

References

Afrika

NIANG 2018

Khady Niang, James Blinkhorn & Matar Ndiaye, *The oldest Stone Age occupation of coastal West Africa and its implications for modern human dispersals, New insight from Tiémassas*. [Quaternary Science Reviews \(2018\), preprint, 1–7](#). DOI:10.1016/j.quascirev.2018.03.022.

Examinations of modern human dispersals are typically focused on expansions from South, East or North Africa into Eurasia, with more limited attention paid to dispersals within Africa. The paucity of the West African fossil record means it has typically been overlooked in appraisals of human expansions in the Late Pleistocene, yet regions such as Senegal occur in key biogeographic transitional zones that may offer significant corridors for human occupation and expansion. Here, we report the first evidence for Middle Stone Age occupation of the West African littoral from Tiémassas, dating to ≈ 44 thousand years ago, coinciding with a period of enhanced humidity across the region. Prehistoric populations mainly procured raw material from exposed Ypresian limestone horizons with Levallois, discoidal and informal reduction sequences producing flake blanks for retouched tools. We discuss this mid-Marine Isotope Stage 3 occupation in the context of the site's unique, ecotonal position amongst Middle Stone Age sites across West Africa, and its significance for Later Stone Age colonization of near coastal forests in the region. The results also support previous suggestions for connections between Middle Stone Age populations in West Africa and the Maghreb, for which the coastline may also have played a significant role.

Keywords: Tiémassas | Senegal | West Africa | Middle stone age | Late pleistocene | Modern human expansions

WELSBY 2004

DEREK A. WELSBY & JULIE R. ANDERSON (Hrsg.), *Sudan Ancient treasures, An exhibition of recent discoveries from the Sudan National Museum*. (London 2004).

Aktuell

CHO 2018

Adrian Cho, *Hawking's bid to save quantum theory from black holes*. [science 359 \(2018\), 1316–1317](#).

He struggled to explain why black holes don't destroy information, a puzzle that may be his greatest legacy.

Hawking's latest work also misses a bigger issue, the theorist says. If a black hole preserves information, he argues, then an unavoidable conclusion of Einstein's theory of gravity—that there's no way to tell if you're falling into a huge black hole—must be wrong.

SCHLESINGER 2018

William H. Schlesinger, *Are wood pellets a green fuel? A return to firewood is bad for forests and for the climate.* *science* **359** (2018), 1328–1329.

SHEPON 2018

Alon Shepon, Gidon Eshel, Elad Noor & Ron Milo, *The opportunity cost of animal based diets exceeds all food losses.* *PNAS* **115** (2018), 3804–3809.

[pnas115-03804-Supplement.pdf](#)

Food loss is widely recognized as undermining food security and environmental sustainability. However, consumption of resource-intensive food items instead of more efficient, equally nutritious alternatives can also be considered as an effective food loss. Here we define and quantify these opportunity food losses as the food loss associated with consuming resource-intensive animal-based items instead of plant-based alternatives which are nutritionally comparable, e.g., in terms of protein content. We consider replacements that minimize cropland use for each of the main US animal-based food categories. We find that although the characteristic conventional retail-to-consumer food losses are $\approx 30\%$ for plant and animal products, the opportunity food losses of beef, pork, dairy, poultry, and eggs are 96%, 90%, 75%, 50%, and 40%, respectively. This arises because plant-based replacement diets can produce 20fold and twofold more nutritionally similar food per cropland than beef and eggs, the most and least resource-intensive animal categories, respectively. Although conventional and opportunity food losses are both targets for improvement, the high opportunity food losses highlight the large potential savings beyond conventionally defined food losses. Concurrently replacing all animal-based items in the US diet with plant-based alternatives will add enough food to feed, in full, 350 million additional people, well above the expected benefits of eliminating all supply chain food waste. These results highlight the importance of dietary shifts to improving food availability and security.

Keywords: livestock | food systems | animal-based diet | plant-based diet | opportunity food loss

Significance: With a third of all food production lost via leaky supply chains or spoilage, food loss is a key contributor to global food insecurity. Demand for resource-intensive animal-based food further limits food availability. In this paper, we show that plant-based replacements for each of the major animal categories in the United States (beef, pork, dairy, poultry, and eggs) can produce twofold to 20-fold more nutritionally similar food per unit cropland. Replacing all animal-based items with plant-based replacement diets can add enough food to feed 350 million additional people, more than the expected benefits of eliminating all supply chain food loss.

SMITH-WOOLLEY 2018

Emily Smith-Woolley et al., *Differences in exam performance between pupils attending selective and non-selective schools mirror the genetic differences between them.* *Science of Learning* **3** (2018), iii, 1–7. DOI:10.1038/s41539-018-0019-8.

[SciLearn03-a003-Supplement.pdf](#)

Emily Smith-Woolley, Jean-Baptiste Pingault, Saskia Selzam, Kaili Rimfeld, Eva Krapohl, Sophie von Stumm, Kathryn Asbury, Philip S. Dale, Toby Young, Rebecca Allen, Yulia Kovas & Robert Plomin

On average, students attending selective schools outperform their non-selective counterparts in national exams. These differences are often attributed to value added by the school, as well as factors schools use to select pupils, including ability, achievement and, in cases where schools charge tuition fees or are located in affluent areas, socioeconomic status. However, the possible role of DNA differences between students of different schools types has not yet been considered. We used a UK-representative sample of 4814 genotyped students to investigate exam performance at age 16 and genetic differences between students in three school types: state-funded, non-selective schools ('non-selective'), state-funded, selective schools ('grammar') and private schools, which are selective ('private'). We created a genome-wide polygenic score (GPS) derived from a genome-wide association study of years of education (EduYears). We found substantial mean genetic differences between students of different school types: students in nonselective schools had lower EduYears GPS compared to those in grammar ($d = 0.41$) and private schools ($d = 0.37$). Three times as many students in the top EduYears GPS decile went to a selective school compared to the bottom decile. These results were mirrored in the exam differences between school types. However, once we controlled for factors involved in pupil selection, there were no significant genetic differences between school types, and the variance in exam scores at age 16 explained by school type dropped from 7% to <1%. These results show that genetic and exam differences between school types are primarily due to the heritable characteristics involved in pupil admission.

Amerika

SMITH 2018

Heather L. Smith & Ted Goebel, *Origins and spread of fluted-point technology in the Canadian Ice-Free Corridor and eastern Beringia*. *PNAS* **115** (2018), 4116–4121.

[pnas115-04116-Supplement.pdf](#)

Fluted projectile points have long been recognized as the archaeological signature of early humans dispersing throughout the Western Hemisphere; however, we still lack a clear understanding of their appearance in the interior “Ice-Free Corridor” of western Canada and eastern Beringia. To solve this problem, we conducted a geometric morphometric shape analysis and a phylogenetic analysis of technological traits on fluted points from the archaeological records of northern Alaska and Yukon, in combination with artifacts from further south in Canada, the Great Plains, and eastern United States to investigate the plausibility of historical relatedness and evolutionary patterns in the spread of fluted-point technology in the latest Pleistocene and earliest Holocene. Results link morphologies and technologies of Clovis, certain western Canadian, and northern fluted points, suggesting that fluting technology arrived in the Arctic from a proximate source in the interior Ice-Free Corridor and ultimately from the earliest populations in temperate North America, complementing new genomic models explaining the peopling of the Americas.

Keywords: peopling of the Americas | Paleoindian technology | Ice-Free Corridor | geometric morphometrics | cladistics

Significance: We report geometric morphometric and cladistic analyses of archaeological materials establishing early human interaction between the North American Arctic, western Canadian “IceFree Corridor,” and temperate North America prior to 12,000 years ago, when the Corridor is inferred to have opened after initial retreat of the continental ice sheets. The findings inform a broad range

of scientists engaged in genomic, evolutionary, ecological, climatological, geological, and anthropological studies of the late Pleistocene, providing tangible evidence of human dispersal through the Americas and placing the archaeological record in the context of new genetic models chronicling the initial migration into America, as well as paleoecological interpretations of the “opening” of interior western Canada’s earliest habitable environments.

Anthropologie

KOZMA 2018

Elaine E. Kozma et al., *Hip extensor mechanics and the evolution of walking and climbing capabilities in humans, apes, and fossil hominins*. *PNAS* **115** (2018), 4134–4139.

[pnas115-04134-Supplement.pdf](#)

Elaine E. Kozma, Nicole M. Webb, William E. H. Harcourt-Smith, David A. Raichlen, Kristiaan D’Août, Mary H. Brown, Emma M. Finestone, Stephen R. Ross, Peter Aerts & Herman Pontzer

The evolutionary emergence of humans’ remarkably economical walking gait remains a focus of research and debate, but experimentally validated approaches linking locomotor capability to postcranial anatomy are limited. In this study, we integrated 3D morphometrics of hominoid pelvic shape with experimental measurements of hip kinematics and kinetics during walking and climbing, hamstring activity, and passive range of hip extension in humans, apes, and other primates to assess arboreal–terrestrial trade-offs in ischium morphology among living taxa. We show that hamstring-powered hip extension during habitual walking and climbing in living apes and humans is strongly predicted, and likely constrained, by the relative length and orientation of the ischium. Ape pelves permit greater extensor moments at the hip, enhancing climbing capability, but limit their range of hip extension, resulting in a crouched gait. Human pelves reduce hip extensor moments but permit a greater degree of hip extension, which greatly improves walking economy (i.e., distance traveled/ energy consumed). Applying these results to fossil pelves suggests that early hominins differed from both humans and extant apes in having an economical walking gait without sacrificing climbing capability. *Ardipithecus* was capable of nearly human-like hip extension during bipedal walking, but retained the capacity for powerful, ape-like hip extension during vertical climbing. Hip extension capability was essentially human-like in *Australopithecus afarensis* and *Australopithecus africanus*, suggesting an economical walking gait but reduced mechanical advantage for powered hip extension during climbing.

Keywords: hominin | locomotion | ischium | evolution | pelvis

Significance: The evolution of humans’ distinct bipedal gait remains a focus of research and debate. Many reconstructions of hominin locomotor evolution assume climbing capability trades off against walking economy, with improvement in one requiring diminishment of the other, but few have tested these functional inferences experimentally. In this study, we integrate experimental locomotor mechanics from humans and other primates with osteological measurements to assess the locomotor capabilities of early hominins. Our analyses show that changes in the ischium and hamstrings would have made walking more economical without reducing the utility of these muscles for climbing in early hominins. A wider set of evolutionary solutions may have been available to early hominins than previously recognized.

PONCE DE LEÓN 2018

Marcia S. Ponce de León et al., *Human bony labyrinth is an indicator of population history and dispersal from Africa*. [PNAS 115 \(2018\), 4128–4133](#).

[pnas115-04128-Supplement.pdf](#)

Marcia S. Ponce de León, Toetik Koesbardiati, John David Weissmann, Marco Milella, Carlos S. Reyna-Blanco, Gen Suwa, Osamu Kondo, Anna-Sapfo Malaspinas, Tim D. White & Christoph P. E. Zollikofer

The dispersal of modern humans from Africa is now well documented with genetic data that track population history, as well as gene flow between populations. Phenetic skeletal data, such as cranial and pelvic morphologies, also exhibit a dispersal-from-Africa signal, which, however, tends to be blurred by the effects of local adaptation and in vivo phenotypic plasticity, and that is often deteriorated by postmortem damage to skeletal remains. These complexities raise the question of which skeletal structures most effectively track neutral population history. The cavity system of the inner ear (the so-called bony labyrinth) is a good candidate structure for such analyses. It is already fully formed by birth, which minimizes postnatal phenotypic plasticity, and it is generally well preserved in archaeological samples. Here we use morphometric data of the bony labyrinth to show that it is a surprisingly good marker of the global dispersal of modern humans from Africa. Labyrinthine morphology tracks genetic distances and geography in accordance with an isolation-by-distance model with dispersal from Africa. Our data further indicate that the neutral-like pattern of variation is compatible with stabilizing selection on labyrinth morphology. Given the increasingly important role of the petrous bone for ancient DNA recovery from archaeological specimens, we encourage researchers to acquire 3D morphological data of the inner ear structures before any invasive sampling. Such data will constitute an important archive of phenotypic variation in present and past populations, and will permit individual-based genotype–phenotype comparisons.

Keywords: human dispersals | bony labyrinth | morphometrics | stabilizing selection

Significance: The cavity system of the inner ear—the so-called bony labyrinth—houses the senses of balance and hearing. This structure is embedded in dense petrous bone, fully formed by birth and generally well preserved in human skeletal remains, thus providing a rich source of morphological information about past populations. Here we show that labyrinthine morphology tracks genetic distances and geography in an isolation-by-distance model with dispersal from Africa. Because petrous bones have become prime targets of ancient DNA recovery, we propose that all destructive studies first acquire high-resolution 3D computed tomography data prior to any invasive sampling. Such data will constitute an important archive of morphological variation in past and present populations, and will permit individual-based genotype–phenotype comparisons.

TRINKAUS 2018

Erik Trinkaus, *The labyrinth of human variation*. [PNAS 115 \(2018\), 3992–3994](#).

The detailed and thorough analysis of Ponce de León et al. is therefore a welcome addition to our understanding of global patterns of human phenotypic variation, and further documentation that human variation is principally within regional populations and patterns geographically. And their concern with the wholesale destruction of human temporal bones for DNA extraction is but a first attempt to stop the irreparable damage being done to human remains, from the Pleistocene to the near present, to obtain DNA sequences of questionable import.

Bibel

FRIEDMAN 1987

Richard Elliott Friedman, *Who wrote the Bible*. (New York ²1997).

Biographie

VOOSEN 2018

Paul Voosen, *The Realist, Vaclav Smil*. [science](#) **359** (2018), 1320–1324.
Vaclav Smil looks to history for the future of energy. What he sees is sobering.

Islam

KORAN 1996

Der heilige Qur-ân arabisch und deutsch, Übersetzung der Ahmadiyya Muslim Jamaat. (Frankfurt ⁷2003).

PARET 2004

Der Koran, Übersetzung von Rudi Paret. (Stuttgart ⁹2004).

RÜCKERT 1996

Der Koran, In der Übersetzung von Friedrich Rückert. (Würzburg 1996).

Klima

CAESAR 2018

L. Caesar, S. Rahmstorf, A. Robinson, G. Feulner & V. Saba, *Observed fingerprint of a weakening Atlantic Ocean overturning circulation*. [nature](#) **556** (2018), 191–196.

The Atlantic meridional overturning circulation (AMOC)—a system of ocean currents in the North Atlantic—has a major impact on climate, yet its evolution during the industrial era is poorly known owing to a lack of direct current measurements. Here we provide evidence for a weakening of the AMOC by about 3 ± 1 sverdrups (around 15 per cent) since the mid-twentieth century. This weakening is revealed by a characteristic spatial and seasonal sea-surface temperature ‘fingerprint’—consisting of a pattern of cooling in the subpolar Atlantic Ocean and warming in the Gulf Stream region—and is calibrated through an ensemble of model simulations from the CMIP5 project. We find this fingerprint both in a high-resolution climate model in response to increasing atmospheric carbon dioxide concentrations, and in the temperature trends observed since the late nineteenth century. The pattern can be explained by a slowdown in the AMOC and reduced northward heat transport, as well as an associated northward shift of the Gulf Stream. Comparisons with recent direct measurements from the RAPID project and several other studies provide a consistent depiction of recordlow AMOC values in recent years.

KATHAYAT 2017

Gayatri Kathayat et al., *The Indian monsoon variability and civilization changes in the Indian subcontinent*. [Science Advances](#) **3** (2017), [e1701296](#). DOI:10.1126/sciadv.1701296.

[SciAdv03-e1701296-Supplement.pdf](#)

Gayatri Kathayat, Hai Cheng, Ashish Sinha, Liang Yi, Xianglei Li, Haiwei Zhang, Hangying Li, Youfeng Ning & R. Lawrence Edwards

The vast Indo-Gangetic Plain in South Asia has been home to some of the world's oldest civilizations, whose fortunes ebbed and flowed with time—plausibly driven in part by shifts in the spatiotemporal patterns of the Indian summer monsoon rainfall. We use speleothem oxygen isotope records from North India to reconstruct the monsoon's variability on socially relevant time scales, allowing us to examine the history of civilization changes in the context of varying hydroclimatic conditions over the past 5700 years. Our data suggest that significant shifts in monsoon rainfall have occurred in concert with changes in the Northern Hemisphere temperatures and the discharges of the Himalayan rivers. The close temporal relationship between these large-scale hydroclimatic changes and the intervals marking the significant sociopolitical developments of the Indus Valley and Vedic civilizations suggests a plausible role of climate change in shaping the important chapters of the history of human civilization in the Indian subcontinent.

PRAETORIUS 2018

Summer K. Praetorius, *North Atlantic circulation slows down*. [nature](#) **556** (2018), 180–181.

Evidence suggests that the circulation system of the North Atlantic Ocean is in a weakened state that is unprecedented in the past 1,600 years, but questions remain as to when exactly the decline commenced.

However, the roughly 100-year difference in the proposed timing of the start of the AMOC decline in these two studies has big implications for the inferred trigger of the slowdown. Caesar et al. clearly put the onus on anthropogenic forcing, whereas Thornalley et al. suggest that an earlier decline in response to natural climate variability was perhaps sustained or enhanced through further ice melting associated with anthropogenic global warming. Never theless, the main culprit in both scenarios is surfacewater freshening.

THORNALLEY 2018

David J.R. Thornalley et al., *Anomalously weak Labrador Sea convection and Atlantic overturning during the past 150 years*. [nature](#) **556** (2018), 227–230.

David J.R. Thornalley, Delia W. Oppo, Pablo Ortega, Jon I. Robson, Chris M. Brierley, Renee Davis, Ian R. Hall, Paola Moffa-Sanchez, Neil L. Rose, Peter T. Spooner, Igor Yashayaev & Lloyd D. Keigwin

The Atlantic meridional overturning circulation (AMOC) is a system of ocean currents that has an essential role in Earth's climate, redistributing heat and influencing the carbon cycle^{1,2}. The AMOC has been shown to be weakening in recent years¹; this decline may reflect decadal-scale variability in convection in the Labrador Sea, but short observational datasets preclude a longer-term perspective on the modern state and variability of Labrador Sea convection and the AMOC^{1,3–5}. Here we provide several lines of palaeo-oceanographic evidence that Labrador Sea deep convection and the AMOC have been anomalously weak over the past 150 years or so (since the end of the Little Ice Age, LIA, approximately ad 1850) compared with the preceding 1,500 years. Our palaeoclimate reconstructions indicate

that the transition occurred either as a predominantly abrupt shift towards the end of the LIA, or as a more gradual, continued decline over the past 150 years; this ambiguity probably arises from non-AMOC influences on the various proxies or from the different sensitivities of these proxies to individual components of the AMOC. We suggest that enhanced freshwater fluxes from the Arctic and Nordic seas towards the end of the LIA—sourced from melting glaciers and thickened sea ice that developed earlier in the LIA—weakened Labrador Sea convection and the AMOC. The lack of a subsequent recovery may have resulted from hysteresis or from twentieth-century melting of the Greenland Ice Sheet⁶. Our results suggest that recent decadal variability in Labrador Sea convection and the AMOC has occurred during an atypical, weak background state. Future work should aim to constrain the roles of internal climate variability and early anthropogenic forcing in the AMOC weakening described here.

Kultur

PORTER 2002

Anne Porter, *The Dynamics of Death, Ancestors, Pastoralism, and the Origins of a Third-Millennium City in Syria*. [Bulletin of the American Schools of Oriental Research](#) **325** (2002), 1–36.

The rituals and practices associated with death are significant sources of social relationships beyond only issues of status. In the ancient Near East, mortuary practices created ancestors, evident both archaeologically and textually, and ancestors were intimately tied to social structures that shaped both the nature of the social group and its history. This paper focuses on the third-millennium settlement complex of Tell Banat, on the left bank of the Euphrates River, Syria. Mortuary practices there included multistage burials in which acts such as the disarticulation and burning of skeletal remains destroyed the individual identities of the deceased and rendered them cultural artifacts to be used in forming collective identities, identities that had their origins in an inclusive, mobile, pastoralist society. Paradoxically, the physical manifestation of those inclusive relations in mortuary practice led to the urbanization of this region and the eventual predominance of an exclusionary social system.

Methoden

TOPALIDOU 2018

Irini Topalidou, *The freedom of choice*. [science](#) **359** (2018), 1434.

A postdoc friend recently called me to discuss his career options. He didn't want to run his own lab, he said. Instead, he wanted to become a research scientist, mainly working at the bench—like me. I sensed that his mind was already made up, but he needed validation about pursuing a path that is not generally thought of as a professional success. Our conversation got me thinking about my own decision to become a research scientist—and about other career choices I made that went against the norm.

Politik

PONSOT 2018

Emmanuel Ponsot, Juan José Burred, Pascal Belin & Jean-Julien Aucouturier, *Cracking the social code of speech prosody using reverse correlation*. [PNAS 115 \(2018\), 3972–3977](#).

[pnas115-03972-Supplement.zip](#)

Human listeners excel at forming high-level social representations about each other, even from the briefest of utterances. In particular, pitch is widely recognized as the auditory dimension that conveys most of the information about a speaker’s traits, emotional states, and attitudes. While past research has primarily looked at the influence of mean pitch, almost nothing is known about how intonation patterns, i.e., finely tuned pitch trajectories around the mean, may determine social judgments in speech. Here, we introduce an experimental paradigm that combines state-of-the-art voice transformation algorithms with psychophysical reverse correlation and show that two of the most important dimensions of social judgments, a speaker’s perceived dominance and trustworthiness, are driven by robust and distinguishing pitch trajectories in short utterances like the word “Hello,” which remained remarkably stable whether male or female listeners judged male or female speakers. These findings reveal a unique communicative adaptation that enables listeners to infer social traits regardless of speakers’ physical characteristics, such as sex and mean pitch. By characterizing how any given individual’s mental representations may differ from this generic code, the method introduced here opens avenues to explore dysprosody and social-cognitive deficits in disorders like autism spectrum and schizophrenia. In addition, once derived experimentally, these prototypes can be applied to novel utterances, thus providing a principled way to modulate personality impressions in arbitrary speech signals.

Keywords: speech | voice | prosody | social traits | reverse-correlation

Significance: In speech, social evaluations of a speaker’s dominance or trustworthiness are conveyed by distinguishing, but little-understood, pitch variations. This work describes how to combine state-of-the-art vocal pitch transformations with the psychophysical technique of reverse correlation and uses this methodology to uncover the prosodic prototypes that govern such social judgments in speech. This finding is of great significance, because the exact shape of these prototypes, and how they vary with sex, age, and culture, is virtually unknown, and because prototypes derived with the method can then be reapplied to arbitrary spoken utterances, thus providing a principled way to modulate personality impressions in speech.

Story or Book

O’NEILL 2018

Jim O’Neill, *Swansong of a data visionary*. [nature 556 \(2018\), 25–26](#).

Jim O’Neill hails the last book by Hans Rosling, the statistician who recast progress.

Factfulness: Ten Reasons We’re Wrong About the World — and Why Things Are Better Than You Think. Hans Rosling with Ola Rosling and Anna Rosling Rönnlund. Flatiron: 2018.

This magnificent book ends with a plea for a factual world view. Rosling was optimistic that this outlook will spread, because it is a useful navigational tool in a complex world, and a genuine antidote to negativity and hopelessness.