

EAORC BULLETIN 1,210 – 23 August 2026

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NOTICES

FORMATTED VERSION OF THIS BULLETIN

A pdf formatted version of this Bulletin is available for download at martinedwardes.me.uk/eaorc/eaorc_bulletins.htm.

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, and doesn’t object to being called out on it.

ACADEMIA.EDU – A New Interpretation of the Animal Bridegroom Motif

Folklore: Electronic Journal of Folklore 99, 341-360 (2026)

CHRIS KNIGHT & HELENA TUŽINSKÁ – Moonstruck for a Fortnight: A New Interpretation of the Animal Bridegroom Motif

This article integrates structuralist methodology, evolutionary linguistics and recent developments in paleogenetics to reinterpret a wondertale, The Three Enchanted Princes. The narrative contrasts darkness with light, wilderness with cultivation and bloodthirsty animality with civilized human form, concluding by celebrating the transition to agriculture, purposeful property management and wedlock. The story’s solar and patriarchal stance frames moon-governed enchantment as a state of instability and chaos to be overcome by cultivation and daylight. By examining motifs of lunar periodicity, the study identifies a recurring but under-theorised narrative pattern in which it is the moon which lies behind the transformations. We argue that wondertales can be read through a time-resistant ritual-narrative syntax in which periodic enchantment mediates shifting structures of kinship, subsistence and temporal order, allowing earlier lunar logics to persist, often in marginal or demonised form, within later symbolic systems.

https://www.academia.edu/171899812/Moonstruck_for_a_Fortnight_A_New_Interpretation_of_the_Animal_Bridegroom_Motif

NEWS

JOHN TEMPLETON FOUNDATION – Summer Reading Series 2026: Part 5

Review of ‘Drunk: How We Sipped, Danced, and Stumbled Our Way to Civilization’ by Edward Slingerland; Little, Brown Spark (2022).

<https://www.templeton.org/news/summer-reading-series-2026-part-5>

JOHN TEMPLETON FOUNDATION – Can the Rocks Cry Out?

Why scientists increasingly believe mind is embedded in matter.

<https://www.templeton.org/news/can-the-rocks-cry-out>

NATURE BRIEFING – Did Neanderthals roam as far as Arabia?

An analysis of stone tools thought to have been crafted by Neanderthals suggests that the ancient humans might have roamed as far south as the Arabian Peninsula around 55,000 years ago. The artifacts come from a site beside an ancient lake in what is now Saudi Arabia's Nefud Desert. The characteristics of the tools, and efforts to date the sand of the site, suggest that Neanderthals might have lived there just as the area was shifting from desert to a wetter environment — which could have drawn animals, and the humans who hunted them, further south.

<https://www.livescience.com/archaeology/neanderthals/neanderthals-may-have-treked-through-the-saudi-arabian-desert-55-000-years-ago-farther-south-than-experts-thought-possible>

NATURE BRIEFING – Dolphins learn to shell from their mothers

Researchers have recorded what appears to be an Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) mother giving its calf a lesson in a hunting technique called shelling. The seldom-observed behaviour involves the dolphin catching a fish in an empty sea snail shell, lifting the shell out of the water and shaking it to drop the fish into its mouth. The team spotted an adult female surfacing with a shell containing a fish, and a calf lifting the same shell a few minutes later, which suggests that it was learning from watching its mother, they say.

<https://www.earth.com/animals/rare-footage-shows-dolphins-using-empty-seashells-as-tools-to-catch-fish-a-skill-called-shelling/>

NEWS FROM SCIENCE – Were these ancient rock images painted with human blood?

Macabre ingredient may have helped murals on Chinese cliffs survive nearly 2000 years of weathering.

<https://www.science.org/content/article/were-these-ancient-rock-images-painted-human-blood>

THE CONVERSATION – Were Denisovans tall compared to other ancient humans? We should be sceptical

Two Denisovan leg bones from Taiwan came from tall individuals. But we can't generalise to a whole species just yet.

<https://theconversation.com/were-denisovans-tall-compared-to-other-ancient-humans-we-should-be-sceptical-290002>

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

AYANA TANAKA et al – Reframing Mother–Child Closeness and Cooperative Caregiving: A Comparative Study of Two Hunter-Gatherer Populations

Caregiving during early childhood emerges from a dynamic interplay between maternal and allomaternal contributions. This study aimed to challenge polarized portrayals of hunter-gatherer childcare as either “mother-centered” or “cooperative” and provide empirical evidence for an integrative cross-cultural approach.

We compared caregiving structures in two hunter-gatherer populations positioned at contrasting ends of a continuum of child-rearing strategies: the !Xun in southern Africa, portrayed as emphasizing mother–child closeness, and the Baka in central Africa, described as exemplifying cooperative caregiving. Over 500 h of caregiving interactions involving 40 children (1–59 months) were recorded using a standardized focal-follow protocol with 30-s interval coding. Rates of maternal, allomaternal, and peer-based caregiving behaviors were analyzed using generalized additive mixed models.

Maternal holding did not differ between the !Xun and the Baka, underscoring the central role of mothers during infancy. However, breastfeeding was less frequent among the !Xun than among the Baka. Allomaternal holding was less frequent among the !Xun than among the Baka. When focusing on child and adolescent allomaternal caregivers, child-holding was more frequent among the !Xun than among the Baka during a period that included the likely !Xun weaning period. Care by young allomaternal caregivers may have played a supportive role during the earlier weaning period associated with sedentarization.

Human caregiving systems should not be understood as either “mother-centered” or “cooperative”. Rather, they should be understood as flexible combinations of interrelated components—including maternal, allomaternal, and peer-based care—shaped by ecological, social, and developmental factors.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.70345>

Current Biology

ARTICLES

CELL PRESS COMMUNICATIONS TEAM – Spontaneous and voluntary laughter come from two different brain regions

Laughter is a universal social signal that connects us with others, but the brain regions underlying laughter are not well understood, in part because it's difficult to elicit genuine laughter in the lab.

In a review published on June 23, 2026 in the Cell Press journal Trends in Neurosciences and covered in the news outlets Vice, Science & Vie, US News & World Reports, researchers analyze reports from medical procedures in which the brain is electrically stimulated in awake patients. Laughter can be an unintentional byproduct of these stimulations, allowing scientists to pinpoint laughter-evoking brain areas. By examining these reports and other clinical and animal studies, the authors describe two distinct networks in the brain for laughter: one that elicits spontaneous outbursts, and another that produces voluntary, conversational laughter.

<https://www.cell.com/news-do/pr-spontaneous-voluntary-laughter-brain-regions>

PAPERS

MOR TAUB et al with INBAL ARNON – The challenge of decoding animal communication using AI

Understanding animal communication requires identifying how signals map onto meaning in the receiver's perceptual space, yet most studies rely on clustering signals by physical similarity. It is tempting to assume that the physical and the perceptual spaces are highly correlated, but this may not be the case. We exemplify this by examining a form of communication for which we do have some access to the perceptual space — the communication of pre-linguistic human toddlers directed towards adult humans. We use a small data set of vocalizations recorded in three different semantic contexts which could be described as: (1) distress calls; (2) contact calls with a specific recipient (father or mother); or (3) begging calls (emitted in expectation of feeding). Our results show that acoustic similarity does not necessarily correlate with the receiver's perceptual space.

[https://www.cell.com/current-biology/abstract/S0960-9822\(26\)00810-9](https://www.cell.com/current-biology/abstract/S0960-9822(26)00810-9)

PHILIPP KANIS et al with SVANTE PÄÄBO – Increased signaling of the Neanderthal growth hormone receptor

Neanderthals had a robust build and distinctive skeletal features. The hypothalamic-pituitary-somatotropic (HPS) axis, with growth hormone (GH) as a central signaling molecule, plays a crucial role in regulating skeletal development. To explore whether Neanderthal-specific genetic variations in the HPS axis contributed to their physical robustness, we examined genes encoding the relevant receptors and hormones. We find that the Neanderthal growth hormone receptor (GHR) carried two amino acid changes and one deletion. When the Neanderthal GHR is expressed in a GH-dependent cell line, the cells proliferate faster than cells expressing the modern human GHR when stimulated by pituitary GH but not by placental GH. We also show that some present-day humans have inherited the gene encoding the Neanderthal GHR. These individuals tend to have more muscle mass and exhibit some craniofacial traits reminiscent of Neanderthals. Thus, aspects of Neanderthal anatomy live on in people today.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(26\)00890-0](https://www.cell.com/current-biology/fulltext/S0960-9822(26)00890-0)

eLife

ARTICLES

BINXU WANG – Visual Categorization: How monkeys carve up the visual world

Monkeys generalize many visual categorization rules, such as animate versus inanimate, but fail on culturally defined ones, placing their behavior closer to networks trained on images alone than to humans.

<https://elifesciences.org/articles/112456>

Evolutionary Human Sciences

PAPERS

FRANCESCO D'ERRICO, IVAN COLAGÈ & LLOYD COURTENAY – The impact of climate change on the evolution of cultural transmission strategies in the human lineage

Accepted Manuscripts are early, peer-reviewed versions that have not yet been copyedited, typeset, or formally published and may not meet all accessibility standards. A fully formatted accessible version will follow.

To investigate whether climate influenced the evolution of cultural transmission in the hominin lineage, we compared transmission strategies associated with archaeological innovations dated between 3.3 Ma and 6 ka to high-resolution paleoclimate records. Transmission was assessed across three dimensions: spatial (proximity between learner and model), temporal (degree of modularity or sequencing), and social (selectivity in knowledge transfer). Results show that transmission modes correlate with long-term climatic phases, not with the rate of climatic variability. Within a long-term trend toward increasingly complex transmission, globally cooler phases favoured low-investment, observation-based strategies, whereas globally warmer phases promoted structured, explanation-based, and modular transmission. The strongest association between modes of cultural transmission and climate occurs between 500–200 ka, followed by progressive decoupling, particularly after 50 ka, when cultural transmission increasingly follows its own dynamics.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/impact-of-climate-change-on-the-evolution-of-cultural-transmission-strategies-in-the-human-lineage/ED9B4BDC08109E6D56073316B936EC69>

JONATHAN R. GOODMAN – How the social brain hypothesis undermines hereditarianism

Accepted Manuscripts are early, peer-reviewed versions that have not yet been copyedited, typeset, or formally published and may not meet all accessibility standards. A fully formatted accessible version will follow.

Hereditarianism is a pseudoscientific view relying on the assumption that varying environmental forces selected for intelligence differentially on ancestral populations. As human groups migrated to different areas worldwide, hereditarians argue, novel ecological pressures necessitated different degrees of innovation. Hereditarians use a mixture of genome-wide association studies, intelligence quotient metrics, and arguments stemming from evolutionary psychology to defend these positions. Yet despite evidence from population genetics refuting hereditarianism, these authors also fail to engage effectively with the social sciences. Specifically, hereditarians consistently ignore or misrepresent the social brain hypothesis, which proposes that sociality – and specifically, pressures to cooperate or compete in different circumstances with conspecifics – was the primary selective pressure for cultural innovation, brain size, and different forms of human intelligence more broadly. The purpose of this article is to evaluate hereditarianism from the views of human behavioural ecology, cultural evolutionary studies, and current understanding of the relationship between forms of capital and reproductive success to show that arguments for hereditarianism are poor and wilfully ignore established research in the social sciences. The pressure to succeed socially drives innovation, and refusal to confront this reality leads hereditarians to make both wrong and unethical claims about human nature.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/how-the-social-brain-hypothesis-undermines-hereditarianism/676DB4A3CC09116E9994FE3E0D96A39E>

Frontiers in Developmental Psychology

PAPERS

HA NA YOO & HYUN-JOO SONG – Infants' expectations about resource distributions in a sharing situation

Although previous research has provided converging evidence showing that infants detect violations of fair resource allocation, most studies have focused mainly on a context in which a distributor allocates resources to two other individuals. The current study investigated infants' expectations of distributive fairness in a SHARING situation using violation-of-expectation paradigms. In Experiment 1, we examined whether 14–19-month-olds expect an individual to share their resources with another individual equally (sharing half of the resources) or unequally (sharing 1 out of 6). The Control condition was conducted to examine whether infants simply expected perceptual symmetry in allocated resources. The results showed that infants looked reliably longer at the unequal event than the equal event, suggesting that they detect violation of the equality norm in the context of sharing. In addition, the result from the control condition ruled out the possibility that infants merely reacted to the perceptual aspect. In Experiment 2, we investigated whether infants differentiate an unequal but altruistic sharing (giving 5 out of 6 to the recipient) from equal sharing. Infants' looking times did not differ in the two events, unlike in Experiment 1, indicating that infants may differentiate between selfish and selfless sharing. The current study demonstrated that infants in their second year may recognize unequal and selfish sharing as a violation of distributive norms, suggesting an emerging sensitivity to distributive fairness and the developmental foundations of prosocial evaluation and actions.

<https://www.frontiersin.org/journals/developmental-psychology/articles/10.3389/fdpys.2026.1800452/full>

Frontiers in Public Health

PAPERS

ORLY SARID – Volunteerism as a multidimensional form of human prosocial engagement

Volunteerism is widely recognized as an important contributor to public health, community resilience, and social cohesion, yet its conceptualization remains fragmented across disciplines. Existing research has advanced understanding of volunteer motivations, identity processes, wellbeing outcomes, and organizational influences, but these perspectives are typically examined separately rather than integrated within a common framework. This paper proposes a multidimensional framework that conceptualizes volunteerism as a form of prosocial behaviors defined by seven dimensions: motivational basis (D1), personal cost (D2), social embeddedness (D3), identity integration (D4), moral commitment (D5), meaning (D6), and psychological consequence (D7). The dimensions are conceptualized as distinct but correlated, with forms of helping characterized by their profiles across all seven. The framework distinguishes volunteerism from altruism by treating volunteerism as a behavioral form of helping that may arise from diverse motivations, whereas altruism is conceptualized as one possible motivational orientation. Drawing on research from public health, psychology, sociology, and moral cognition, the paper situates informal helping, structured volunteering, and high-cost helping within a single multidimensional space. Attention is given to the conditions under which volunteering is associated with wellbeing, resilience, social connectedness, and purpose, as well as to circumstances in which emotionally demanding or poorly supported roles may contribute to compassion fatigue, emotional exhaustion, and burnout. The framework advances a prospectively testable, configural account of high-cost helping, proposing that such acts are characterized by the joint elevation of personal cost, moral

commitment, identity integration, and meaning, together with low anticipated reward. Five propositions and a corresponding measurement program are specified to guide empirical evaluation. By integrating motivations, costs, meanings, contexts, and consequences within a single model, the framework provides a foundation for future research and informs public-health and organizational strategies aimed at supporting both community benefit and volunteer wellbeing.

<https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2026.1908108/full>

iScience

PAPERS

ALICIA P. MELIS et al – Chimpanzees follow human pointing when attention is engaged

Pointing is central to human communication and cooperative information sharing. By 12–14 months, infants understand adults' helpful communicative intentions when they point to the location of a hidden toy. In contrast, decades of ape pointing studies have yielded negative results, leading to the influential claim that chimpanzees do not understand cooperative communicative intentions. We test an alternative account proposing that limitations in attentional engagement, rather than socio-cognitive competence, constrain chimpanzees' performance in pointing tasks. Chimpanzees (N = 9) successfully used cooperative pointing to locate hidden food when ostensive name-calling and species-typical food vocalizations accompanied the gesture but failed in a closely matched condition lacking attention-grabbing auditory cues. These results are in line with the hypothesis that chimpanzees understand cooperative communicative intentions and suggest that the field may have misdiagnosed the source of prior failures, as insufficient attentional engagement, rather than absent socio-cognitive competence, may be the key limiting factor.

[https://www.cell.com/iscience/fulltext/S2589-0042\(26\)02573-3](https://www.cell.com/iscience/fulltext/S2589-0042(26)02573-3)

Mind & Language

PAPERS

MACIEJ TARNOWSKI – Non-assertoric Moorean speech acts

This paper offers a unified account of Moorean speech acts beyond assertion. While the knowledge norm of assertion provides a familiar explanation of Moorean assertions, it does not generalize easily to non-assertoric cases. I argue that Stalnaker's model of common ground provides a suitable framework for explaining these phenomena. Speech acts propose updates to the common ground, understood as targeting common knowledge, involving both their satisfaction and sincerity conditions, and Moorean speech acts universally generate incompatible update proposals. The resulting account applies across speech act categories and explains characteristic patterns of conversational coordination and presupposition.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.70062>

Nature Communications

PAPERS

ITAMAR JALON et al – Music evokes shared neural representations of imagined narratives across sensory modalities

The human capacity to construct and share subjective experiences from diverse sensory inputs is central to human cognition, and is vividly exemplified through music listening. Direct, focused music perception has been extensively studied while free, imaginative listening, typical of real-world engagement with music, has not. Here, we identify shared neural representations for imaginings evoked by matched excerpts of music and speech across listeners. Twenty participants freely imagine stories while listening to ten music excerpts in an fMRI scanner, then recount their imaginings. Stories for each excerpt are highly similar between listeners. Stimulus-specific spatial patterns are observed in auditory regions for music perception, speech perception, and music report. Triple pattern similarity across all conditions reveals unique spatial patterns in default mode, language, and association regions. These findings demonstrate that music elicits detectable, modality-general brain representations specific to particular excerpts, pointing to a shared neural basis for meaning-making across diverse sensory inputs.

<https://www.nature.com/articles/s41467-026-76452-0>

Nature Human Behaviour

PAPERS

ERNST FEHR & KEYU WU – An agenda for real-world fairness research to inform policy and organizations

Fairness concerns shape how people judge wages, institutions, taxes, transfers and social conflict. Decades of research show that people care not only about their own outcomes but also about how outcomes are distributed across others. The key question is now how these concerns operate outside simple laboratory settings, in real social and institutional environments. We argue that fairness concerns are shaped by comparison groups, beliefs about what outcomes are deserved, social norms, early-life experience and the institutions that make some comparisons more visible than others. This means that policies and organizations do not merely respond to fairness preferences; they can also activate, redirect and reshape them. Progress requires methods that connect experiments with field data, institutional variation and richer measures of how people

evaluate whole income distributions. Such work can improve the design of workplaces, welfare policies and public institutions that are both effective and seen as legitimate.

<https://www.nature.com/articles/s41562-026-02557-7>

Nature Reviews Psychology

PAPERS

KRISTIN LAURIN – Approaches to differentiating the dimensions of social class

The concept of social class is not new: for centuries, people have recognized their own and others' positions in a hierarchy based on their relative access to material, social and cultural capital. However, this concept caught psychologists' sustained interest only three decades ago, and conflicting findings have emerged. These contradictions might reflect the fact that there are multiple forms of social class, meaning that different measures of social class might not be interchangeable. For example, the psychological consequences of working a high-paying job might have little to do with the psychological consequences of coming from a family in which most people have university degrees. In this Review, I examine three fault lines scholars have noted in the construct of social class: subjective versus objective, rank versus culture, and adult (current) versus childhood. Each of these approaches has yielded important insights. At the same time, there is conceptual overlap between these contrasts, and more research is needed to systematically distinguish among them.

<https://www.nature.com/articles/s44159-026-00598-3>

New Scientist

ARTICLES

MICHAEL LEPAGE – DNA reveals a society organised around women in pre-Roman Britain

Clans in north-east England were organised around maternal lineage prior to the Roman conquest of Britain, a study of more than 500 Iron Age individuals suggests.

<https://www.newscientist.com/article/2584364-dna-reveals-a-society-organised-around-women-in-pre-roman-britain/>

PeerJ

PAPERS

ANDREAS WARTEL et al with CLAUDIO TENNIE – Structure without semantics: no evidence for bonobo compositionality in Berthet et al. (2025)

Understanding the evolutionary origins of combinatorial communication has motivated studies that analyse the semantic capacities of great ape vocal repertoires. A prominent example is the study by Berthet et al. (2025), which used Multiple Correspondence Analysis (MCA) on a large multidimensional dataset of bonobo calls and concluded that certain call combinations exhibit compositional meaning. We applied the published analytical pipeline to randomized datasets lacking any genuine association between call types and contextual features. Depending on implementation choices, the procedure identified significant relationships in 34.5–84.3% of simulations, suggesting substantial inflation of false-positive results. We therefore re-examined the statistical assumptions underlying the analysis itself. Because the MCA was constructed from repeated measures and uneven sampling across call types, its geometry reflects sampling frequencies and hierarchical dependencies in addition to any semantic structure. As such, any subsequent linear modelling of distances within this fixed space further violates assumptions of independence. We introduced a full permutation test in which a weighted MCA is recomputed under random reassignment of call-type labels, thereby generating a null distribution that respects the dependence structure of the data. Applying this procedure to the original dataset yielded a non-significant Monte Carlo p-value ($p = 0.2597$), indicating that the observed between-call-type separation does not exceed chance expectations. We argue that interpreting MCA distances as semantic relations requires theoretically motivated feature selection and dependence-aware inference, both of which are lacking in the original analysis. We conclude that Berthet et al. (2025) do not provide any statistically significant evidence for bonobo compositionality and highlight the broader limitations of relying on exploratory post-hoc statistical inference to identify semantic structure in animal communication.

[Berthet et al, *EAORC Bulletin* 1138, <https://www.science.org/doi/10.1126/science.adv1170>]

<https://peerj.com/articles/21651/>

PLoS One

PAPERS

FRANCESCA CHELAZZI & DAN LAWRENCE – The emergence of urban scaling in Ancient Southwest Asia

This study investigates the long-term emergence of settlement scaling in Ancient Southwest Asia by analysing house-size data from 1,852 buildings across 80 archaeological sites dating from the Late Epipalaeolithic to the Iron Age (c. 13,100–580 BCE). Using domestic architecture as a proxy for household productivity, we provide the first fully diachronic test of settlement scaling theory in the region where urbanisation first developed. Mixed-effects models reveal that scaling relationships were absent in the Neolithic, ambiguous in the Chalcolithic, and only fully emerged in the Bronze Age, where sub-linear exponents align with theoretical predictions for intensive socioeconomic outputs. These patterns persist into the Iron Age, indicating

that strongly mixing interaction networks—central to settlement scaling theory—became structurally embedded only with the rise of urban complexity. Across periods, baseline house size more than doubles, suggesting long-term technological or organisational improvements independent of agglomeration effects. We also examine how scaling relates to economic inequality using Gini coefficients of residential size distributions. Inequality correlates with settlement size only in politically complex systems and primarily at major centres, indicating that institutional structures—not agglomeration-driven productivity—govern the allocation of returns. Residuals from scaling models do not predict inequality, demonstrating that productivity gains and their distribution operate through independent channels. Finally, we derive period-specific estimates of population density from the intercepts of area-population scaling relationships. These results document a marked decline in residential density from the Chalcolithic to the Bronze Age, followed by partial recovery in the Iron Age, aligning with independent reconstructions from sites such as Tell Brak. Overall, the study shows that scaling behaviours emerged only with sustained urban integration, and that inequality in early cities was shaped more by political institutions than by the geometric constraints of urban interaction.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0355479>

Proceedings of the Royal Society B

PAPERS

YUTING DONG et al – Zealots lower coordination barriers but undermine cooperation in multiplayer games

How can a small group of committed cooperators shape collective outcomes in social dilemmas? Previous studies have shown that zealots—individuals who always cooperate—can promote cooperation in prisoner's dilemmas. Yet real-world cooperation also involves multiplayer coordination problems, where their role remains less understood. Here, we examine the role of zealots in

-person stag-hunt games in both finite and infinite, well-mixed populations. We show that a minority of zealots facilitates the emergence of cooperation by lowering the barrier to coordination, but at the cost of reducing the equilibrium level of cooperation. More strikingly, zealots can create two new attractors in infinite populations—full cooperation and stable coexistence—that extend beyond the classical equilibrium of full defection or bistability between defection and cooperation (or coexistence). In finite populations, this dual effect largely persists as population size approaches infinity; otherwise, zealots either matter little or consistently enhance cooperation. Together, these findings revise the conventional view that zealots enhance cooperation in well-mixed populations, revealing instead their dual role in multiplayer coordination dilemmas. This nuanced influence may also shape broader collective problems, from collective-risk dilemmas to the emergence of social conventions.

<https://royalsocietypublishing.org/rspb/article/293/2077/20260923/482823/Zealots-lower-coordination-barriers-but-undermine>

Trends Open

PAPERS

SHAOQI PAN & PATRICK C.M. WONG – Extending cognitive maps from navigation to language learning

Cognitive maps, which are internal representations instantiated by hippocampal place cells and entorhinal grid cells, are well known to support spatial navigation. Emerging evidence indicates that they also organize abstract structured knowledge. In this opinion article, we summarize evidence that cognitive-map computations can be generalized to language learning, which is itself structured knowledge. Specifically, we propose that cognitive-map mechanisms can support structured representations for language, prediction-driven and active learning, multimodal input integration, and dynamic developmental processes in language learning. Linking cognitive maps to language learning connects high-level language learning behaviors to neuronal mechanisms, explaining how neurons in our brain support language learning. Our proposed language cognitive-map framework both enriches neurocognitive theories of language learning and suggests design cues for artificial intelligence language models.

[https://www.cell.com/trends-open/fulltext/S3117-3470\(26\)00088-X](https://www.cell.com/trends-open/fulltext/S3117-3470(26)00088-X)

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