EAORC BULLETIN 1,124 – 29 December 2024

CONTENTS

NOTICES

FORMATTED VERSION OF THIS BULLETIN

A pdf formatted version if 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.

ACADEMIA.EDU – Early dispersal of modern humans in Europe and implications for Neanderthals

Nature 479, 525-529 (2011).

STEFANO BENAZZI et al with CATHERINE C. BAUER & KATERINA HARVATI – Early dispersal of modern humans in Europe and implications for Neanderthal behaviour

The appearance of anatomically modern humans in Europe and the nature of the transition from the Middle to Upper Palaeolithic are matters of intense debate. Most researchers accept that before the arrival of anatomically modern humans, Neanderthals had adopted several 'transitional' technocomplexes. Two of these, the Uluzzian of southern Europe and the Châtelperronian of western Europe, are key to current interpretations regarding the timing of arrival of anatomically modern humans in the region and their potential interaction with Neanderthal populations. They are also central to current debates regarding the cognitive abilities of Neanderthals and the reasons behind their extinction. However, the actual fossil evidence associated with these assemblages is scant and fragmentary, and recent work has questioned the attribution of the Châtelperronian to Neanderthals on the basis of taphonomic mixing and lithic analysis. Here we reanalyse the deciduous molars from the Grotta del Cavallo (southern Italy), associated with the Uluzzian and originally classified as Neanderthal. Using two independent morphometric methods based on microtomographic data, we show that the Cavallo specimens can be attributed to anatomically modern humans. The secure context of the teeth provides crucial evidence that the makers of the Uluzzian technocomplex were therefore not Neanderthals. In addition, new chronometric data for the Uluzzian layers of Grotta del Cavallo obtained from associated shell beads and included within a Bayesian age model show that the teeth must date to 45,000–43,000 calendar years before present. The Cavallo human remains are therefore the oldest known European anatomically modern humans, confirming a rapid dispersal of modern humans across the continent before the Aurignacian and the disappearance of Neanderthals.
https://www.academia.edu/1083705/Benazzi_S_Douka_K_Fornai_C_Bauer_C_C_Kullmer_O_Svoboda_J_Pap_I_Mallegni_F_Bayle_P_Coquerelle_M_Condemi_S_Ronchitelli_A_Harvati_K_and_Weber_G_W_2011_Early_dispersal_of_modern_humans_in_Europe_and_implications_for_Neanderthal_behaviour_Nature_doi_10_1038_nature10617

ACADEMIA.EDU – Human Behavioral Organization in Middle Paleolithic: Were Neanderthals Different?

American Anthropologist 106:1, 17-31 (2004).

DONALD O. HENRY et al – Human Behavioral Organization in the Middle Paleolithic: Were Neanderthals Different?

Interwoven with the debate regarding the biologic replacement of Neanderthals by modern humans is the question of the degree to which Neanderthals and modern foragers differed behaviorally. We consider this question through a detailed spatial analysis of artifacts and related evidence from stratified living floors within a 49–69 k.y.a. rock shelter site, Tor Faraj,

in southern Jordan. The study involves a critical evaluation of living floors, the identification of site structure, and the decoding of the site structure in an effort to understand how the inhabitants of the shelter organized their behaviors. The site structure of Tor Faraj is also compared to occupations of modern foragers in ethnographic and archaeological contexts. When the information from the excavation of Tor Faraj is considered with evidence from other late Middle Paleolithic sites, there seems to be little basis for the claims that constraints in the behavioral organization of Neanderthals led to their replacement by modern foragers.
https://www.academia.edu/88943847/Human_Behavioral_Organization_in_the_Middle_Paleolithic_Were_Neanderthals_Different

NEWS

SCIENCE DAILY – Water & gruel -- not bread: Discovering the diet of early Neolithic farmers in Scandinavia

At a Neolithic settlement on the Danish island Funen dating back 5,500 years, archaeologists have discovered both grinding stones and grains from early cereals. However, new research reveals that the inhabitants did not use the stones to grind the cereal grains. Instead of making bread, they likely prepared porridge or gruel from the grains.
https://www.sciencedaily.com/releases/2024/12/241220133041.htm

SCIENCE DAILY – Patience isn't a virtue; it's a coping mechanism

Impatience, studies of more than 1,200 people found, is the emotion people feel when they face a delay that seems unfair, unreasonable, or inappropriate -- like a traffic jam outside of rush hour, or a meeting that should have ended 15 minutes ago. Patience is the form of emotion regulation we use to cope with those feelings of impatience.
https://www.sciencedaily.com/releases/2024/12/241219190310.htm

SCIENCE DAILY – Tracking other people's minds in communication

Language and social cognition are fundamental to human communication. But how do these capacities interact? In a review paper, researchers show how language and social cognition are integrated in real time. The authors propose a new 'mind-tracking' model of communication, in which social micro-processes play a fundamental role in language production and comprehension.
https://www.sciencedaily.com/releases/2024/12/241218132155.htm

SCIENCE DAILY – Unraveling the power and influence of language

A choice was made to include each word in this sentence. Every message, even the most mundane, is crafted with a specific frame in mind that impacts how the message is perceived. The study of framing effects is a multidisciplinary line of research that investigates when, how, and why language influences those who receive a message and how it impacts their response.
https://www.sciencedaily.com/releases/2024/12/241223134304.htm

SCIENCE.ORG NEWS – Some whales may live nearly twice as long as believed—if we let them

Study extends lifespan estimate for one whale species and suggests researchers have been underestimating others as well.
https://www.science.org/content/article/some-whales-may-live-nearly-twice-long-believed-if-we-let-them

THE CONVERSATION – Are we moral blank slates at birth? A new study offers some clues

What does a baby know about right and wrong? A foundational finding in moral psychology suggested that even infants have a moral sense, preferring “helpers” over “hinderers” before uttering their first word. Now, nearly 20 years later, a study that tried to replicate these findings calls this result into question.
https://theconversation.com/are-we-moral-blank-slates-at-birth-a-new-study-offers-some-clues-245333

THE CONVERSATION – Why there’s no such thing as normal in child development

For parents, carers and teachers, it’s often tempting to base our thinking on a child’s development around what we understand as “normal”. Much of the time we do this without thinking, describing a child as “doing well” in one subject and “behind” in another.
https://theconversation.com/why-theres-no-such-thing-as-normal-in-child-development-244681

THE CONVERSATION – Stonehenge’s giant Altar Stone came all the way from north-east Scotland

This is the longest known journey for any stone used in a Neolithic monument.
https://theconversation.com/stonehenges-giant-altar-stone-came-all-the-way-from-north-east-scotland-heres-how-we-worked-out-this-astonishing-new-finding-236630

PUBLICATIONS

eLife

PAPERS

YA ZHENG & RUMENG TANG – Dissociable after-effects of prosocial acts: Effort is costly for others but valued for self

Prosocial behavior requires effort, yet people are often reluctant to exert effort for others' benefit. However, the manner in which effort exertion affects subsequent reward evaluation during prosocial acts remains elusive. Here, we leveraged the temporal precision of electroencephalography, along with a paradigm that independently manipulated effort and reward for self and another person, to uncover the neural mechanism underlying the reward after-effect of effort expenditure during prosocial acts. We found a dissociable reward after-effect between self-benefitting and other-benefitting effort. When the beneficiary was oneself, the reward positivity (RewP) became more positive as effort increased, indicating an effort-enhancement effect. In contrast, when the beneficiary was others, the RewP became less positive as effort increased, demonstrating an effort-discounting effect. Moreover, this dissociation occurred only when reward system was activated and was independent of performance evaluation. Our finding provides novel insights into how prior effort expenditure shape reward evaluation during prosocial behavior.
https://elifesciences.org/reviewed-preprints/103566

Frontiers in Psychology

PAPERS

CHRISTOPH RÜHLEMANN & JAMES TRUJILLO – The effect of gesture expressivity on emotional resonance in storytelling interaction

The key function of storytelling is a meeting of hearts: a resonance in the recipient(s) of the story narrator's emotion toward the story events. This paper focuses on the role of gestures in engendering emotional resonance in conversational storytelling. The paper asks three questions: Does story narrators' gesture expressivity increase from story onset to climax offset (RQ #1)? Does gesture expressivity predict specific EDA responses in story participants (RQ #2)? How important is the contribution of gesture expressivity to emotional resonance compared to the contribution of other predictors of resonance (RQ #3)? 53 conversational stories were annotated for a large number of variables including Protagonist, Recency, Group composition, Group size, Sentiment, and co-occurrence with quotation. The gestures in the stories were coded for gesture phases and gesture kinematics including Size, Force, Character view-point, Silence during gesture, Presence of hold phase, Co-articulation with other bodily organs, and Nucleus duration. The Gesture Expressivity Index (GEI) provides an average of these parameters. Resonating gestures were identified, i.e., gestures exhibiting concurrent specific EDA responses by two or more participants. The first statistical model, which addresses RQ #1, suggested that story narrators' gestures become more expressive from story onset to climax offset. The model constructed to adress RQ #2 suggested that increased gesture expressivity increases the probability of specific EDA responses. To address RQ #3 a Random Forest for emotional resonance as outcome variable and the seven GEI parameters as well as six more variables as predictors was constructed. All predictors were found to impact Eemotional resonance. Analysis of variable importance showed Group composition to be the most impactful predictor. Inspection of ICE plots clearly indicated combined effects of individual GEI parameters and other factors, including Group size and Group composition. This study shows that more expressive gestures are more likely to elicit physiological resonance between individuals, suggesting an important role for gestures in connecting people during conversational storytelling. Methodologically, this study opens up new avenues of multimodal corpus linguistic research by examining the interplay of emotion-related measurements and gesture at micro-analytic kinematic levels and using advanced machine-learning methods to deal with the inherent collinearity of multimodal variables.
https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2024.1477263/full

Journal of Language Evolution

PAPERS

FRANCISCO R MAGDALENO, ISAAC QUINTANILLA SALINAS & STEPHEN I ROTHSTEIN – Vocal functional flexibility in a nonprimate vocal learning species

Can nonhuman animals use the same acoustic signal to transmit different illocutions on different occasions? This communicative capacity is known as vocal functional flexibility and occurs, for example, in speech, when a sentence serves different illocutionary forces or functions on different occasions based on changes to visual and intonational cues. Although common in human speech, there is a lack of clear evidence for this ability in other species. Here, we examined a likely candidate, the Brown-headed Cowbird (Molothrus ater), which is a vocal-learning songbird species that develops a repertoire of structurally distinct song types. Most of this species' songs are directed towards conspecific males and females less than a meter away, making it unusually easy to determine the apparent target of songs, unlike the broadcast songs done by most songbirds. Songs directed to other males have clear aggressive/threatening intent, while those to females involve courtship/sexual intent. Extensive prior work shows that male cowbirds perform the visual display that accompanies singing differently in these two social settings and also modulate the intonation of song types differently. Because of these display and tonal modulations, constancy of song type usage across male- vs female-directed singing would provide evidence of

vocal functional flexibility. Herein, we examined 4,828 songs in three captive flocks containing twenty-four males and thirty females during the breeding season. Males did not use their song types randomly and had strongly favored songs and less commonly used ones. Importantly, favored song types and less commonly used ones were the same whether directing courtship song to a female, aggressive song to another male or singing nonsocially with no receiver nearby. Results were consistent within and across the three flocks, providing strong evidence of vocal functional flexibility. These findings indicate that some species may evolve the ability to modulate and exaggerate visual display components and prosody more than vocal presentation per se because a learned phonological system in this and possibly other species is constrained by its vital role as an indicator trait.
https://academic.oup.com/jole/article-abstract/9/1-2/1/7797262

EMIL CARLSSON, DEVDATT DUBHASHI & TERRY REGIER – Cultural evolution via iterated learning and communication explains efficient color naming systems
It has been argued that semantic systems reflect pressure for efficiency, and a current debate concerns the cultural evolutionary process that produces this pattern. We consider efficiency as instantiated in the Information Bottleneck (IB) principle, and a model of cultural evolution that combines iterated learning and communication. We show that this model, instantiated in neural networks, converges to color naming systems that are efficient in the IB sense and similar to human color naming systems. We also show that some other proposals such as iterated learning alone, communication alone, or the greater learnability of convex categories, do not yield the same outcome as clearly. We conclude that the combination of iterated learning and communication provides a plausible means by which human semantic systems become efficient.
https://academic.oup.com/jole/article/9/1-2/49/7907230

REVIEWS

JUHA A JANHUNEN – Language origins: a puzzle with a missing piece
Although there is no scarcity of books on the origins of human language, the topic is never exhausted, and new questions constantly arise with the progress of the various disciplines involved. This is an issue that typically calls for a multi-, cross-, and inter-disciplinary approach and, therefore, collaboration between specialists in fields such as primatology, palaeoanthropology, palaeoecology, archaeology, neurology, human genetics, psychology, semiotics, cognitive science, and, of course, linguistics and phonetics, as well as all the basic and applied sciences that provide the necessary tools for the technical analysis of the data. Professional and still relatively up-to-date multi-author volumes on language origins include, for instance, those edited by Knight et al. (2000), Tallerman, (2005), and Tallerman and Gibson (2012). What has happened more recently is mainly the discovery of additional palaeoanthropological remains and archaeological sites, as well as, more importantly, increased insights into the history of the human genome. Of particular significance has been the confirmation of the close genetic relationship of Homo sapiens with the Neanderthals and their Denisovan cousins.
Review of 'The Language Puzzle: How We Talked Our Way Out of the Stone Age' by Steven Mithen, Profile Books (2024).
https://academic.oup.com/jole/article-abstract/9/1-2/84/7825977

Journal of Linguistics

PAPERS

RYAN MARK NEFDT – Pullum's philosophy of linguistics: towards a unified framework
Geoffrey Pullum has produced countless contributions to linguistic theory over his 50-year career in the field. Given this exceptional scientific achievement, his philosophical work often goes underappreciated. In this article, I discuss and critique three themes from Pullum's philosophy of linguistics, namely, cardinality neutrality, model-theoretic syntax and normativity in language. I conclude by showing how these seemingly disparate elements might indeed be connected in terms of a normative constructivist approach to linguistics.
https://www.cambridge.org/core/journals/journal-of-linguistics/article/pullums-philosophy-of-linguistics-towards-a-unified-framework/F5E220DFE406D144664DAAC20C430D1C

Journal of the Royal Anthropological Institute

PAPERS

SHUMON T. HUSSAIN – Feral ecologies of the human deep past: multispecies archaeology and palaeo-synanthropy
This article articulates recent advances in palaeo-ecology with the goals and ambitions of multispecies archaeology. It centres the synanthropic nexus as a key context for the study of early human-animal relationships and argues that its evolution yields important yet currently overlooked dynamics shaping the structure of the archaeological record. I first show how the dominant heuristic of wild versus domesticated nonhuman animals obfuscates the inherent variability and creativity of past animal agency. I then illustrate how such agency is caught up with human behaviour and ecosystem impacts from relatively early on in human history, navigating historically shifting configurations of autonomy and control. Drawing on deep-historical examples of synanthropic niches co-assembled by human foragers and nonhuman animals, I argue that such interspecies configurations require careful attention to concepts of liminality and ferality and challenge species-level approaches. I finally highlight potential human behavioural, material, and cosmological consequences of the synanthropic nexus, including

integrative foraging patterns and notions of the giving animal, which play an important role in many Indigenous and ethnographic forager societies and illustrate the value of attending to this nexus as a focus of comparative multispecies research.
https://rai.onlinelibrary.wiley.com/doi/10.1111/1467-9655.14152

Nature Communications Psychology

PAPERS

WOJCIECH ZAJKOWSKI et al – A neurocognitive mechanism for increased cooperation during group formation

How do group size changes influence cooperation within groups? To examine this question, we performed a dynamic, network-based prisoner's dilemma experiment with fMRI. Across 83 human participants, we observed increased cooperation as group size increased. However, our computational modeling analysis of behavior and fMRI revealed that groups size itself did not increase cooperation. Rather, interaction between (1) participants' stable prosocial tendencies, and (2) dynamic reciprocal strategy weighed by memory confidence, underlies the group size-modulated increase in cooperation because the balance between them shifts towards the prosocial tendency with higher memory demands in larger groups. We found that memory confidence was encoded in fusiform gyrus and precuneus, whereas its integration with prosocial tendencies was reflected in the left DLPFC and dACC. Therefore, interaction between recall uncertainty during reciprocal interaction (i.e., forgetting) and one's individual prosocial preference is a core pillar of emergent cooperation in more naturalistic and dynamic group formation.
https://www.nature.com/articles/s44271-024-00177-3

Nature Human Behaviour

PAPERS

S. BERDUGO et al with S. CARVALHO – Reliable long-term individual variation in wild chimpanzee technological efficiency

Variation in the efficiency of extracting calorie-rich and nutrient-dense resources directly impacts energy expenditure and potentially has important repercussions for cultural transmission where social learning strategies are used. Assessing variation in efficiency is key to understanding the evolution of complex behavioural traits in primates. Here we examine evidence for individual-level differences beyond age- and sex-class in non-human primate extractive foraging efficiency. We used 25 years (1992–2017) of video of 21 chimpanzees aged ≥6 years in Bossou, Guinea, to longitudinally investigate individual-level differences in stone tool use efficiency. Data from 3,882 oil-palm nut-cracking bouts from >800 h of observation were collected. We found reliability in relative efficiency across four measures of nut-cracking efficiency, as well as a significant effect of age. Our findings highlight the importance of longitudinal data from long-term field sites when investigating underlying cognitive and behavioural diversity across individual lifespans and between populations.
https://www.nature.com/articles/s41562-024-02071-8

Nature Scientific Reports

PAPERS

PATRICK NEFF et al – Cognitive abilities predict naturalistic speech length in older adults

Past research has demonstrated the association between social engagement and the maintenance of cognitive abilities. However, inconsistent definitions of social engagement have posed challenges to systematically investigate this association. This paper addresses the role of social relationships in cognitive functioning among older adults, focusing on the real-life communication indicator—length of own speech—as a measure of social activity. Utilizing advanced technology to unobtrusively measure older adults' real-life speech, this study investigates its association with various cognitive abilities and sociodemographic factors. Differential cognitive measures, and sociodemographic data including factors like age, sex, education, income, persons living in the same household, loneliness, and subjective hearing status were included. Audio data of 83 participants are analyzed with a machine learning speaker identification algorithm. Using Elastic Net regularized regression, results indicate that higher levels of working memory, cognitive speed, and semantic fluency predict own speech in everyday life. While having no partner negatively predicted own speech length, we unexpectedly found that higher hearing status was related to lower speech frequency. Age was neither a relevant predictor in the regression nor correlated with any other variables. We discuss implications and future research applications based on the findings from our novel approach.
https://www.nature.com/articles/s41598-024-82144-w

RYOSUKE GOTO et al – Muscle synergy in several locomotor modes in chimpanzees and Japanese macaques, and its implications for the evolutionary origin of bipedalism through shared muscle synergies

Recent evidence indicates that human ancestors utilized a combination of quadrupedal walking, climbing, and bipedal walking. Therefore, the origin of bipedalism may be linked to underlying mechanisms supporting diverse locomotor modes. This study aimed to elucidate foundations of varied locomotor modes from the perspective of motor control by identifying muscle synergies and demonstrating similarities in synergy compositions across different locomotor modes in chimpanzees and Japanese macaques. Four muscle synergies were extracted for bipedal and quadrupedal walking in both the

chimpanzees and macaques, as well as for vertical climbing in the chimpanzees. Bipedal walking synergies were generally analogous to those observed in quadrupedal walking and vertical climbing. Specifically, the bipedal walking synergies during the stance and swing phase in the chimpanzees were substitutable with those of vertical climbing and quadrupedal walking, respectively. For the macaque, not all bipedal walking synergies exhibited similarities to quadrupedal walking synergies, likely due to instability during the single support phase of bipedalism. These findings suggest that synergies from vertical climbing and quadrupedal walking might be transferred to bipedal walking, as seen in the chimpanzees, and that this sharing of synergies might form a foundation for a diverse range of locomotor capacities including bipedal walking.
https://www.nature.com/articles/s41598-024-82479-4

PNAS

PAPERS

JEREMY I. BORJON et al – Recognizability and timing of infant vocalizations relate to fluctuations in heart rate

For human infants, producing recognizable speech is more than a cognitive process. It is a motor skill that requires infants to learn to coordinate multiple muscles of varying functions across their body. This coordination is directly linked to ongoing fluctuations in heart rate; a physiological process that can scaffold behavior. We investigated whether ongoing fluctuations in heart rate coincide with vocal production and word formation in 24-mo-old infants. Infants were most likely to produce a vocalization when heart rate fluctuations reached a peak (local maximum) or trough (local minimum). Vocalizations produced at the peak were longer than expected by chance. Functionally, vocalizations produced just before the trough, while heart rate is decelerating, were more likely to be recognized as a word by naive listeners. Thus, for the developing infant, heart rate fluctuations align with the timing of vocal productions and are associated with their duration and the likelihood of producing recognizable speech. Our results have broad and immediate implications for understanding normative language development, the evolutionary basis and physiological process of vocal production, and potential early indicators of speech and communication disorders.
https://www.pnas.org/doi/full/10.1073/pnas.2419650121

ELLA REES-BAYLIS, IDO PEN & JAN J. KREIDER – Maternal manipulation of offspring size can trigger the evolution of eusociality in promiscuous species

Eusocial organisms typically live in colonies with one reproductive queen supported by thousands of sterile workers. It is widely believed that monogamous mating is a precondition for the evolution of eusociality. Here, we present a theoretical model that simulates a realistic scenario for the evolution of eusociality. In the model, mothers can evolve control over resource allocation to offspring, affecting offspring's body size. The offspring can evolve body-size-dependent dispersal, by which they disperse to breed or stay at the nest as helpers. We demonstrate that eusociality can evolve even if mothers are not strictly monogamous, provided that they can constrain their offspring's reproduction through manipulation. We also observe the evolution of social polymorphism with small individuals that help and larger individuals that disperse to breed. Our model unifies the traditional kin selection and maternal manipulation explanations for the evolution of eusociality and demonstrates that—contrary to current consensus belief—eusociality can evolve despite highly promiscuous mating.
https://www.pnas.org/doi/10.1073/pnas.2402179121

COMMENTARIES

JACK DA SILVA – Eusocial workers must evolve before maternal control

Rees-Baylis et al. explore the role of maternal manipulation in the evolution of eusociality with an individual-based simulation in which mothers may evolve control of resource allocation to offspring, which affects offspring size, and offspring may evolve body-size-dependent dispersal, with smaller offspring benefiting from remaining in the nest as workers. They show that with maternal control, eusociality may evolve in the absence of strict lifetime monogamy, which has been argued as necessary for the high genetic relatedness between workers and their siblings that facilitates the evolution of worker reproductive altruism. However, there is a serious flaw with the Rees-Baylis et al. model and with the logic of maternal control as the basis for the evolution of workers. In this model, maternal manipulation can evolve only if offspring have previously evolved body-size-dependent dispersal and alloparental behavior, otherwise the mother produces undersized offspring that disperse and underperform as breeders, which would obviously reduce her fitness. Worker behavior must evolve before the evolution of maternal manipulation. That is, the evolution of worker morphology and behavior are initially decoupled, but may become coupled after the evolution of worker behavior. This is an important distinction because if worker behavior evolves first, then kin selection for reproductive altruism, rather than selection on maternal behavior, explains the origin of eusociality.
https://www.pnas.org/doi/full/10.1073/pnas.2422269121

ELLA REES-BAYLIS, IDO PEN & JAN J. KREIDER – Reply to da Silva: Helping behavior can emerge without its prior adaptive evolution

In a letter to PNAS, da Silva brought up two points of criticism on our model in Rees-Baylis et al. First, da Silva argues that the production of small worker-like offspring by mothers should be disfavored if these offspring disperse to breed. Offspring philopatry and helping behavior would have to evolve before mothers evolve to produce daughters of small size. This would

undermine the role of maternal manipulation for the evolution of eusociality. This argument builds on a recent model by Flintham and Field, who argue that "worker behavior" needs to have evolved before "worker morphology" can be maternally enforced. However, the emergence of "worker behavior" does not necessarily require adaptive evolution since helping behaviors, such as caring for offspring or guarding the nest, are behaviors that are already present in solitary organisms, and which could simply be expressed in a different context, i.e., at the natal nest instead of a newly founded nest. Additionally, when mothers produce unusually small offspring, this will expose cryptic genetic variation that has accumulated due to genetic drift, influencing the size-dependent offspring behavior. This also happens in our model. Regions of the body-size-dependent dispersal reaction norm that are not under selection accumulate some variation over time (Fig. 3 B2 and C2 give an impression of this variation at the end of simulations). This variation becomes exposed to selection when a mutation occurs that causes mothers to alter offspring size. As a consequence, eusociality can evolve through maternal manipulation if "the right variation" has accumulated in the offspring dispersal reaction norms when "the right mutations" occur in the mother's resource allocation to offspring. Fig. 2B shows that this coevolutionary process leads to stochasticity in the evolutionary outcomes where eusociality evolves in some but not all replicate simulations. An exposure of cryptic genetic variation is important in evolution. It is therefore a strength of our model that it can capture such complex evolutionary processes.
https://www.pnas.org/doi/full/10.1073/pnas.2423017121

Trends in Genetics

PAPERS

RUTHIE GOLOMB et al – Cell-autonomous adaptation: an overlooked avenue of adaptation in human evolution
Adaptation to environmental conditions occurs over diverse evolutionary timescales. In multi-cellular organisms, adaptive traits are often studied in tissues/organs relevant to the environmental challenge. We argue for the importance of an underappreciated layer of evolutionary adaptation manifesting at the cellular level. Cell-autonomous adaptations (CAAs) are inherited traits that boost organismal fitness by enhancing individual cell function. For instance, the cell-autonomous enhancement of mitochondrial oxygen utilization in hypoxic environments differs from an optimized erythropoiesis response, which involves multiple tissues. We explore the breadth of CAAs across challenges and highlight their counterparts in unicellular organisms. Applying these insights, we mine selection signals in Andean highlanders, revealing novel candidate CAAs. The conservation of CAAs across species may reveal valuable insights into multi-cellular evolution.
https://www.cell.com/trends/genetics/abstract/S0168-9525(24)00260-9

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