants spontaneously gave these items to a begging stranger. Moreover, human infants exhibited this behavior across different types of objects that are relevant to theory (personal objects, sweet food, and common objects)—showing flexible generalizability not evidenced in non-human primates. We combined these data with a previous dataset, yielding a large sample of infants (N = 192), and identified sociocultural factors that may calibrate young infants' sharing of objects with others. The current findings show a proclivity that is rare or absent in our closest living relatives—the capacity to override possessive behavior toward personally valued objects by sharing those same desired objects with others.

<https://www.nature.com/articles/s41598-021-88898-x>

ANDRZEJ KASPERSKI & RENATA KASPERSKA – Study on attractors during organism evolution

The important question that arises during determining the evolution of organisms is whether evolution should be treated as a continuous process or whether groups of organisms fall into 'local' attractors during evolution. A similar question arises during considering the development of cells after cancer transformation. Answers to these questions can provide a better understanding of how normal and transformed organisms evolve. So far, no satisfactory answers have been found to these questions. To find the answers and demonstrate that organisms during evolution get trapped in 'local' attractors, an artificial neural network supported by a semihomologous approach and unified cell bioenergetics concept have been used in this work. A new universal model of cancer transformation and cancer development has been established and presented to

highlight the differences between the development of transformed cells and normal organisms. An unequivocal explanation of cancer initialization and development has not been discovered so far, thus the proposed model should shed new light on the evolution of transformed cells.

<https://www.nature.com/articles/s41598-021-89001-0>

New Scientist

NEWS

Remains of a 3-year-old child are the oldest known burial in Africa

The oldest known burial in Africa is of a 3-year-old child who died around 78,000 years ago. The discovery sheds light on how people in the region cared for their dead at that time.

<https://www.newscientist.com/article/2276470-remains-of-a-3-year-old-child-are-the-oldest-known-burial-in-africa/#ixzz6uCO42yoC>

Arabian cult may have built 1000 monuments older than Stonehenge

A vast site in north-west Saudi Arabia is home to 1000 structures that date back more than 7000 years, making them older than the Egyptian pyramids and Stonehenge in the UK.

<https://www.newscientist.com/article/2276273-arabian-cult-may-have-built-1000-monuments-older-than-stonehenge/#ixzz6uCOGHg8y>

ARTICLES

STEPHEN FLEMING – How to boost your self-awareness and make better decisions

Having good metacognition - the ability to think about our own thoughts - is key to success in many aspects of life. Fortunately, there are things we can all do to get to know ourselves better

<https://www.newscientist.com/article/mg25033332-300-how-to-boost-your-self-awareness-and-make-better-decisions/#ixzz6uC2KC31>

REVIEWS

ELLE HUNT – Lucy, the Human Chimp review: The ape that was raised like a human

Lucy, the Human Chimp, a new TV documentary from KEO Films and Channel 4, explores the meeting of chimpanzee and human worlds through the story of one unique relationship: that between Lucy, a chimpanzee raised as a human, and Janis Carter, a graduate student hired to clean her cage. Through the late 1960s, Lucy was the subject of a high-profile study by psychologists Maurice and Jane Temerlin, ostensibly to explore the limits of nature versus nurture.

<https://www.newscientist.com/article/2274938-lucy-the-human-chimp-review-the-ape-that-was-raised-like-a-human/#ixzz6uC2mfQOq>

Philosophical Transactions of the Royal Society B

PAPERS

REBECCA SEAR – The male breadwinner nuclear family is not the ‘traditional’ human family, and promotion of this myth may have adverse health consequences

The importance of social support for parental and child health and wellbeing is not yet sufficiently widely recognized. The widespread myth in Western contexts that the male breadwinner–female homemaker nuclear family is the ‘traditional’ family structure leads to a focus on mothers alone as the individuals with responsibility for child wellbeing. Inaccurate perceptions about the family have the potential to distort academic research and public perceptions, and hamper attempts to improve parental and child health. These perceptions may have arisen partly from academic research in disciplines that focus on the Western middle classes, where this particular family form was idealized in the mid-twentieth century, when many of these disciplines were developing their foundational research. By contrast, evidence from disciplines that take a cross-cultural or historical perspective shows that in most human societies, multiple individuals beyond the mother are typically involved in raising children: in evolutionary anthropology, it is now widely accepted that we have evolved a strategy of cooperative reproduction. Expecting mothers to care for children with little support, while expecting fathers to provide for their families with little support, is, therefore, likely to lead to adverse health consequences for mothers, fathers and children. Incorporating evidence-based evolutionary, and anthropological, perspectives into research on health is vital if we are to ensure the wellbeing of individuals across a wide range of contexts.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0020>

RYAN SCHACHT et al – Was Cinderella just a fairy tale? Survival differences between stepchildren and their half-siblings

The death of a parent, particularly the mother, is linked to a suite of negative outcomes across the life-course. Compounding concerns for child outcomes are expectations of poor treatment by step-parents after parental remarriage. Indeed, folk tales of step-parental abuse abound cross-culturally and are embedded into stories taught to children. To understand why child outcomes might be sensitive to levels of relatedness within the household, evolutionary-oriented research targets patterning

in parental expenditure in ways predicted to maximize inclusive fitness. In particular, parents are expected to prioritize investments in their biological children. However, stepfamilies are only formed after children experience multiple unfortunate events (e.g. parental loss, poverty), blurring causal interpretations between step-parental presence and stepchild outcomes. Moreover, stepchildren have been shown to be integral to household functioning, caring for their half-siblings and stabilizing relationships. These results challenge narrow views of adaptive behaviour; specifically, that step-parents, unlike biological parents, do not stand to reap fitness benefits from the care that they provide to their stepchildren. To evaluate these critiques, we analyse the survival outcomes of stepchildren. We include over 400 000 individuals from across a natural fertility period (1847–1940) in the United States state of Utah and examine the consequences of parental loss and step-parental introduction. Our analyses yield three key results: (i) exposure to maternal loss in childhood is associated with elevated mortality risk, (ii) parental remarriage does not increase the risk of mortality among stepchildren compared to non-stepchildren who too had lost a parent, and (iii) stepchildren enjoy higher survival than their half-siblings within the same family. Ultimately, this work contributes to the increasingly recognized importance of cooperative relationships among non-kin for childcare and household functioning.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2020.0032>

PLoS Genetics

PAPERS

ELAINE E. GUEVARA et al with CHET C. SHERWOOD – Comparative analysis reveals distinctive epigenetic features of the human cerebellum

Identifying the molecular underpinnings of the neural specializations that underlie human cognitive and behavioral traits has long been of considerable interest. Much research on human-specific changes in gene expression and epigenetic marks has focused on the prefrontal cortex, a brain structure distinguished by its role in executive functions. The cerebellum shows expansion in great apes and is gaining increasing attention for its role in motor skills and cognitive processing, including language. However, relatively few molecular studies of the cerebellum in a comparative evolutionary context have been conducted. Here, we identify human-specific methylation in the lateral cerebellum relative to the dorsolateral prefrontal cortex, in a comparative study with chimpanzees (*Pan troglodytes*) and rhesus macaques (*Macaca mulatta*). Specifically, we profiled genome-wide methylation levels in the three species for each of the two brain structures and identified human-specific differentially methylated genomic regions unique to each structure. We further identified which differentially methylated regions (DMRs) overlap likely regulatory elements and determined whether associated genes show corresponding species differences in gene expression. We found greater human-specific methylation in the cerebellum than the dorsolateral prefrontal cortex, with differentially methylated regions overlapping genes involved in several conditions or processes relevant to human neurobiology, including synaptic plasticity, lipid metabolism, neuroinflammation and neurodegeneration, and neurodevelopment, including developmental disorders. Moreover, our results show some overlap with those of previous studies focused on the neocortex, indicating that such results may be common to multiple brain structures. These findings further our understanding of the cerebellum in human brain evolution.

<https://journals.plos.org/plosgenetics/article?id=10.1371/journal.pgen.1009506>

PLoS One

PAPERS

LUC DOYON et al with FRANCESCO D'ERRICO – A 115,000-year-old expedient bone technology at Lingjing, Henan, China

Activities attested since at least 2.6 Myr, such as stone knapping, marrow extraction, and woodworking may have allowed early hominins to recognize the technological potential of discarded skeletal remains and equipped them with a transferable skillset fit for the marginal modification and utilization of bone flakes. Identifying precisely when and where expedient bone tools were used in prehistory nonetheless remains a challenging task owing to the multiple natural and anthropogenic processes that can mimic deliberately knapped bones. Here, we compare a large sample of the faunal remains from Lingjing, a 115 ka-old site from China which has yielded important hominin remains and rich faunal and lithic assemblages, with bone fragments produced by experimentally fracturing *Equus caballus* long bones. Our results provide a set of qualitative and quantitative criteria that can help zooarchaeologists and bone technologists distinguish faunal remains with intentional flake removal scars from those resulting from carcass processing activities. Experimental data shows marrow extraction seldom generates diaphyseal fragments bearing more than six flake scars arranged contiguously or in interspersed series. Long bone fragments presenting such characteristics can, therefore, be interpreted as being purposefully knapped to be used as expediency tools. The identification, based on the above experimental criteria, of 56 bone tools in the Lingjing faunal assemblage is consistent with the smaller size of the lithics found in the same layer. The continuity gradient observed in the size of lithics and knapped bones suggests the latter were used for tasks in which the former were less or not effective.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0250156>

TIRZA BIRON et al – Automatic detection of prosodic boundaries in spontaneous speech

Automatic speech recognition (ASR) and natural language processing (NLP) are expected to benefit from an effective, simple, and reliable method to automatically parse conversational speech. The ability to parse conversational speech depends crucially on the ability to identify boundaries between prosodic phrases. This is done naturally by the human ear, yet has

proved surprisingly difficult to achieve reliably and simply in an automatic manner. Efforts to date have focused on detecting phrase boundaries using a variety of linguistic and acoustic cues. We propose a method which does not require model training and utilizes two prosodic cues that are based on ASR output. Boundaries are identified using discontinuities in speech rate (pre-boundary lengthening and phrase-initial acceleration) and silent pauses. The resulting phrases preserve syntactic validity, exhibit pitch reset, and compare well with manual tagging of prosodic boundaries. Collectively, our findings support the notion of prosodic phrases that represent coherent patterns across textual and acoustic parameters.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0250969>

PNAS

PAPERS

WILLIAM B. LEVY & VICTORIA G. CALVERT – Communication consumes 35 times more energy than computation in the human cortex, but both costs are needed to predict synapse number

Darwinian evolution tends to produce energy-efficient outcomes. On the other hand, energy limits computation, be it neural and probabilistic or digital and logical. Taking a particular energy-efficient viewpoint, we define neural computation and make use of an energy-constrained computational function. This function can be optimized over a variable that is proportional to the number of synapses per neuron. This function also implies a specific distinction between adenosine triphosphate (ATP)-consuming processes, especially computation per se vs. the communication processes of action potentials and transmitter release. Thus, to apply this mathematical function requires an energy audit with a particular partitioning of energy consumption that differs from earlier work. The audit points out that, rather than the oft-quoted 20 W of glucose available to the human brain, the fraction partitioned to cortical computation is only 0.1 W of ATP [L. Sokoloff, *Handb. Physiol. Sect. I Neurophysiol.* 3, 1843–1864 (1960)] and [J. Sawada, D. S. Modha, “Synapse: Scalable energy-efficient neurosynaptic computing” in *Application of Concurrency to System Design (ACSD)* (2013), pp. 14–15]. On the other hand, long-distance communication costs are 35-fold greater, 3.5 W. Other findings include 1) a 10^8 -fold discrepancy between biological and lowest possible values of a neuron’s computational efficiency and 2) two predictions of N, the number of synaptic transmissions needed to fire a neuron (2,500 vs. 2,000).

<https://www.pnas.org/content/118/18/e2008173118.abstract?etoc>

MARTEN SCHEFFER et al – Loss of resilience preceded transformations of pre-Hispanic Pueblo societies

Climate extremes are thought to have triggered large-scale transformations of various ancient societies, but they rarely seem to be the sole cause. It has been hypothesized that slow internal developments often made societies less resilient over time, setting them up for collapse. Here, we provide quantitative evidence for this idea. We use annual-resolution time series of building activity to demonstrate that repeated dramatic transformations of Pueblo cultures in the pre-Hispanic US Southwest were preceded by signals of critical slowing down, a dynamic hallmark of fragility. Declining stability of the status quo is consistent with archaeological evidence for increasing violence and in some cases, increasing wealth inequality toward the end of these periods. Our work thus supports the view that the cumulative impact of gradual processes may make societies more vulnerable through time, elevating the likelihood that a perturbation will trigger a large-scale transformation that includes radically rejecting the status quo and seeking alternative pathways.

<https://www.pnas.org/content/118/18/e2024397118.abstract?etoc>

Science

PAPERS

SERGIO ALMÉCJA et al – Fossil apes and human evolution

Humans diverged from apes (chimpanzees, specifically) toward the end of the Miocene ~9.3 million to 6.5 million years ago. Understanding the origins of the human lineage (hominins) requires reconstructing the morphology, behavior, and environment of the chimpanzee-human last common ancestor. Modern hominoids (that is, humans and apes) share multiple features (for example, an orthograde body plan facilitating upright positional behaviors). However, the fossil record indicates that living hominoids constitute narrow representatives of an ancient radiation of more widely distributed, diverse species, none of which exhibit the entire suite of locomotor adaptations present in the extant relatives. Hence, some modern ape similarities might have evolved in parallel in response to similar selection pressures. Current evidence suggests that hominins originated in Africa from Miocene ape ancestors unlike any living species.

<https://science.sciencemag.org/content/372/6542/eabb4363>

BENJAMIN VERNOT et al with JOSÉ MARÍA BERMÚDEZ DE CASTRO & JANET KELSO – Unearthing Neanderthal population history using nuclear and mitochondrial DNA from cave sediments

Bones and teeth are important sources of Pleistocene hominin DNA, but are rarely recovered at archaeological sites. Mitochondrial DNA (mtDNA) has been retrieved from cave sediments but provides limited value for studying population relationships. We therefore developed methods for the enrichment and analysis of nuclear DNA from sediments and applied them to cave deposits in Western Europe and Southern Siberia dated to between 200,000 and 50,000 years ago. We detected a population replacement in Northern Spain about 100,000 years ago, which was accompanied by a turnover of

mtDNA. We also identified two radiation events in Neanderthal history during the early part of the late Pleistocene. Our work lays the ground for studying the population history of ancient hominins from trace amounts of nuclear DNA in sediments.
<https://science.sciencemag.org/content/372/6542/eabf1667>

Trends in Cognitive Sciences

PAPERS

JACQUELINE C. SNOW & JODY C. CULHAM – The Treachery of Images: How Realism Influences Brain and Behavior

Although the cognitive sciences aim to ultimately understand behavior and brain function in the real world, for historical and practical reasons, the field has relied heavily on artificial stimuli, typically pictures. We review a growing body of evidence that both behavior and brain function differ between image proxies and real, tangible objects. We also propose a new framework for immersive neuroscience to combine two approaches: (i) the traditional build-up approach of gradually combining simplified stimuli, tasks, and processes; and (ii) a newer tear-down approach that begins with reality and compelling simulations such as virtual reality to determine which elements critically affect behavior and brain processing.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(21\)00052-8](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(21)00052-8)

THOMAS O'ROURKE et al with CEDRIC BOECKX – Capturing the Effects of Domestication on Vocal Learning Complexity

Domesticated and vocal learning species can serve as informative model organisms for the reduction of reactive aggression and emergence of speech in our lineage. Amidst mounting evidence that domestication modifies vocal repertoires across different species, we focus on the domesticated Bengalese finch, which has a more complex song than the wild-type white-rumped munia. Our explanation for this effect revolves around the glutamate neurotransmitter system. Glutamate signaling (i) is implicated in birdsong learning, (ii) controls dopamine activity in neural circuits crucial for vocal learning, (iii) is disproportionately targeted in the evolution of domesticates, and (iv) regulates stress responses and aggressive behaviors attenuated under domestication. We propose that attenuated excitation of stress-related neural circuits potentiates vocal learning via altered dopaminergic signaling.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(21\)00066-8](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(21)00066-8)

C.O. BRAND, A. MESOUDI & P.E. SMALDINO – Analogy as a Catalyst for Cumulative Cultural Evolution

Analogies, broadly defined, map novel concepts onto familiar concepts, making them essential for perception, reasoning, and communication. We argue that analogy-building served a critical role in the evolution of cumulative culture by allowing humans to learn and transmit complex behavioural sequences that would otherwise be too cognitively demanding or opaque to acquire. The emergence of a protolanguage consisting of simple labels would have provided early humans with the cognitive tools to build explicit analogies and to communicate them to others. This focus on analogy-building can shed new light on the coevolution of cognition and culture and addresses recent calls for better integration of the field of cultural evolution with cognitive science.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(21\)00058-9](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(21)00058-9)

SAMI R. YOUSIF & FRANK C. KEIL – How We See Area and Why It Matters

A large and growing literature examines how we see the visual quantities of number, area, and density. The literature rests on an untested assumption: that our perception of area is veridical. Here, we discuss a systematic distortion of perceived area and its implications for quantity perception more broadly.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(21\)00092-9](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(21)00092-9)

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