

EAORC BULLETIN 1,034 – 9 April 2023

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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, please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.

If there is a journal you feel I should be tracking on a regular basis, let me know.

And if you have any other ideas for extending the “EAORC experience”, please contact me.

EDITORIAL INTERJECTIONS

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

CONFERENCE ALERT – The Third AsiaEvo Conference on Evolutionary Biology

We are pleased to invite you to the 3rd AsiaEvo Conference, set to take place at the National University of Singapore, Singapore, 16-18 December 2023.

The AsiaEvo conference is a biennial event that seeks to promote evolutionary research by facilitating international collaboration, research, and education on evolutionary biology in Asia and beyond. At a time when many in the Northern Hemisphere are already shoveling snow, this exciting venue features warm tropical weather, tall skyscrapers, rich rainforests, and fantastic food. Singapore is also centrally located in Southeast Asia with inexpensive short flights to places like Bali, Phuket, and Angkor Wat.

We are open to registration and proposals for symposia. For more information, please navigate to: <https://phylorlf.org>

Some target dates:

Symposium Proposal Deadline has been extended to: 30 April 2023

Abstract Submission Deadline: 1 September 2023

Early Paid Registration Closes: 15 October 2023

Note that Symposia organizers can invite speakers for their symposium, but all speakers (and organizers) will need to cover their own travel costs (until sufficient sponsorships are raised, which we are trying to do).

Antónia Monteiro and Li Daiqin

Antonia Monteiro antonia.monteiro@nus.edu.sg

NEWS**JOHN TEMPLETON FOUNDATION – What Is Future-Mindedness?**

Future-mindedness, or prospection, is the ability to envision and think about the future. It's something that so many organisms do that it's been described as a core organizing principle of animal and human behavior. Countless animals use prospection to adapt their behavior to their environments, allowing them to improve their chances of finding food or a mate, and to avoid danger. It's also something humans seem to be especially good at: thinking about the future helps us make decisions, set and achieve goals, and cultivate cooperation and generosity.

{It seems to me that the genetically-controlled evolutionary mandates to survive and thrive have been conflated with the human capacity to model the self into future scenarios. Neither of these requires "prospection" except at a trivial level – they are both mechanisms for adjusting current behaviour to avoid undesirable outcomes. Like "mindfulness", "future-mindedness" seems to suffer from under-definition and over-promotion.}

<https://www.templeton.org/news/what-is-future-mindedness>

NATURE BRIEFING – Outsiders are best at solving problems

Researchers presented irresistible snacks to zoo residents, representing 13 species of hoofed animals, and found that goats and camels, especially those that were low in the pecking order, were best at getting the goods. Low-status animals were less afraid of new objects, more willing to explore them and more likely to get the prize. "If we want to have a comprehensive idea of how cognition evolves, we cannot always be testing the same species," says psychologist Álvaro Caicoya, who led the research.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=eb0daa745a&e=1db4b9a19b>

SAPIENS – What Ancient DNA Reveals About Life in Africa 20,000 Years Ago

Newly sequenced African aDNA shows dynamic ancient migratory patterns and interactions around the Later Stone Age that shaped human history.

<https://www.sapiens.org/archaeology/adna-africa-later-stone-age/>

SAPIENS – Ancient DNA Illuminates Pastoralism's Rise in Africa

A new study pieces together clues to the multistep process behind the origins of livestock herding in sub-Saharan Africa.

<https://www.sapiens.org/archaeology/pastoralism-ancient-dna-africa/>

SCIENCE.ORG NEWS – Ancient people lived among ruins too. What did they make of them?

Mesoamerican sites offer insights into how communities in the past viewed their own history.

<https://www.science.org/content/article/ancient-people-lived-among-ruins-too-what-did-they-make-them>

SCIENCE.ORG NEWS – Elephants may be domesticating themselves

Find would put pachyderms in a rare group that only includes humans and bonobos.

<https://www.science.org/content/article/elephants-may-be-domesticating-themselves>

SOCIETY FOR SCIENCE – Your brain wires itself to match your native language

MRI scans of nearly 100 native speakers of either German or Arabic revealed differences in how the language circuits of their brains are connected.

<https://www.sciencenews.org/article/brain-wires-native-language-neurons>

THE CONVERSATION – Bonobos and chimps: what our closest relatives tell us about humans

Chimpanzees have been the focus of primate research for decades. But their close cousins, the bonobos, can offer us important insights into human nature too.

<https://theconversationuk.cmail20.com/t/r-l-ttmlyhd-khhiliah-a/>

THE CONVERSATION – Archaeology shows how hunter-gatherers fitted into southern Africa’s first city

Hunter-gatherers were an important part of the development of the Mapungubwe Kingdom in southern Africa – a fact that history has tended to neglect.

<https://theconversationuk.cmail20.com/t/r-l-ttmlyhd-khhiliah-z/>

THE CONVERSATION – Life: modern physics can’t explain it – but our time-is-fundamental theory might

The key to understanding why life is not explainable in current physics may be to reconsider our notions of time and information.

<https://theconversation.com/life-modern-physics-cant-explain-it-but-our-new-theory-which-says-time-is-fundamental-might-203129>

THE CONVERSATION – Great Mysteries of Physics: is there a fundamental theory of life & consciousness?

Life may be using quantum mechanics to its advantage.

<https://theconversationuk.cmail20.com/t/r-l-ttdijk-khhiliah-x/>

PUBLICATIONS

Frontiers in Communication**PAPERS****OLIVIA FUGIKAWA et al – A computational analysis of crosslinguistic regularity in semantic change**

Semantic change is attested commonly in the historical development of lexicons across the world's languages. Extensive research has sought to characterize regularity in semantic change, but existing studies have typically relied on manual approaches or the analysis of a restricted set of languages. We present a large-scale computational analysis to explore regular patterns in word meaning change shared across many languages. We focus on two levels of analysis: (1) regularity in directionality, which we explore by inferring the historical direction of semantic change between a source meaning and a target meaning; (2) regularity in source-target mapping, which we explore by inferring the target meaning given a source meaning. We work with DatSemShift, the world's largest public database of semantic change that records thousands of meaning changes from over hundreds of languages. For directionality inference, we find that concreteness explains directionality in more than 70% of the attested cases of semantic change and is the strongest predictor among the alternatives including frequency and valence. For target inference, we find that a parallelogram-style analogy model based on contextual embeddings predicts the attested source-target mappings substantially better than chance and similarity-based models. Clustering the meaning pairs of semantic change reveals regular meaning shiftings between domains, such as body parts to geological formations. Our study provides an automated approach and large-scale evidence for multifaceted regularity in semantic change across languages.

<https://www.frontiersin.org/articles/10.3389/fcomm.2023.1136338/full>

Human Nature**PAPERS****VÁCLAV HRNČIŘ – The Use of Wooden Clubs and Throwing Sticks among Recent Foragers: Cross-Cultural Survey and Implications for Research on Prehistoric Weaponry**

There is a popular idea that archaic humans commonly used wooden clubs as their weapons. This is not based on archaeological finds, which are minimal from the Pleistocene, but rather on a few ethnographic analogies and the association of these weapons with simple technology. This article presents the first quantitative cross-cultural analysis of the use of wooden clubs and throwing sticks for hunting and violence among foragers. Using a sample of 57 recent hunting-gathering societies from the Standard Cross-Cultural Sample, it is shown that the majority used clubs for violence (86%) and/or hunting (74%). Whereas in hunting and fishing the club usually served only as a secondary tool, 33% of societies used the club as one of their main fighting weapons. The use of throwing sticks was less frequent among the societies surveyed (12% for violence, 14% for hunting). Based on these results and other evidence, it is argued that the use of clubs by early humans was highly probable, at least in the simplest form of a crude stick. The great variation in the forms and use of clubs and throwing sticks among recent hunter-gatherers, however, indicates that they are not standardized weapons and that similar variation may have existed in the past. Many such prehistoric weapons may therefore have been quite sophisticated, multifunctional, and carried strong symbolic meaning.

<https://link.springer.com/article/10.1007/s12110-023-09445-3>

KRISTOPHER M. SMITH, IBRAHIM A. MABULLA & COREN L. APICELLA – Hearing Prosocial Stories Increases Hadza Hunter-Gatherers’ Generosity in an Economic Game

Folk stories featuring prosocial content are ubiquitous across cultures. One explanation for the ubiquity of such stories is that stories teach people about the local socioecology, including norms of prosociality, and stories featuring prosocial content

may increase generosity in listeners. We tested this hypothesis in a sample of 185 Hadza hunter-gatherers. We read participants a story in which the main character either swims with another person (control story) or rescues him from drowning (prosocial story). After hearing the story, participants played a dictator game with dried meat sticks and then were given a recall test of facts presented in the story. There was moderate evidence for a small effect of the prosocial story: participants who heard the prosocial story gave an estimated 0.22 [90% HDI: -0.12–0.57] more meat sticks than those who heard the control story. However, the association between generosity and sex, marital status, and region of residence was stronger; men gave more than women, unmarried participants gave more than married participants, and participants living in a region with more exposure to markets gave more than participants living further from markets. There was no evidence that the prosocial story was more easily recalled than the control story. These results provide some support for the hypothesis that prosocial stories can increase prosociality in listeners, though the effect of hearing a single story is small.

<https://link.springer.com/article/10.1007/s12110-023-09444-4>

MADELON M.E. RIEM et al – Grandparental Support and Maternal Postpartum Mental Health: A Review and Meta-Analysis

Support from grandparents plays a role in mothers' perinatal mental health. However, previous research on maternal mental health has mainly focused on influences of partner support or general social support and neglected the roles of grandparents. In this narrative review and meta-analysis, the scientific evidence on the association between grandparental support and maternal perinatal mental health is reviewed. Searches in PubMed, EMBASE, MEDLINE, Scopus, and PsycINFO yielded 11 empirical studies on N = 3381 participants, reporting on 35 effect sizes. A multilevel approach to meta-analysis was applied to test the association between grandparental support and maternal mental health. The results showed a small, statistically significant association ($r = .16$; 95% CI: 0.09–0.25). A moderator test indicated that the association was stronger for studies reporting on support from the maternal grandmother in particular ($r = .23$; 95% CI: 0.06–0.29). Our findings suggest that involved grandparents, in particular mother's own mother, constitute a protective factor for the development of maternal postpartum mental health problems. These findings have clear implications for interventions. Future studies should examine whether stimulating high-quality support from grandparents is a fruitful avenue for enhancing maternal postpartum mental health.

<https://link.springer.com/article/10.1007/s12110-023-09440-8>

Mind & Language

PAPERS

MICHAEL DEIGAN – Don't trust Fodor's guide in Monte Carlo: Learning concepts by hypothesis testing without circularity

Fodor argued that learning a concept by hypothesis testing would involve an impossible circularity. I show that Fodor's argument implicitly relies on the assumption that actually ϕ -ing entails an ability to ϕ . But this assumption is false in cases of ϕ -ing by luck, and just such luck is involved in testing hypotheses with the kinds of generative random sampling methods that many cognitive scientists take our minds to use. Concepts thus can be learned by hypothesis testing without circularity, and it is plausible that this is how humans in fact acquire at least some of their concepts.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12366>

GABE DUPRE – Public language, private language, and subsymbolic theories of mind

Language has long been a problem-case for subsymbolic theories of mind. The reason for this is obvious: Language seems essentially symbolic. However, recent work has developed a potential solution to this problem, arguing that linguistic symbols are public objects which augment a fundamentally subsymbolic mind, rather than components of cognitive symbol-processing. I shall argue that this strategy cannot work, on the grounds that human language acquisition consists in projecting linguistic structure onto environmental entities, rather than extracting this structure from them.

<https://onlinelibrary.wiley.com/doi/full/10.1111/mila.12400>

HEATHER V. ADAIR & PETER CARRUTHERS – Pretend play: More imitative than imaginative

Pretense is generally thought to constitutively involve imagination. We argue that this is a mistake. Although pretense often involves imagination, it need not; nor is it a kind of imagination. The core nature of pretense is closer to imitation than it is to imagination, and likely shares some of its motivation with the former. Three main strands of argument are presented. One is from the best explanation of cross-cultural data. Another is from task-analysis of instances of pretend play. And the third concerns the different ways in which pretense (especially childhood pretense) and imagination impact one's evaluative/affective systems.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12417>

MANUEL GARCÍA-CARPINTERO – The semantics of fiction

The paper reviews proposals by Abell, Predelli, and others on the semantics of fiction, focusing on the discourse through which fictions are created. Predelli develops the radical fictionalism of former writers like Kripke and van Inwagen, according to which that discourse is contentless and does not express propositions. This paper offers reasons to doubt these claims. It

then explores realist proposals like Abell's in which singular terms in fictions refer to fictional characters, understood as socially created representational artifacts, and irrealist alternatives in which the discourse is fully meaningful even though those terms fail to refer.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12412>

National Geographic

ARTICLES

ANGELA SAINI – A man's world? Not according to biology or history.

For proof, we can look to the many matrilineal societies dotted all over the world. In some regions, these traditions may date back thousands of years.

<https://www.nationalgeographic.com/history/article/angela-saini-patriarchy-matriarchy-gender-equality>

Nature

ARTICLES

DOM BYRNE with CHANTAL PRAT – Understanding the difference between the mind and the brain (PODCAST)

Neuroscientist Chantel Prat is keen to understand why, despite a growing awareness of diversity and its importance, we still sometimes struggle to accept different perspectives.

<https://www.nature.com/articles/d41586-023-01017-w>

Nature Neuropsychopharmacology

PAPERS

HANA H. KUTLIKOVA et al – Testosterone eliminates strategic prosocial behavior through impacting choice consistency in healthy males

Humans are strategically more prosocial when their actions are being watched by others than when they act alone. Using a psychopharmacogenetic approach, we investigated the endocrinological and computational mechanisms of such audience-driven prosociality. One hundred and ninety-two male participants received either a single dose of testosterone (150 mg) or a placebo and performed a prosocial and self-benefitting reinforcement learning task. Crucially, the task was performed either in private or when being watched. Rival theories suggest that the hormone might either diminish or strengthen audience-dependent prosociality. We show that exogenous testosterone fully eliminated strategic, i.e., feigned, prosociality and thus decreased submission to audience expectations. We next performed reinforcement-learning drift-diffusion computational modeling to elucidate which latent aspects of decision-making testosterone acted on. The modeling revealed that testosterone compared to placebo did not deteriorate reinforcement learning per se. Rather, when being watched, the hormone altered the degree to which the learned information on choice value translated to action selection. Taken together, our study provides novel evidence of testosterone's effects on implicit reward processing, through which it counteracts conformity and deceptive reputation strategies.

<https://www.nature.com/articles/s41386-023-01570-y>

Nature Scientific Reports

PAPERS

JESS HOHENSTEIN et al – Artificial intelligence in communication impacts language and social relationships

Artificial intelligence (AI) is already widely used in daily communication, but despite concerns about AI's negative effects on society the social consequences of using it to communicate remain largely unexplored. We investigate the social consequences of one of the most pervasive AI applications, algorithmic response suggestions ("smart replies"), which are used to send billions of messages each day. Two randomized experiments provide evidence that these types of algorithmic recommender systems change how people interact with and perceive one another in both pro-social and anti-social ways. We find that using algorithmic responses changes language and social relationships. More specifically, it increases communication speed, use of positive emotional language, and conversation partners evaluate each other as closer and more cooperative. However, consistent with common assumptions about the adverse effects of AI, people are evaluated more negatively if they are suspected to be using algorithmic responses. Thus, even though AI can increase the speed of communication and improve interpersonal perceptions, the prevailing anti-social connotations of AI undermine these potential benefits if used overtly.

<https://www.nature.com/articles/s41598-023-30938-9>

YANSONG LI et al – Spillover effects of competition outcome on future risky cooperation

There is growing evidence that risky cooperation is regulated by the experience of previous interactions with others. However, it is unclear how the evaluation of outcomes from competitive interactions can affect individuals' subsequent cooperative behavior. To address this issue, we examined how participants cooperated with a partner having just competed with them. While competing, participants (N = 164) were randomly assigned to receive one of four types of outcome

feedback regarding their performance (victory vs. defeat vs. uncertain vs. no competition (control)). We found that both the experience of defeats and of uncertainty as competitive outcomes exerted a negative impact on the extent to which participants then engaged in cooperative behavior with their recent opponents. This only occurred when such subsequent cooperative behavior involved a high potential for incurring personal costs but not when there was no risk of incurring personal costs and a positive return. Finally, mediation analysis revealed that the effect of defeat was mediated by participants' level of interpersonal trust and the extent to which participants were willing to cooperate, while the effect of the uncertain competitive outcome was mediated only by the extent to which participants were willing to cooperate. These findings offer novel insights into how risky cooperation is modulated by previous competition.

<https://www.nature.com/articles/s41598-023-32523-6>

Neuron

PAPERS

ILEANA L. HANGANU-OPATZ et al – Resolving the prefrontal mechanisms of adaptive cognitive behaviors: A cross-species perspective

The prefrontal cortex (PFC) enables a staggering variety of complex behaviors, such as planning actions, solving problems, and adapting to new situations according to external information and internal states. These higher-order abilities, collectively defined as adaptive cognitive behavior, require cellular ensembles that coordinate the tradeoff between the stability and flexibility of neural representations. While the mechanisms underlying the function of cellular ensembles are still unclear, recent experimental and theoretical studies suggest that temporal coordination dynamically binds prefrontal neurons into functional ensembles. A so far largely separate stream of research has investigated the prefrontal efferent and afferent connectivity. These two research streams have recently converged on the hypothesis that prefrontal connectivity patterns influence ensemble formation and the function of neurons within ensembles. Here, we propose a unitary concept that, leveraging a cross-species definition of prefrontal regions, explains how prefrontal ensembles adaptively regulate and efficiently coordinate multiple processes in distinct cognitive behaviors.

[https://www.cell.com/neuron/fulltext/S0896-6273\(23\)00213-1](https://www.cell.com/neuron/fulltext/S0896-6273(23)00213-1)

New Scientist

NEWS

Wild African elephants may have domesticated themselves

African savannah elephants play, care for their young and show social behaviours associated with domestic animals, despite never being domesticated by humans.

<https://www.newscientist.com/article/2367325-wild-african-elephants-may-have-domesticated-themselves/>

PeerJ

PAPERS

YEVHEN KOSTIUK et al – Automatic detection of semantic primitives using optimization based on genetic algorithm

In this article, we propose a method for the automatic retrieval of a set of semantic primitive words from an explanatory dictionary and a novel evaluation procedure for the obtained set of primitives. The approach is based on the representation of the dictionary as a directed graph with a single-objective constrained optimization problem via a genetic algorithm with the PageRank scoring model. The problem is defined as a subset selection. The algorithm is fit to search for the sets of words that should fulfil several requirements: the cardinality of the set should not exceed empirically selected limits and the PageRank word importance score is minimized with cycle prevention thresholding. In the experiments, we used the WordNet dictionary for English. The proposed method is an improvement over the previous state-of-the-art solutions.

<https://peerj.com/articles/cs-1282/>

ANDREY ANIKIN – The honest sound of physical effort

Acoustic correlates of physical effort are still poorly understood, even though effort is vocally communicated in a variety of contexts with crucial fitness consequences, including both confrontational and reproductive social interactions. In this study 33 lay participants spoke during a brief, but intense isometric hold (L-sit), first without any voice-related instructions, and then asked either to conceal their effort or to imitate it without actually performing the exercise. Listeners in two perceptual experiments then rated 383 recordings on perceived level of effort (n = 39 listeners) or categorized them as relaxed speech, actual effort, pretended effort, or concealed effort (n = 102 listeners). As expected, vocal effort increased compared to baseline, but the accompanying acoustic changes (increased loudness, pitch, and tense voice quality) were under voluntary control, so that they could be largely suppressed or imitated at will. In contrast, vocal tremor at approximately 10 Hz was most pronounced under actual load, and its experimental addition to relaxed baseline recordings created the impression of concealed effort. In sum, a brief episode of intense physical effort causes pronounced vocal changes, some of which are difficult to control. Listeners can thus estimate the true level of exertion, whether to judge the condition of their opponent in a fight or to monitor a partner's investment into cooperative physical activities.

<https://peerj.com/articles/14944/>

Philosophical Transactions of the Royal Society B

PAPERS

ALEJANDRO V. CANO et al – Mutation bias and the predictability of evolution

Predicting evolutionary outcomes is an important research goal in a diversity of contexts. The focus of evolutionary forecasting is usually on adaptive processes, and efforts to improve prediction typically focus on selection. However, adaptive processes often rely on new mutations, which can be strongly influenced by predictable biases in mutation. Here, we provide an overview of existing theory and evidence for such mutation-biased adaptation and consider the implications of these results for the problem of prediction, in regard to topics such as the evolution of infectious diseases, resistance to biochemical agents, as well as cancer and other kinds of somatic evolution. We argue that empirical knowledge of mutational biases is likely to improve in the near future, and that this knowledge is readily applicable to the challenges of short-term prediction.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2022.0055>

JAMES S. HORTON, SHANI U. P. ALI & TIFFANY B. TAYLOR – Transient mutation bias increases the predictability of evolution on an empirical genotype–phenotype landscape

Predicting how a population will likely navigate a genotype–phenotype landscape requires consideration of selection in combination with mutation bias, which can skew the likelihood of following a particular trajectory. Strong and persistent directional selection can drive populations to ascend toward a peak. However, with a greater number of peaks and more routes to reach them, adaptation inevitably becomes less predictable. Transient mutation bias, which operates only on one mutational step, can influence landscape navigability by biasing the mutational trajectory early in the adaptive walk. This sets an evolving population upon a particular path, constraining the number of accessible routes and making certain peaks and routes more likely to be realized than others. In this work, we employ a model system to investigate whether such transient mutation bias can reliably and predictably place populations on a mutational trajectory to the strongest selective phenotype or usher populations to realize inferior phenotypic outcomes. For this we use motile mutants evolved from ancestrally non-motile variants of the microbe *Pseudomonas fluorescens* SBW25, of which one trajectory exhibits significant mutation bias. Using this system, we elucidate an empirical genotype–phenotype landscape, where the hill-climbing process represents increasing strength of the motility phenotype, to reveal that transient mutation bias can facilitate rapid and predictable ascension to the strongest observed phenotype in place of equivalent and inferior trajectories.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2022.0043>

SANDEEP VENKATARAM & SERGEY KRYAZHIMSKIY – Evolutionary repeatability of emergent properties of ecological communities

Most species belong to ecological communities where their interactions give rise to emergent community-level properties, such as diversity and productivity. Understanding and predicting how these properties change over time has been a major goal in ecology, with important practical implications for sustainability and human health. Less attention has been paid to the fact that community-level properties can also change because member species evolve. Yet, our ability to predict long-term eco-evolutionary dynamics hinges on how repeatably community-level properties change as a result of species evolution. Here, we review studies of evolution of both natural and experimental communities and make the case that community-level properties at least sometimes evolve repeatably. We discuss challenges faced in investigations of evolutionary repeatability. In particular, only a handful of studies enable us to quantify repeatability. We argue that quantifying repeatability at the community level is critical for approaching what we see as three major open questions in the field: (i) Is the observed degree of repeatability surprising? (ii) How is evolutionary repeatability at the community level related to repeatability at the level of traits of member species? (iii) What factors affect repeatability? We outline some theoretical and empirical approaches to addressing these questions. Advances in these directions will not only enrich our basic understanding of evolution and ecology but will also help us predict eco-evolutionary dynamics.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2022.0047>

PLoS Biology

PAPERS

YAQING SU et al – A deep hierarchy of predictions enables online meaning extraction in a computational model of human speech comprehension

This is an uncorrected proof.

Understanding speech requires mapping fleeting and often ambiguous soundwaves to meaning. While humans are known to exploit their capacity to contextualize to facilitate this process, how internal knowledge is deployed online remains an open question. Here, we present a model that extracts multiple levels of information from continuous speech online. The model applies linguistic and nonlinguistic knowledge to speech processing, by periodically generating top-down predictions and incorporating bottom-up incoming evidence in a nested temporal hierarchy. We show that a nonlinguistic context level provides semantic predictions informed by sensory inputs, which are crucial for disambiguating among multiple meanings of

the same word. The explicit knowledge hierarchy of the model enables a more holistic account of the neurophysiological responses to speech compared to using lexical predictions generated by a neural network language model (GPT-2). We also show that hierarchical predictions reduce peripheral processing via minimizing uncertainty and prediction error. With this proof-of-concept model, we demonstrate that the deployment of hierarchical predictions is a possible strategy for the brain to dynamically utilize structured knowledge and make sense of the speech input.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002046>

HUIHUI ZHANG & HUAN LUO – Feature-specific reactivations of past information shift current neural encoding thereby mediating serial bias behaviors

This is an uncorrected proof.

The regularities of the world render an intricate interplay between past and present. Even across independent trials, current-trial perception can be automatically shifted by preceding trials, namely the “serial bias.” Meanwhile, the neural implementation of the spontaneous shift of present by past that operates on multiple features remains unknown. In two auditory categorization experiments with human electrophysiological recordings, we demonstrate that serial bias arises from the co-occurrence of past-trial neural reactivation and the neural encoding of current-trial features. The meeting of past and present shifts the neural representation of current-trial features and modulates serial bias behavior. Critically, past-trial features (i.e., pitch, category choice, motor response) keep their respective identities in memory and are only reactivated by the corresponding features in the current trial, giving rise to dissociated feature-specific serial biases. The feature-specific automatic reactivation might constitute a fundamental mechanism for adaptive past-to-present generalizations over multiple features.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002056>

PLoS One

PAPERS

ANNE DELAGNES et al – Exploring the relative influence of raw materials, percussion techniques, and hominin skill levels on the diversity of the early Oldowan assemblages: Insights from the Shungura Formation, Lower Omo Valley, Ethiopia

The eastern African Oldowan has been documented in multiple raw material contexts and physical environments and displays considerable differences in terms of technological complexity. The relative influence of percussion techniques and raw material quality are central to debates concerning hominin skill levels as a potential driver of change during the period between 2.6 and 2 million-years (Ma). The early Oldowan assemblages from the Shungura Formation play a key role in these debates due to a number of distinctive features, including the small size of the artefacts and poorly controlled flaking. Here we mobilize quantified and replicable experimental data in order to (a) assess the significance of the bipolar technique in the Omo archaeological assemblages and (b) discriminate the respective impact of raw materials, technical choices and knapper skill levels on the unique character of these assemblages. By combining descriptive statistics with regression tree models, our analysis demonstrates knapper skill level to be of minimal importance in this context for the production of sharp-edged flakes. The absence of a link between skill and knapping success reflects the combined effect of raw material constraints, the frequent use of the bipolar technique, and relatively simple technical objectives. Our analysis confirms the key role played by local environmental conditions in the unique appearance of the Shungura assemblages, a relationship which has been frequently suggested but never demonstrated. Beyond the operational and sensorimotor skills considered in most studies, we suggest that the diversity of early Oldowan assemblages should be better sought in the cognitive abilities developed by early toolmakers as a response to landscape learning and use, two elements of early human evolution that remain largely unexplored.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0283250>

MONICA TAMARIZ et al – Context congruence: How associative learning modulates cultural evolution

The adoption of cultural variants by learners is affected by multiple factors including the prestige of the model and the value and frequency of different variants. However, little is known about what affects onward cultural transmission, or the choice of variants that models produce to pass on to new learners. This study investigated the effects on this choice of congruence between two contexts: the one in which variants are learned and the one in which they are later transmitted on. We hypothesized that when we are placed in a particular context, we will be more likely to produce (and therefore transmit) variants that we learned in that same (congruent) context. In particular, we tested the effect of a social contextual aspect—the relationship between model and learner. Our participants learned two methods to solve a puzzle, a variant from an “expert” (in an expert-to-novice context) and another one from a “peer” (in a peer-to-peer context). They were then asked to transmit one method onward, either to a “novice” (in a new expert-to-novice context) or to another “peer” (in a new peer-to-peer context). Participants were, overall, more likely to transmit the variant learned from an expert, evidencing an effect of by prestige bias. Crucially, in support of our hypothesis, they were also more likely to transmit the variant they had learned in the congruent context. Parameter estimation computer simulations of the experiment revealed that congruence bias was stronger than prestige bias.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0282776>

Proceedings of the Royal Society B

PAPERS

ALVARO L. CAICOYA et al – Innovation across 13 ungulate species: problem solvers are less integrated in the social group and less neophobic

Innovation is the ability to solve new problems or find novel solutions to familiar problems, and it is known to provide animals with crucial fitness benefits. Although this ability has been extensively studied in some taxa, the factors that predict innovation within and across species are still largely unclear. In this study, we used a novel foraging task to test 111 individuals belonging to 13 ungulate species—a still understudied taxon. To solve the task, individuals had to open transparent and opaque cups with food rewards, by removing their cover. We assessed whether individual factors (neophobia, social integration, sex, age, rank) and socio-ecological factors (dietary breadth, fission–fusion dynamics, domestication, group size) predicted participation and performance in the task. Using a phylogenetic approach, we showed that success was higher for less neophobic and socially less integrated individuals. Moreover, less neophobic individuals, individuals of domesticated species and having higher fission–fusion dynamics were more likely to participate in the task. These results are in line with recent literature suggesting a central role of sociality and personality traits to successfully deal with novel challenges, and confirm ungulates as a promising taxon to test evolutionary theories with a comparative approach.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2022.2384>

Royal Society Open Science

PAPERS

KRISTEN A. DUNFIELD et al – Helpers or halos: examining the evaluative mechanisms underlying selective prosociality

This research examines the proximate evaluative mechanisms underlying prosocial partner choice-based reciprocity. Across four studies we presented 855 university undergraduates (online for course credit) and 76 4- to 6-year-olds (offline at a university laboratory) with vignettes describing prosocial, social and non-social characters, and asked participants about their person preferences in prosocial, social and general contexts. Adults demonstrated sophisticated appraisals, coordinating between relevant trait and contextual cues to make selections. Adults were particularly attentive to prosocial cues in costly conditions, suggesting that they were using dispositional attributions to make their selections. By contrast, children were largely unable to integrate trait and contextual cues in determining their partner preferences, instead displaying valenced preferences for non-social cues, suggesting the use of affective tagging. Together, these studies demonstrate that the mechanisms underlying prosocial, partner choice-based reciprocity are not early emerging and stable but show considerable development over the lifespan.

<https://royalsocietypublishing.org/doi/10.1098/rsos.221188>

Trends in Cognitive Sciences

PAPERS

KATE C. MCLEAN, MONISHA PASUPATHI & MOIN SYED – Cognitive scripts and narrative identity are shaped by structures of power

Constructing a narrative identity involves developing an understanding of oneself as integrated through time and across contexts, a task critical to psychosocial development and functioning. However, research has primarily focused on the individual in isolation or in highly localized contexts. This is problematic because narrative identity is profoundly shaped by structures of power; thus, we cannot understand how individuals understand themselves through time, across contexts, and as a member of a particular community without attention to the structure of society. We propose a structural-psychological framework for the study of autobiographical memory, narrative, and context that examines how structures of power are maintained, and potentially changed, through the narration of autobiographical events, as guided by cognitive scripts, or master narratives.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00068-2](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00068-2)

NICHOLAS J. FENDINGER, PIA DIETZE & ERIC D. KNOWLES – Beyond cognitive deficits: how social class shapes social cognition

Lower social class is thought to contribute to poorer executive functioning and working memory. Nevertheless, lower social class individuals consistently outperform their higher-class counterparts on social cognitive tasks that rely on similar underlying cognitive processes (e.g., working memory and executive functioning). Why would lower social class inhibit such processes in one domain, but promote them in another? We argue that features of lower-class communities (e.g., resource scarcity) promote social cognition via cultural processes. We then argue that social cognition involves partially unique task and neural demands that are separate from nonsocial cognition. We conclude that unique task and neural demands, together with the distinctive cognitive proclivities of lower- and higher-class cultures, can explain variable associations between social class and cognitive functioning.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(23\)00066-9](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(23)00066-9)

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