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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 – Replacing the Membership Page on the Website

The new membership page is now live. If you wish to add a comment, just send me a few kind words about EAORC and I'll include them.

You can add a comment no matter how you receive the bulletin – first-hand by email every Sunday, by copied email, by ResearchGate notification, or any way you access the bulletin.

Many thanks in anticipation, and especial thanks to those who have already responded.

Martin

ACADEMIA.EDU – Australopithecus sediba Hand Demonstrates Mosaic Evolution

In Science 333, 1411-1417 (2011)

TRACY L. KIVELL et al with LEE R. BERGER – Australopithecus sediba Hand Demonstrates Mosaic Evolution of Locomotor and Manipulative Abilities

Hand bones from a single individual with a clear taxonomic affiliation are scarce in the hominin fossil record, which has hampered understanding the evolution of manipulative abilities in hominins. Here we describe and analyze a nearly complete wrist and hand of an adult female [Malapa Hominin 2 (MH2)] *Australopithecus sediba* from Malapa, South Africa (1.977 million years ago). The hand presents a suite of *Australopithecus*-like features, such as a strong flexor apparatus associated with arboreal locomotion, and *Homo*-like features, such as a long thumb and short fingers associated with precision gripping and possibly stone tool production. Comparisons to other fossil hominins suggest that there were at least two distinct hand morphotypes around the Plio-Pleistocene transition. The MH2 fossils suggest that *Au. sediba* may represent a basal condition associated with early stone tool use and production.

https://www.academia.edu/7701466/Australopithecus_sediba_Hand_Demonstrates_Mosaic_Evolution_of_Locomotor_and_Manipulative_Abilities

OTHER PUBLICATIONS – New Middle Pleistocene human lineage

In The Innovation 100130 (2021)

XIJUN NI et al with CHRIS STRINGER – Massive cranium from Harbin in northeastern China establishes a new Middle Pleistocene human lineage

It has recently become clear that several human lineages coexisted with *Homo sapiens* during the late Middle and Late Pleistocene. Here, we report an archaic human fossil that throws new light on debates concerning the diversification of the *Homo* genus and the origin of *H. sapiens*. The fossil was recovered in Harbin city in northeastern China, with a minimum uranium-series age of 146 ka. This cranium is one of the best preserved Middle Pleistocene human fossils. Its massive size, with a large cranial capacity (~1,420 mL) falling in the range of modern humans, is combined with a mosaic of primitive and derived characters. It differs from all the other named *Homo* species by presenting a combination of features, such as long and low cranial vault, a wide and low face, large and almost square orbits, gently curved but massively developed supraorbital torus, flat and low cheekbones with a shallow canine fossa, and a shallow palate with thick alveolar bone supporting very large molars. The excellent preservation of the Harbin cranium advances our understanding of several less-complete late Middle Pleistocene fossils from China, which have been interpreted as local evolutionary intermediates between the earlier species *Homo erectus* and later *H. sapiens*. Phylogenetic analyses based on parsimony criteria and Bayesian tip-dating suggest that the Harbin cranium and some other Middle Pleistocene human fossils from China, such as those from Dali and Xiahe, form a third East Asian lineage, which is a part of the sister group of the *H. sapiens* lineage. Our analyses of such morphologically distinctive archaic human lineages from Asia, Europe, and Africa suggest that the diversification of the *Homo* genus may have had a much deeper timescale than previously presumed. Sympatric isolation of small populations combined with stochastic long-distance dispersals is the best fitting biogeographical model for interpreting the evolution of the *Homo* genus.

[https://www.cell.com/the-innovation/fulltext/S2666-6758\(21\)00055-2](https://www.cell.com/the-innovation/fulltext/S2666-6758(21)00055-2)

NEWS

BREAKING SCIENCE – Bat Pups Babble Like Human Infants, Researchers Find

Babbling is a production milestone in infant speech development. Evidence for babbling in non-human mammals is scarce. In a new study, researchers from the Museum für Naturkunde at the Leibniz Institute for Evolution and Biodiversity Science, the Freie Universität Berlin and the Smithsonian Tropical Research Institute have recorded the vocalizations of greater sac-winged bat (*Saccopteryx bilineata*) pups in the wild and found clear evidence of babbling that was consistent with that seen in humans.

http://feedproxy.google.com/~r/BreakingScienceNews/~3/EOszBoam2CM/bat-babbling-09983.html?utm_source=feedburner&utm_medium=email

NATURE BRIEFING – Cuttlefish recall times and places

Cuttlefish can remember what, when and where information about specific things that happened — even in old age. Researchers taught six older common cuttlefish (*Sepia officinalis*) that a seafood snack in their tanks changed location depending on the time of day. The old cuttlefish learnt to associate the time and location just as well as six young cuttlefish did. “The pedestal upon which humans place themselves in terms of neurological abilities continues to crumble,” says biologist Malcolm Kennedy.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=1e580afba4&e=1db4b9a19b>

NATURE BRIEFING – Baby bats babble like human infants

Pups of the greater sac-winged bat develop their vocal skills by babbling in a similar way to human babies — a discovery that could help researchers to explore the underlying neuroscience of how mammals learn to communicate. Human infants babble to practise speech sounds, which require precise motor control over their voice boxes, research suggests. Young songbirds also babble, but there are very few other recorded examples of babbling behaviour among animals — the bat research is the first to identify baby babble produced by a mammal that isn't a primate.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=b4fb910916&e=1db4b9a19b>

SAPIENS – What indigenous languages reveal about bear genetics

New research on Indigenous language groups in British Columbia shows a relationship between geographical patterns in genetic variation in grizzly bears and words used to identify these bear populations.

<https://www.sapiens.org/biology/indigenous-people-grizzly-bears/>

SCIENCE DAILY – Building bonds between males leads to more offspring for chimpanzees

If you're a male chimp looking for love -- or offspring -- it pays to make friends with other males. A study examined why male chimpanzees form close relationships with each other, and found that male chimpanzees that build strong bonds with the alpha male of the group, or with a large network of other males, are more successful at siring offspring.

<https://www.sciencedaily.com/releases/2021/08/210817111436.htm>

SCIENCE DAILY – What if our history was written in our grammar?

Humans have been always on the move, creating a complex history of languages and cultural traditions dispersed over the globe. An international team has now traced families of related languages over more than 10,000 years by combining data from genetics, linguistics and musicology using novel digital methods. Their findings: grammar reflects best the common prehistory of a population and therefore mirrors genetics more than any other cultural feature.

<https://www.sciencedaily.com/releases/2021/08/210818153710.htm>

SCIENCE DAILY – Sounds and words are processed separately and simultaneously in the brain

After years of research, neuroscientists have discovered a new pathway in the human brain that processes the sounds of language. The findings suggest that auditory and speech processing occur in parallel, contradicting a long-held theory that the brain processed acoustic information then transformed it into linguistic information.

<https://www.sciencedaily.com/releases/2021/08/210818130509.htm>

SCIENCE DAILY – Evolution now accepted by majority of Americans

The level of public acceptance of evolution in the United States is now solidly above the halfway mark, according to a new study based on a series of national public opinion surveys conducted over the last 35 years.

<https://www.sciencedaily.com/releases/2021/08/210820111042.htm>

SCIENCE DAILY – A parent's genes can influence a child's educational success, inherited or not

A child's educational success depends on the genes that they haven't inherited from their parents, as well as the genes they have, according to a new study.

{Both nature and nurture are important, but parental nature affects parental nurture. So there is a need for non-parental nurture in terms of education. Nice to know we have been on the right track this last 3,000 years.}

<https://www.sciencedaily.com/releases/2021/08/210819125249.htm>

SCIENCE NEWS – ‘Mind blowing’: Grizzly bear DNA maps onto Indigenous language families

The bears and Indigenous humans of coastal British Columbia have more in common than meets the eye. The two have lived side by side for millennia in this densely forested region on the west coast of Canada. But it's the DNA that really stands out: A new analysis has found that the grizzlies here form three distinct genetic groups, and these groups align closely with the region's three Indigenous language families.

<https://www.sciencemag.org/news/2021/08/mind-blowing-grizzly-bear-dna-maps-indigenous-language-families>

SCIENCE NEWS – Baby bats babble, much like human infants

When Ahana Fernandez and her colleagues trek through the rainforests of Central America, they keep their ears tuned for an unusual sound: high-pitched, repetitive chirping and squeaking. The noises come from greater sac-winged bat pups (*Saccopteryx bilineata*). Though they sound nothing like the babbling of human babies, the animal behavior researcher and her colleagues at the Museum of Natural History (MNH) in Berlin suspected the two might have something in common.

<https://www.sciencemag.org/news/2021/08/baby-bats-babble-much-human-infants>

SOCIETY FOR SCIENCE – An Indigenous people in the Philippines have the most Denisovan DNA

Indigenous people known as the Ayta Magbukon get around 5 percent of their DNA from Denisovans, a new study finds.

<http://click.societyforscience-email.com/?qs=63e53fbcd2279b4aa1cee4ceba4478f32c51276077155804a9fc2a6330851ab9de07a7b3b87a22cb9182e69b04639f89482ecd4ab1a27a6b>

SOCIETY FOR SCIENCE – How the strange idea of 'statistical significance' was born

A mathematical ritual known as null hypothesis significance testing has led researchers astray since the 1950s.

<http://click.societyforscience-email.com/?qs=d8ba862bf5e0907b1a08dc61de985e238fbc80ea9240d74d723faf2921a75abe09eb7266184f54ccdd2fb7b1f88ed2e7291b228c29d83a33c2a6d4a2c277acf5>

SOCIETY FOR SCIENCE – Psychology has struggled for a century to make sense of the mind

Research into what makes us tick has been messy and contentious, but has led to intriguing insights.

<http://click.societyforscience-email.com/?qs=d8ba862bf5e0907b1a08dc61de985e238fbc80ea9240d74d723faf2921a75abe09eb7266184f54ccdd2fb7b1f88ed2e7291b228c29d83a33c2a6d4a2c277acf5>

PUBLICATIONS

American Journal of Physical Anthropology

PAPERS

DREW K. ENIGK et al with RICHARD W. WRANGHAM – Female-directed aggression by adolescent male chimpanzees primarily constitutes dominance striving, not sexual coercion

We analyzed 1771 copulations and 1812 instances of male-initiated aggression between adolescent males (aged nine through 14 years) and adult females across 21 years of observation of the Kanyawara chimpanzee community in Kibale National Park, Uganda.

Our test of the sexual coercion hypothesis revealed that adolescent males did not selectively target cycling females for aggression, nor did aggression against cycling females predict rates of copulation with those females. Our test of the social dominance hypothesis showed that males succeeded in dominating all adult females before, or soon after, dominating their first adult male. Additionally, we found that adolescent males dominated females approximately in the order of the females' own ranks, from the bottom to the top of the female hierarchy.

Our data illustrate that the establishment of social dominance was more important than sexual coercion in explaining patterns of adolescent male aggression toward females. In comparison, evidence for sexual coercion was clear and compelling in adult males. These findings highlight that the primary function of male-to-female aggression differs between adolescent and adult males.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24296>

QUYI JIANG et al – First direct evidence of conservative foraging ecology of early *Gigantopithecus blacki* (~2 Ma) in Guangxi, southern China

Gigantopithecus blacki, the largest hominoid known, is one of the representative Pleistocene mammals in southern China and northern Southeast Asia. Here we investigate the feeding ecology of *G. blacki* in its core habitat (Guangxi, Southern China) during the early Early Pleistocene, which was the early period in its evolution.

The isotopic data show Guangxi was characterized by closed C3 forest and humid climate in the early Early Pleistocene. Niche partitioning is found among *G. blacki*, *Sinomastodon*, *Ailuropoda* and *Stegodon*, the typical megafauna in South China in the early Early Pleistocene. This could be one of the important factors for them to co-exist until the Middle Pleistocene. Smallest isotopic variations of *G. blacki* are found compared with those of contemporary animals, indicating a conservative foraging ecology i.e., limited foraging area and/or narrow dietary flexibility. Furthermore, the more confined foraging ecology of *G. blacki* is also seen in comparison with fossil and extant large-bodied primates. However, the unique dietary pattern of *G. blacki* does not seem to have hindered its survival. The environment in Guangxi during the early Early Pleistocene offered the suitable conditions for *G. blacki* to become one of the typical species in the faunal assemblages.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24300>

Animal Behaviour and Cognition

PAPERS

KATHLEEN DUDZINSKI et al – Bottlenose Dolphin Calf Initiated Pectoral Fin Contact Exchanges with Mother, Other Kin, and Non-Kin

For dolphins, the strongest bond documented is typically that between a mother and her pre-weaned offspring, but outside of the maternal relationship, our knowledge of calf behavior is limited. We examined how 23 bottlenose dolphin (*Tursiops truncatus*) calves (11 females and 12 males from 9 matriline) initiated pectoral fin contact (PFC) exchanges with their mothers and kin ($n = 362$) versus with non-kin ($n = 950$). Calves initiated PFC exchanges with preferred partners (primarily their mothers) over individuals who were simply available to them. For calves with mothers as their only kin available, there was a difference in how they shared PFC with non-kin adults versus non-kin young. A calf was twice as likely to initiate PFC with an adult (mother or adult non-kin) as with another young dolphin. Male and female calves were different in how they initiated PFC with kin and non-kin, which supports previous research that identified a sex difference in calf behavior. These results support the observation that kin and non-kin dolphins share PFC differently. It is also likely that kin (mothers and calves, siblings, etc.) use other forms of contact to share information and potentially develop their relationships. Understanding all types of tactile contact would facilitate a more detailed understanding of how touch might be used by dolphins when relationships are established and maintained.

https://www.researchgate.net/publication/353810060_Bottlenose_Dolphin_Calf_Initiated_Pectoral_Fin_Contact_Exchanges_with_Mother_Other_Kin_and_Non-Kin

KATHRIN S KOPP et al with ROMAN M WITTIG & CATHERINE CROCKFORD – Small Mirrors Do the Trick: A Simple, but Effective Method to Study Mirror Self-Recognition in Chimpanzees

Mirror self-recognition (MSR) is considered an indicator of self-awareness. Standardized mirror tests reveal compelling evidence for MSR in a few non-human species, including all great apes. However, substantial inter-individual variation of MSR within species resulted in an ongoing methodological controversy, questioning the appropriateness of standard MSR tests for cross-species comparisons. Especially lack of motivation is discussed as one possible cause for false negative results. Here, we compare the spontaneous behavioral response of 47 zoo-housed chimpanzees (*Pan troglodytes*) to (i) standard body-sized, stationary mirrors and (ii) small, portable hand mirrors. We predicted that the monopolizability and maneuverability of small mirrors increase the chances of identifying MSR across a larger proportion of individuals. Chimpanzees both revealed a substantially higher frequency of general mirror-related behaviors and engaged in significantly more and longer behaviors specifically indicating MSR when provided with small mirrors compared to a large mirror. Handheld mirrors provide a more sensitive measure for MSR within and likely between primate species than the traditional large mirrors, and thereby are a potentially valuable tool for studying self-awareness across species.

https://www.researchgate.net/publication/345762801_Small_Mirrors_Do_the_Trick_A_Simple_but_Effective_Method_to_Study_Mirror_Self-Recognition_in_Chimpanzees

JOHANNA ECKERT et al with JOSEF CALL – The Ape Lottery: Chimpanzees Fail To Consider Spatial Information When Drawing Statistical Inferences

Humans and nonhuman great apes share a sense for intuitive statistics, making intuitive probability judgments based on proportional information. This ability is of tremendous importance, in particular for predicting the outcome of events using prior information and for inferring general regularities from limited numbers of observations. Already in infancy, humans functionally integrate intuitive statistics with other cognitive domains, rendering this type of reasoning a powerful tool to make rational decisions in a variety of contexts. Recent research suggests that chimpanzees are capable of one type of such cross-domain integration: The integration of statistical and social information. Here, we investigated whether apes can also integrate physical information into their statistical inferences. We tested 14 sanctuary-living chimpanzees in a new task setup consisting of two “gumball machine”-apparatuses that were filled with different combinations of preferred and non-preferred food items. In four test conditions, subjects decided which of two apparatuses they wanted to operate to receive a random sample, while we varied both the proportional composition of the food items as well as their spatial configuration above and below a barrier. To receive the more favorable sample, apes needed to integrate proportional and spatial information. Chimpanzees succeeded in conditions in which we provided them either with proportional information or spatial information, but they failed to correctly integrate both types of information when they were in conflict. Whether these limitations in chimpanzees' performance reflect true limits of cognitive competence or merely performance limitations due to accessory task demands is still an open question.

https://www.researchgate.net/publication/353814725_The_Ape_Lottery_Chimpanzees_Fail_To_Consider_Spatial_Information_When_Drawing_Statistical_Inferences

eLife

PAPERS

TAOYU WU & SHIHUI HAN – Neural mechanisms of modulations of empathy and altruism by beliefs of others' pain

Perceived cues signaling others' pain induce empathy which in turn motivates altruistic behavior toward those who appear suffering. This perception-emotion-behavior reactivity is the core of human altruism but does not always occur in real-life

situations. Here, by integrating behavioral and multimodal neuroimaging measures, we investigate neural mechanisms underlying modulations of empathy and altruistic behavior by beliefs of others' pain (BOP). We show evidence that lack of BOP reduces subjective estimation of others' painful feelings and decreases monetary donations to those who show pain expressions. Moreover, lack of BOP attenuates neural responses to their pain expressions within 200 ms after face onset and modulates neural responses to others' pain in the insular, post-central, and frontal cortices. Our findings suggest that BOP provide a cognitive basis of human empathy and altruism and unravel the intermediate neural mechanisms.

<https://elifesciences.org/articles/66043>

Frontiers in Neuroscience

PAPERS

PETER J. MARSHALL, TROY M. HOUSER & STACI M. WEISS – The Shared Origins of Embodiment and Development

As a domain of study centering on the nature of the body in the functioning of the individual organism, embodiment encompasses a diverse array of topics and questions. One useful organizing framework places embodiment as a bridge construct connecting three standpoints on the body: the form of the body, the body as actively engaged in and with the world, and the body as lived experience. Through connecting these standpoints, the construct of embodiment shows that they are not mutually exclusive: inherent in form is the capacity for engagement, and inherent in engagement is a lived perspective that confers agency and meaning. Here, we employ this framework to underscore the deep connections between embodiment and development. We begin with a discussion of the origins of multicellularity, highlighting how the evolution of bodies was the evolution of development itself. The evolution of the metazoan (animal) body is of particular interest, because most animals possess complex bodies with sensorimotor capacities for perceiving and acting that bring forth a particular sort of embodiment. However, we also emphasize that the thread of embodiment runs through all living things, which share an organizational property of self-determination that endows them with a specific kind of autonomy. This realization moves us away from a Cartesian machine metaphor and instead puts an emphasis on the lived perspective that arises from being embodied. This broad view of embodiment presents opportunities to transcend the boundaries of individual disciplines to create a novel integrative vision for the scientific study of development.

<https://www.frontiersin.org/articles/10.3389/fnsys.2021.726403/full>

MAX S. BENNETT – Five Breakthroughs: A First Approximation of Brain Evolution From Early Bilaterians to Humans

Retracing the evolutionary steps by which human brains evolved can offer insights into the underlying mechanisms of human brain function as well as the phylogenetic origin of various features of human behavior. To this end, this article presents a model for interpreting the physical and behavioral modifications throughout major milestones in human brain evolution. This model introduces the concept of a “breakthrough” as a useful tool for interpreting suites of brain modifications and the various adaptive behaviors these modifications enabled. This offers a unique view into the ordered steps by which human brains evolved and suggests several unique hypotheses on the mechanisms of human brain function.

<https://www.frontiersin.org/articles/10.3389/fnana.2021.693346/full>

Frontiers in Psychology

PAPERS

RÉMI TISON & PIERRE POIRIER – Active Inference and Cooperative Communication: An Ecological Alternative to the Alignment View

We present and contrast two accounts of cooperative communication, both based on Active Inference, a framework that unifies biological and cognitive processes. The mental alignment account, defended in Vasil et al., takes the function of cooperative communication to be the alignment of the interlocutor's mental states, and cooperative communicative behavior to be driven by an evolutionarily selected adaptive prior belief favoring the selection of action policies that promote such an alignment. We argue that the mental alignment account should be rejected because it neglects the action-oriented nature of cooperative communication, which skews its view of the dynamics of communicative interaction. We introduce our own conception of cooperative communication, inspired by a more radical ecological interpretation of the active inference framework. Cooperative communication, on our ecological conception, serves to guide and constrain the dynamics of the cooperative interaction via the construction and restructuring of shared fields of affordances, in order to reach the local goals of the joint actions in which episodes of cooperative communication are embedded. We argue that our ecological conception provides a better theoretical standpoint to account for the action-oriented nature of cooperative communication in the active inference framework.

{I may have this wrong, but I think Vasil et al argue that evolution favours cooperative behaviour, which in turn favours cooperative communication; in my terms it would be that cooperative communication – negotiation toward meaning – emerges from social and cultural cooperation, which is sustained by the fitness advantages it gives. T&P seem to be arguing that cooperative communication constrains cooperative behaviour – which is true, but only a side-effect of Vasil et al's model. I would say that cooperative communication is constrained by the meanings already shared, but that clearly does not preclude the negotiation toward new meanings. T&P do not seem to accommodate the full human capacity for novelty.}

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.708780/full>

ABBY CHOPOORIAN, YAKOV PICHKAR & NICOLE CREANZA – The Role of the Learner in the Cultural Evolution of Vocalizations

As a uniquely human behavior, language is crucial to our understanding of ourselves and of the world around us. Despite centuries of research into how languages have historically developed and how people learn them, fully understanding the origin and evolution of language remains an ongoing challenge. In parallel, researchers have studied the divergence of birdsong in vocal-learning songbirds to uncover broader patterns of cultural evolution. One approach to studying cultural change over time, adapted from biology, focuses on the transmission of socially learned traits, including language, in a population. By studying how learning and the distribution of cultural traits interact at the population level, we can better understand the processes that underlie cultural evolution. Here, we take a two-fold approach to understanding the cultural evolution of vocalizations, with a focus on the role of the learner in cultural transmission. First, we explore previous research on the evolution of social learning, focusing on recent progress regarding the origin and ongoing cultural evolution of both language and birdsong. We then use a spatially explicit population model to investigate the coevolution of culture and learning preferences, with the assumption that selection acts directly on cultural phenotypes and indirectly on learning preferences. Our results suggest that the spatial distribution of learned behaviors can cause unexpected evolutionary patterns of learning. We find that, intuitively, selection for rare cultural phenotypes can indirectly favor a novelty-biased learning strategy. In contrast, selection for common cultural phenotypes leads to cultural homogeneity; we find that there is no selective pressure on learning strategy without cultural variation. Thus, counterintuitively, selection for common cultural traits does not consistently favor conformity bias, and novelty bias can stably persist in this cultural context. We propose that the evolutionary dynamics of learning preferences and cultural biases can depend on the existing variation of learned behaviors, and that this interaction could be important to understanding the origin and evolution of cultural systems such as language and birdsong. Selection acting on learned behaviors may indirectly impose counterintuitive selective pressures on learning strategies, and understanding the cultural landscape is crucial to understanding how patterns of learning might change over time.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.667455/full>

XIAOMEI CHAO & YULIANG GU – Effects of Labor Values on Subjective Well-Being: The Mediating Role of Altruistic Tendencies

This study examined the mediating role of altruistic tendency in the association between labor values and subjective well-being (SWB). About 2,691 Chinese students (1,504 males and 1,187 females) completed the labor values scale (LVS), the Positive Affect and Negative Affect Scale, the Satisfaction With Life Scale, and the altruistic tendency scale. Results demonstrated that labor values were positively associated with life satisfaction and positive affect, while negatively with negative affect. The altruistic tendency was positively correlated with labor values, and positive affect, while negatively correlated with negative affect. Furthermore, altruistic tendency served as a mediator linking labor values and positive/negative affect. These results confirmed the relationship between labor values and SWB and revealed the mechanism of altruism tendency between the two.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.715179/full>

FRANK RÖDER et al – The Embodied Crossmodal Self Forms Language and Interaction: A Computational Cognitive Review

Human language is inherently embodied and grounded in sensorimotor representations of the self and the world around it. This suggests that the body schema and ideomotor action-effect associations play an important role in language understanding, language generation, and verbal/physical interaction with others. There are computational models that focus purely on non-verbal interaction between humans and robots, and there are computational models for dialog systems that focus only on verbal interaction. However, there is a lack of research that integrates these approaches. We hypothesize that the development of computational models of the self is very appropriate for considering joint verbal and physical interaction. Therefore, they provide the substantial potential to foster the psychological and cognitive understanding of language grounding, and they have significant potential to improve human-robot interaction methods and applications. This review is a first step toward developing models of the self that integrate verbal and non-verbal communication. To this end, we first analyze the relevant findings and mechanisms for language grounding in the psychological and cognitive literature on ideomotor theory. Second, we identify the existing computational methods that implement physical decision-making and verbal interaction. As a result, we outline how the current computational methods can be used to create advanced computational interaction models that integrate language grounding with body schemas and self-representations.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.716671/full>

RÉKA PETŐ, KATALIN OLÁH & ILDIKÓ KIRÁLY – Two-Year-Old Children Expect Native, but Not Foreign Speakers to Use the Same Tool for the Same Purpose

Previous research has already demonstrated that even very young children are sensitive to language cues and learn differently from native and foreign speaker models. A possible explanation for this phenomenon suggests that spoken language is a sign of someone's cultural background and in this sense demonstrates the person's culture specific knowledge. The aim of the present study was to investigate what children think about native and foreign speakers' behavior in a domain that is typically regulated by cultural norms (tool usage), specifically whether they expect group members to act alike or not. In a violation of expectation paradigm, two-year-old toddlers first watched a video on which a native and a foreign speaker

person used different tools for achieving the same goal. In the test phase a new native speaker model appeared and selected one of the previously seen tools for the same goal as it was used before. Results indicated that toddlers were surprised if the native speaker model had chosen the tool that had previously been used by the foreign speaker. In Experiment 2, the familiarization phase was exactly the same as in Experiment 1, but during the test phase, the model spoke a foreign language. Results, in this case, showed no significant differences between looking times. These experiments suggest that two-year-olds expect native (but not foreign) speakers to use the same tool for the same goals. As tool usage is a fundamental element of cultural knowledge, we propose that this pattern of results suggest that children expect native speakers to possess shared cultural knowledge at least in the domain of artifacts.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.675595/full>

Language Sciences

PAPERS

BERND HEINE & GUNTHER KALTENBÖCK – From clause to discourse marker: on the development of comment clauses

This paper proposes an alternative account for the development of comment clauses (e.g. I think, I mean, I admit), which differs from previous accounts centring on grammaticalization, pragmaticalization, or lexicalization. Based on the framework of Discourse Grammar and building on Heine et al. (2021a, b), it is argued that their development involves a stage of cooptation, whereby a text piece is transferred from the sentence level to the metatextual level of discourse processing thus acquiring new grammatical properties, viz. independence from the host clause in terms of meaning, syntax and prosody, metatextual function, and positional freedom. All these changes are hard to reconcile with grammaticalization. At the same time, however, grammaticalization does play a role in the process once cooptation has taken place, affecting mainly the internal form of coopted expressions.

<https://www.sciencedirect.com/science/article/pii/S0388000121000474>

Nature

NEWS

Baby bats babble like human infants

Repeated vocalizations could help young bats to practise the sounds they will need as adults.

<https://www.nature.com/articles/d41586-021-02258-3>

Clever orangutans invent nutcrackers from scratch

Chimpanzees are not the only great apes to develop tools without tutoring.

<https://www.nature.com/articles/d41586-021-02239-6>

Nature Human Behaviour

ARTICLES

TOMER D. ULLMAN – What are you talking about?

Figuring out the referent of a new word is a hard problem, yet children solve it early and often. A new model by Bohn et al. proposes that young children rationally combine different sources of information when learning language. This account precisely predicts and explains novel developmental findings, above and beyond competing proposals.

<https://www.nature.com/articles/s41562-021-01147-z>

PAPERS

MANUEL BOHN et al – How young children integrate information sources to infer the meaning of words

Before formal education begins, children typically acquire a vocabulary of thousands of words. This learning process requires the use of many different information sources in their social environment, including their current state of knowledge and the context in which they hear words used. How is this information integrated? We specify a developmental model according to which children consider information sources in an age-specific way and integrate them via Bayesian inference. This model accurately predicted 2–5-year-old children's word learning across a range of experimental conditions in which they had to integrate three information sources. Model comparison suggests that the central locus of development is an increased sensitivity to individual information sources, rather than changes in integration ability. This work presents a developmental theory of information integration during language learning and illustrates how formal models can be used to make a quantitative test of the predictive and explanatory power of competing theories.

<https://www.nature.com/articles/s41562-021-01145-1>

Nature Neuropsychopharmacology

PAPERS

YOONSEO ZOH, STEVE W. C. CHANG & MOLLY J. CROCKETT – The prefrontal cortex and (uniquely) human cooperation: a comparative perspective

Humans have an exceptional ability to cooperate relative to many other species. We review the neural mechanisms supporting human cooperation, focusing on the prefrontal cortex. One key feature of human social life is the prevalence of cooperative norms that guide social behavior and prescribe punishment for noncompliance. Taking a comparative approach, we consider shared and unique aspects of cooperative behaviors in humans relative to nonhuman primates, as well as divergences in brain structure that might support uniquely human aspects of cooperation. We highlight a medial prefrontal network common to nonhuman primates and humans supporting a foundational process in cooperative decision-making: valuing outcomes for oneself and others. This medial prefrontal network interacts with lateral prefrontal areas that are thought to represent cooperative norms and modulate value representations to guide behavior appropriate to the local social context. Finally, we propose that more recently evolved anterior regions of prefrontal cortex play a role in arbitrating between cooperative norms across social contexts, and suggest how future research might fruitfully examine the neural basis of norm arbitration.

<https://www.nature.com/articles/s41386-021-01092-5>

NAOMI P. FRIEDMAN & TREVOR W. ROBBINS – The role of prefrontal cortex in cognitive control and executive function

Concepts of cognitive control (CC) and executive function (EF) are defined in terms of their relationships with goal-directed behavior versus habits and controlled versus automatic processing, and related to the functions of the prefrontal cortex (PFC) and related regions and networks. A psychometric approach shows unity and diversity in CC constructs, with 3 components in the most commonly studied constructs: general or common CC and components specific to mental set shifting and working memory updating. These constructs are considered against the cellular and systems neurobiology of PFC and what is known of its functional neuroanatomical or network organization based on lesioning, neurochemical, and neuroimaging approaches across species. CC is also considered in the context of motivation, as “cool” and “hot” forms. Its Common CC component is shown to be distinct from general intelligence (g) and closely related to response inhibition. Impairments in CC are considered as possible causes of psychiatric symptoms and consequences of disorders. The relationships of CC with the general factor of psychopathology (p) and dimensional constructs such as impulsivity in large scale developmental and adult populations are considered, as well as implications for genetic studies and RDoC approaches to psychiatric classification.

<https://www.nature.com/articles/s41386-021-01132-0>

Nature Scientific Reports

PAPERS

OLGA A. WUDARCZYK et al – Robots facilitate human language production

Despite recent developments in integrating autonomous and human-like robots into many aspects of everyday life, social interactions with robots are still a challenge. Here, we focus on a central tool for social interaction: verbal communication. We assess the extent to which humans co-represent (simulate and predict) a robot’s verbal actions. During a joint picture naming task, participants took turns in naming objects together with a social robot (Pepper, Softbank Robotics). Previous findings using this task with human partners revealed internal simulations on behalf of the partner down to the level of selecting words from the mental lexicon, reflected in partner-elicited inhibitory effects on subsequent naming. Here, with the robot, the partner-elicited inhibitory effects were not observed. Instead, naming was facilitated, as revealed by faster naming of word categories co-named with the robot. This facilitation suggests that robots, unlike humans, are not simulated down to the level of lexical selection. Instead, a robot’s speaking appears to be simulated at the initial level of language production where the meaning of the verbal message is generated, resulting in facilitated language production due to conceptual priming. We conclude that robots facilitate core conceptualization processes when humans transform thoughts to language during speaking.

<https://www.nature.com/articles/s41598-021-95645-9>

GUANGHAO YOU et al – Child-directed speech is optimized for syntax-free semantic inference

The way infants learn language is a highly complex adaptive behavior. This behavior chiefly relies on the ability to extract information from the speech they hear and combine it with information from the external environment. Most theories assume that this ability critically hinges on the recognition of at least some syntactic structure. Here, we show that child-directed speech allows for semantic inference without relying on explicit structural information. We simulate the process of semantic inference with machine learning applied to large text collections of two different types of speech, child-directed speech versus adult-directed speech. Taking the core meaning of causality as a test case, we find that in child-directed speech causal meaning can be successfully inferred from simple co-occurrences of neighboring words. By contrast, semantic inference in adult-directed speech fundamentally requires additional access to syntactic structure. These results suggest that child-directed speech is ideally shaped for a learner who has not yet mastered syntactic structure.

<https://www.nature.com/articles/s41598-021-95392-x>

BENOÎT DE COURSON et al – Cultural diversity and wisdom of crowds are mutually beneficial and evolutionarily stable

The ability to learn from others (social learning) is often deemed a cause of human species success. But if social learning is indeed more efficient (whether less costly or more accurate) than individual learning, it raises the question of why would anyone engage in individual information seeking, which is a necessary condition for social learning's efficacy. We propose an evolutionary model solving this paradox, provided agents (i) aim not only at information quality but also vie for audience and prestige, and (ii) do not only value accuracy but also reward originality—allowing them to alleviate herding effects. We find that under some conditions (large enough success rate of informed agents and intermediate taste for popularity), both social learning's higher accuracy and the taste for original opinions are evolutionarily-stable, within a mutually beneficial division of labour-like equilibrium. When such conditions are not met, the system most often converges towards mutually detrimental equilibria.

<https://www.nature.com/articles/s41598-021-95914-7>

New Scientist

NEWS

Howler monkeys navigate using adaptable mental maps, just like humans

Black howler monkeys move through their environment using mental maps that they modify and adapt as the landscape changes – a skill previously seen only in humans.

<https://www.newscientist.com/article/2286901-howler-monkeys-navigate-using-adaptable-mental-maps-just-like-humans/#ixzz740br9aC1>

ARTICLES

MICHAEL MARSHALL – The other cradle of humanity: How Arabia shaped human evolution

New evidence reveals that Arabia was not a mere stopover for ancestral humans leaving Africa, but a lush homeland where they flourished and evolved.

<https://www.newscientist.com/article/mg25133480-700-the-other-cradle-of-humanity-how-arabia-shaped-human-evolution/#ixzz740cbrnIQ>

PLoS One

PAPERS

IVÁN G. TORRE ,ŁUKASZ DEBOWSKI ,ANTONI HERNÁNDEZ-FERNÁNDEZ – Can Menzerath's law be a criterion of complexity in communication?

Menzerath's law is a quantitative linguistic law which states that, on average, the longer is a linguistic construct, the shorter are its constituents. In contrast, Menzerath-Altmann's law (MAL) is a precise mathematical power-law-exponential formula which expresses the expected length of the linguistic construct conditioned on the number of its constituents. In this paper, we investigate the anatomy of MAL for constructs being word tokens and constituents being syllables, measuring its length in graphemes. First, we derive the exact form of MAL for texts generated by the memoryless source with three emitted symbols, which can be interpreted as a monkey typing model or a null model. We show that this null model complies with Menzerath's law, revealing that Menzerath's law itself can hardly be a criterion of complexity in communication. This observation does not apply to the more precise Menzerath-Altmann's law, which predicts an inverted regime for sufficiently range constructs, i.e., the longer is a word, the longer are its syllables. To support this claim, we analyze MAL on data from 21 languages, consisting of texts from the Standardized Project Gutenberg. We show the presence of the inverted regime, not exhibited by the null model, and we demonstrate robustness of our results. We also report the complicated distribution of syllable sizes with respect to their position in the word, which might be related with the emerging MAL. Altogether, our results indicate that Menzerath's law—in terms of correlations—is a spurious observation, while complex patterns and efficiency dynamics should be rather attributed to specific forms of Menzerath-Altmann's law.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0256133>

Proceedings of the Royal Society B

PAPERS

ALEXANDRA K. SCHNELL et al – Episodic-like memory is preserved with age in cuttlefish

Episodic memory, remembering past experiences based on unique what–where–when components, declines during ageing in humans, as does episodic-like memory in non-human mammals. By contrast, semantic memory, remembering learnt knowledge without recalling unique what–where–when features, remains relatively intact with advancing age. The age-related decline in episodic memory likely stems from the deteriorating function of the hippocampus in the brain. Whether episodic memory can deteriorate with age in species that lack a hippocampus is unknown. Cuttlefish are molluscs that lack a hippocampus. We test both semantic-like and episodic-like memory in sub-adults and aged-adults nearing senescence ($n = 6$ per cohort). In the semantic-like memory task, cuttlefish had to learn that the location of a food resource was dependent on the time of day. Performance, measured as proportion of correct trials, was comparable across age groups. In the episodic-like memory task, cuttlefish had to solve a foraging task by retrieving what–where–when information about a past event with unique spatio-temporal features. In this task, performance was comparable across age groups; however, aged-adults reached

the success criterion (8/10 correct choices in consecutive trials) significantly faster than sub-adults. Contrary to other animals, episodic-like memory is preserved in aged cuttlefish, suggesting that memory deterioration is delayed in this species.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2021.1052>

Science

NEWS

Baby bats babble, much like human infants

When Ahana Fernandez and her colleagues trek through the rainforests of Central America, they keep their ears tuned for an unusual sound: high-pitched, repetitive chirping and squeaking. The noises come from greater sac-winged bat pups (*Saccopteryx bilineata*). Though they sound nothing like the babbling of human babies, the animal behavior researcher and her colleagues at the Museum of Natural History (MNH) in Berlin suspected the two might have something in common.

<https://www.sciencemag.org/news/2021/08/baby-bats-babble-much-human-infants>

PAPERS

AHANA A. FERNANDEZ et al – Babbling in a vocal learning bat resembles human infant babbling

Babbling is a production milestone in infant speech development. Evidence for babbling in nonhuman mammals is scarce, which has prevented cross-species comparisons. In this study, we investigated the conspicuous babbling behavior of *Saccopteryx bilineata*, a bat capable of vocal production learning. We analyzed the babbling of 20 bat pups in the field during their 3-month ontogeny and compared its features to those that characterize babbling in human infants. Our findings demonstrate that babbling in bat pups is characterized by the same eight features as babbling in human infants, including the conspicuous features reduplication and rhythmicity. These parallels in vocal ontogeny between two mammalian species offer future possibilities for comparison of cognitive and neuromolecular mechanisms and adaptive functions of babbling in bats and humans.

<https://science.sciencemag.org/content/373/6557/923>

Science Advances

PAPERS

HIROMI MATSUMAE et al – Exploring correlations in genetic and cultural variation across language families in northeast Asia

Culture evolves in ways that are analogous to, but distinct from, genomes. Previous studies examined similarities between cultural variation and genetic variation (population history) at small scales within language families, but few studies have empirically investigated these parallels across language families using diverse cultural data. We report an analysis comparing culture and genomes from in and around northeast Asia spanning 11 language families. We extract and summarize the variation in language (grammar, phonology, lexicon), music (song structure, performance style), and genomes (genome-wide SNPs) and test for correlations. We find that grammatical structure correlates with population history (genetic history). Recent contact and shared descent fail to explain the signal, suggesting relationships that arose before the formation of current families. Our results suggest that grammar might be a cultural indicator of population history while also demonstrating differences among cultural and genetic relationships that highlight the complex nature of human history.

<https://advances.sciencemag.org/content/7/34/eabd9223>

Scientific American Mind

ARTICLES

JOHN HORGAN – What God, Quantum Mechanics and Consciousness Have in Common

Theories that try to explain these big metaphysical mysteries fall short, making agnosticism the only sensible stance.

{What they do NOT have in common is that: without an explanation of consciousness, awareness is still a thing; without evidence of quantum mechanics, the theories still map to actuality; god, not so much.}

http://links.email.scientificamerican.com/els/v2/j_mWC9v-

[9Wh8/akdCbmZGMmxhdDFtYnVWamxUL2ICNVBicEdNVThWMUhrWCsxVVJhR2NtR0dhaitlOTVjMXZsZjNTbXZxeTVxbDFEVIJIVkNsTjh1eUZlejBVYzg4alBrUTI5dEZCem4xTGRJTWZRZQUdDWkU9S0/](http://links.email.scientificamerican.com/els/v2/j_mWC9v-9Wh8/akdCbmZGMmxhdDFtYnVWamxUL2ICNVBicEdNVThWMUhrWCsxVVJhR2NtR0dhaitlOTVjMXZsZjNTbXZxeTVxbDFEVIJIVkNsTjh1eUZlejBVYzg4alBrUTI5dEZCem4xTGRJTWZRZQUdDWkU9S0/)

KATHERINE KORNEI – Made-Up Sounds Convey Meaning across Cultures

Newly created vocalizations can convey concepts remarkably well.

<http://links.email.scientificamerican.com/els/v2/->

[RWPCa7qaXH3/akdCbmZGMmxhdDFtYnVWamxUL2ICNVBicEdNVThWMUhrWCsxVVJhR2NtR0dhaitlOTVjMXZsZjNTbXZxeTVxbDFEVIJIVkNsTjh1eUZlejBVYzg4alBrUTI5dEZCem4xTGRJTWZRZQUdDWkU9S0/](http://links.email.scientificamerican.com/els/v2/-RWPCa7qaXH3/akdCbmZGMmxhdDFtYnVWamxUL2ICNVBicEdNVThWMUhrWCsxVVJhR2NtR0dhaitlOTVjMXZsZjNTbXZxeTVxbDFEVIJIVkNsTjh1eUZlejBVYzg4alBrUTI5dEZCem4xTGRJTWZRZQUdDWkU9S0/)

Trends in Cognitive Sciences

ARTICLES

PATRICK SHAFTO, JUNQI WANG & PEI WANG – Cooperative communication as belief transport

Recent research formalizes cooperative communication as belief transport using the mathematical theory of optimal transport. This formalization allows rigorous a priori analysis of the statistical and ecological properties of models of cooperative communication, unification of prior models and analysis of their differences, and promising directions for future research.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(21\)00182-0](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(21)00182-0)

PAPERS

HYOWON GWEON – Inferential social learning: cognitive foundations of human social learning and teaching

Social learning is often portrayed as a passive process of copying and trusting others. This view, however, does not fully capture what makes human social learning so powerful: social information is often 'curated' by helpful teachers. I argue that both learning from others (social learning) and helping others learn (teaching) can be characterized as probabilistic inferences guided by an intuitive understanding of how people think, plan, and act. Consistent with this idea, even young children draw rich inferences from evidence provided by others and generate informative evidence that helps others learn. By studying social learning and teaching through a common theoretical lens, inferential social learning provides an integrated account of how human cognition supports acquisition and communication of abstract knowledge.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(21\)00178-9](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(21)00178-9)

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