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References

Aktuell

Fay 2019

Nicolas Fay, Naomi De Kleine, Bradley Walker & Christine A. Caldwell, *Various factors may enable large populations to enhance cumulative cultural evolution, but more evidence is needed, Reply to Martens.* PNAS **116** (2019), 17161–17162.

To conclude, our experiment set out not to simulate reality but to test the basic effect of population size on CCE. We found no evidence that larger populations enhanced CCE, suggesting that additional factors may be required. Several candidates are listed above, all of which merit empirical test. However, we must remain open to the possibility, consistent with some reports from the archeological and ethnographic record (3, 9), that larger populations do not enhance CCE.

Haggadone 2019

Mikel Haggadone, *How running redefines success.* science **365** (2019), 718.

"YOU ARE AMAZING." Those three words adorned the final slide of my most recent Research in Progress Seminar, which Ph.D. candidates in my program give annually to fellow students, postdocs, and faculty members. It's an unconventional way to end a scientific talk. The inspiration comes from my experiences as an ultrarunner—an athlete who completes runs longer than a standard marathon. The core philosophy of the team I run with—the Some Work, All Play Adventure Team—is that the courage required to pursue any scary adventure is to be celebrated, independent of the outcome. This mentality has helped me tremendously in both my professional and personal pursuits, but it's all too rare in the scientific community.

Hodgskiss 2019

Malcolm S. W. Hodgskiss, Peter W. Crockford, Yongbo Peng, Boswell A. Wing & Tristan J. Horner, *A productivity collapse to end Earth's Great Oxidation.* PNAS **116** (2019), 17207–17212.

pnas116-17207-Supplement.pdf

It has been hypothesized that the overall size of—or efficiency of carbon export from—the biosphere decreased at the end of the Great Oxidation Event (GOE) (ca. 2,400 to 2,050 Ma). However, the timing, tempo, and trigger for this decrease remain poorly constrained. Here we test this hypothesis by studying the isotope geochemistry of sulfate minerals from the Belcher Group, in subarctic Canada. Using insights from sulfur and barium isotope measurements, combined with radiometric ages from bracketing strata, we infer that the sulfateminerals studied here record ambient sulfate in the immediate aftermath of the GOE (ca. 2,018 Ma). These sulfate minerals captured negative triple-oxygen isotope anomalies as low as ≈-0.8‰. Such negative values occurring shortly after the GOE require a rapid reduction in primary productivity of >80 %, although even larger reductions are plausible. Given that these data imply a collapse in primary productivity rather than export efficiency, the trigger for this shift in the Earth system must

reflect a change in the availability of nutrients, such as phosphorus. Cumulatively, these data highlight that Earth's GOE is a tale of feast and famine: A geologically unprecedented reduction in the size of the biosphere occurred across the end-GOE transition.

Keywords: Proterozoic | primary productivity | Great Oxidation Event | triple-oxygen isotopes | nutrient limitation

Significance: The Great Oxidation Event (GOE) ca. 2,400 to 2,050 Ma caused the first significant accumulation of free oxygen in the atmosphere and potentially a dramatic growth of oxidant reservoirs on the Earth's surface in a suggested "oxygen overshoot." However, the termination of this event remains poorly understood. Here, we present geochemical data suggesting a drastic decline in gross primary productivity across the end-GOE transition, delineating a shift from "feast" to "famine" conditions characteristic of the next 1 billion y.

Martens 2019

Jason P. Martens, *Scenarios where increased population size can enhance cumulative cultural evolution are likely common.* PNAS **116** (2019), 17160.

They further suggest that only under certain circumstances might larger population sizes lead to enhanced CCE. However, the circumstances that might lead to such an effect seem to be common ones. The chosen methodological approach restricted known biases from being employed, but biases typically operate in environments outside of the laboratory. Consequently, the extent to which the results can be generalized is not clear.

People have several cultural learning biases that guide whom they copy. To name a few, people are more likely to copy prestigious social models (2), those that receive the most eye gaze (3), and those conveying nonverbal pride (4). Such biased learning increases the likelihood of copying skilled and knowledgeable others while reducing the need to consciously consider all available social models. [...] Such biased learning is likely to be widespread in the real world and is thought to contribute to prestige hierarchies (2), yet scenarios where biased learning occurs are not represented in the chosen research design.

Tian 2019

Jinge Tian, Chenglong Wang & Feng Tian et al., *Teosinte ligule allele narrows plant architecture and enhances high-density maize yields.* science **365** (2019), 658–664.

s365-0658-Supplement.pdf

Increased planting densities have boosted maize yields. Upright plant architecture facilitates dense planting. Here, we cloned UPA1 (Upright Plant Architecture1) and UPA2, two quantitative trait loci conferring upright plant architecture. UPA2 is controlled by a two-base sequence polymorphism regulating the expression of a B3-domain transcription factor (ZmRAVL1) located 9.5 kilobases downstream. UPA2 exhibits differential binding by DRL1 (DROOPING LEAF1), and DRL1 physically interacts with LG1 (LIGULELESS1) and represses LG1 activation of ZmRAVL1. ZmRAVL1 regulates brd1 (brassinosteroid C-6 oxidase1), which underlies UPA1, altering endogenous brassinosteroid content and leaf angle.The UPA2 allele that reduces leaf angle originated from teosinte, the wild ancestor of maize, and has been lost during maize domestication. Introgressing the wild UPA2 allele into modern hybrids and editing ZmRAVL1 enhance high-density maize yields.

Jinge Tian, Chenglong Wang, Jinliang Xia, Lishuan Wu, Guanghui Xu, Weihao Wu, Dan Li, Wenchao Qin, Xu Han, Qiuyue Chen, Weiwei Jin & Feng Tian

Vogel 2019

Gretchen Vogel, *'Ethical' eggs could save day-old chicks from slaughter*. science **365** (2019), 627–628.

Scientists find ways to count male chicks before they hatch.

Sorting males from females before chicks hatch at 21 days wouldn't just avoid the massacre. Hatcheries would no longer need to employ sexers, they wouldn't waste space and energy incubating male eggs, and they could sell those eggs as a raw material for animal feed producers, the cosmetics industry, or vaccine manufacturers.

Groups in Australia and Israel have used the CRISPR gene-editing technique to modify hens' sex chromosomes so that their sons carry a marker gene that makes male eggs glow under fluorescent light. That would allow hatcheries to sort out the fluorescent male eggs with a simple detector. Finding a marker that produces a strong enough signal in early embryos is a challenge, says Yehuda Elram, CEO of eggXYt (pronounced "exit") in Jerusalem. He says eggXYt has found a solution, but declined to say whether it is close to hatchery tests.

Public opposition to genetic modification in Europe means the approach is unlikely to catch on there. But Mark Tizard, a geneticist at the Australian Animal Health Laboratory in Geelong, who is also working on the technology, says his group's social science research suggests consumers in North America and Australia might accept it. Neither the layer hens nor the eggs sold for consumption would contain modified genes, because only males carry the inserted marker gene, he notes.

Wessner 2019

David R. Wessner, *Science can't be taught in a vacuum*. science **365** (2019), 614.

The news spread quickly. A student at the small liberal arts college where I am a biology professor had allegedly posted anti-Semitic neo-Nazi rhetoric on social media. Faculty members and students alike were shocked. The bubble of our close-knit community had burst; the realities of the external world were now the realities of our internal world, too. In the hours and days that followed, we all asked, "How could this happen?" Students asked another question, too: "Why don't faculty in our STEM courses discuss these issues with us?" This second question troubled me. I and other STEM (science, technology, engineering, and math) faculty members at my institution do explore social and political issues in our courses. But our students were telling us that, as a whole, we fell short.

Anthropologie

Aldenderfer 2019

Mark Aldenderfer, *Clearing the (high) air*. science **365** (2019), 541–542.

Do recent discoveries accurately define early human settlements at extreme altitudes?

Possible Acheulean-style hand axes were discovered at the buried, open-air site of DEN12-A02 (3000 masl) near Mount Dendi in Ethiopia, but because the site could not be dated chronometrically, its reported age estimate—500,000 to 200,000 yr B.P.—must be viewed with caution. The current study by Ossendorf et al. illustrates that archaeological research performed at early high-elevation sites can only be definitive if the new findings are interpreted as part of a larger system of land use in an environment with distinct adaptive challenges.

In the new work, Ossendorf et al. carefully describe both the features of the Fincha Habera rock shelter and the range of artifacts recovered at the site. In their Conclusions, the authors defined Fincha Habera as a "residential base" but say little about the duration or season of occupation of the site. Their restraint is admirable because it would have been tempting to speculate whether the site was occupied permanently. They mention this possibility but are aware that their data cannot support the claim. They also note that the site could have been part of a settlement system involving the very near lowlands.

In scientific research, words matter. The time has come for archaeologists who work on the world's high plateaus to be more deliberate about the terms they use to describe and frame their findings.

Klein 2019

Richard G. Klein, *Population structure and the evolution of Homo sapiens in Africa*. Evolutionary Anthropology **28** (2019), 179–188.

It has been proposed that a multiregional model could describe how Homo sapiens evolved in Africa beginning 300,000 years ago. Multiregionalism would require enduring morphological or behavioral differences among African regions and morphological or behavioral continuity within each. African fossils, archeology, and genetics do not comply with either requirement and are unlikely to, because climatic change periodically disrupted continuity and reshuffled populations. As an alternative to multiregionalism, I suggest that reshuffling produced novel gene constellations, including one in which the additive or cumulative effect of newly associated genes enhanced cognitive or communicative potential. Eventual fixation of such a constellation in the lineage leading to modern H. sapiens would explain the abrupt appearance of the African Later Stone Age 50–45 thousand years ago, its nearly simultaneous expansion to Eurasia in the form of the Upper Paleolithic, and the ability of fully modern Upper Paleolithic people to swamp or replace non-modern Eurasians.

Keywords: evolution of Homo sapiens | later stone age | middle stone age | modern human origins

Ossendorf 2019

Götz Ossendorf, Alexander R. Groos, Tobias Bromm, Minassie Girma Tekelemariam & Bruno Glaser et al., *Middle Stone Age foragers resided in high elevations of the glaciated Bale Mountains, Ethiopia*. science **365** (2019), 583–587.

s365-0583-Supplement1.pdf, s365-0583-Supplement2.xlsx

Studies of early human settlement in alpine environments provide insights into human physiological, genetic, and cultural adaptation potentials. Although Late and even Middle Pleistocene human presence has been recently documented on the Tibetan Plateau, little is known regarding the nature and context of early persistent human settlement in high elevations. Here, we report the earliest evidence of a prehistoric high-altitude residential site. Located in Africa's largest alpine ecosystem, the repeated occupation of Fincha Habera rock shelter is dated to 47 to 31 thousand years ago.The available resources in cold and glaciated environments included the exploitation of an endemic rodent as a key food source, and this played a pivotal role in facilitating the occupation of this site by Late Pleistocene hunter-gatherers.

Götz Ossendorf, Alexander R. Groos, Tobias Bromm, Minassie Girma Tekelemariam, Bruno Glaser, Joséphine Lesur, Joachim Schmidt, Naki Akçar, Tamrat Bekele, Alemseged Beldados, Sebsebe Demissew, Trhas Hadush Kahsay, Barbara P.

Nash, Thomas Nauss, Agazi Negash, Sileshi Nemomissa, Heinz Veit, Ralf Vogelsang, Zerihun Woldu, Wolfgang Zech, Lars Opgenoorth & Georg Miehe

Bibel

Fantalkin 2011

Alexander Fantalkin, *Why Did Nebuchadnezzar II Destroy Ashkelon in Kislev 604 B.C.E.?* In: Israel Finkelstein & Nadav Na'aman (Hrsg.), *The Fire Signals of Lachish, Archaeology and History of Israel in the Late Bronze Age, Iron Age, and Persian Period in Honor of David Ussishkin*. (Winona Lake 2011), 87–111.

To conclude, the goal of the present study has been to demonstrate that the best possible explanation for the Babylonian destruction of Ashkelon in Kislev 604 B.C.E. should be sought in the Babylonian desire to eliminate an Egyptian garrison located in the town and consisting mainly of Greek mercenaries. Toward that end, the Babylonians wisely calculated the best possible season for such an operation; all this in order to crush the remaining Egyptian strongholds in Palestine and to prevent Ashkelon with its Egyptian garrison from becoming a thorn in the lesh of the southern frontier of the Babylonian empire. Needless to say, such a severe punitive campaign, undertaken in the irst regnal year of Nebuchadnezzar, sent a powerful message to the other kingdoms in the region. Apparently, however, the lesson was not learned, and soon a number of additional kingdoms and their sovereigns would share the fate of Ashkelon under Babylonian rule.

Lizorkin-Eyzenberg 2019

Eliyahu Lizorkin-Eyzenberg, *The Hidden Story of Jacob, What we can see in Hebrew that we cannot see in English*. (Kadima-Tzuran 2019).

Jacob is one of the most fascinating characters in the entire Hebrew Bible. His story and the story of his children are some of the greatest stories ever told. Some details of his life remain hidden to most people because they cannot read the original Hebrew. Translations often fail to convey everything the Hebrew text reveals. I hope to help you see some of the details hidden and obscured by English translations. So, let us begin in the beginning.

Zissu 2014

Boaz Zissu & Omri Abadi, *Paleo-Hebrew Script in Jerusalem and Judea From the Second Century B.C.E. Through the Second Century C.E. A Reconsideration*. Journal for Semitics **23** (2014), 653–664.

The article focuses on the use of the Paleo-Hebrew script versus the square script (known also as "Jewish script" or "Assyrian") by the Jews of Judea during the Hellenistic and Roman periods. From the Persian period until the Bar Kokhba Rebellion, Paleo-Hebrew script was used in various Jewish contexts (official, sacred, funerary) and on a variety of substrates (parchment, stone, coins, and pottery). The most representative artefacts bearing inscriptions in the Paleo-Hebrew script are Jewish coins of that time and the Dead Sea Scrolls. One common view is that because the Hasmoneans and the rebels in both revolts sought to establish their sovereignty, they employed symbols of Jewish significance and the archaic and obsolete – but prestigious – Paleo-Hebrew script, which was a reminder of the glorious past. Studies of the Dead Sea Scrolls commonly premise that greater holiness and value was attached to the Paleo- Hebrew script than to the square

script. The article shows that, in the Second Temple period, the square script was considered holy. Consequently, those who were scrupulous about observing the laws of ritual purity refrained from using the square script for mundane purposes and used the Paleo-Hebrew script instead.

Biologie

Ackermann 2019

Rebecca R. Ackermann et al., *Hybridization in human evolution: Insights from other organisms*. Evolutionary Anthropology **28** (2019), 189–209.

Rebecca R. Ackermann, Michael L. Arnold, Marcella D. Baiz, James A. Cahill, Liliana Cortés-Ortiz, Ben J. Evans, B. Rosemary Grant, Peter R. Grant, Benedikt Hallgrimsson, Robyn A. Humphreys, Clifford J. Jolly, Joanna Malukiewicz, Christopher J. Percival, Terrence B. Ritzman, Christian Roos, Charles C. Roseman, Lauren Schroeder, Fred H. Smith, Kerryn A. Warren, Robert K. Wayne & Dietmar Zinner

During the late Pleistocene, isolated lineages of hominins exchanged genes thus influencing genomic variation in humans in both the past and present. However, the dynamics of this genetic exchange and associated phenotypic consequences through time remain poorly understood. Gene exchange across divergent lineages can result in myriad outcomes arising from these dynamics and the environmental conditions under which it occurs. Here we draw from our collective research across various organisms, illustrating some of the ways in which gene exchange can structure genomic/phenotypic diversity within/among species. We present a range of examples relevant to questions about the evolution of hominins. These examples are not meant to be exhaustive, but rather illustrative of the diverse evolutionary causes/consequences of hybridization, highlighting potential drivers of human evolution in the context of hybridization including: influences on adaptive evolution, climate change, developmental systems, sex-differences in behavior, Haldane's rule and the large X-effect, and transgressive phenotypic variation.

Keywords: gene flow | introgression | model organisms | modern human origins | Neanderthals

Datierung

Brandt 2017

Steven Brandt, Elisabeth Hildebrand, Ralf Vogelsang, Jesse Wolfhagen & Hong Wang, *A new MIS 3 radiocarbon chronology for Mochena Borago Rockshelter, SW Ethiopia, Implications for the interpretation of Late Pleistocene chronostratigraphy and human behavior*. Journal of Archaeological Science: Reports **11** (2017), 352–369.

With excavated layers spanning a period from N49 ka to ≈36 ka, Mochena Borago Rockshelter reveals a complex sequence of Late Pleistocene human occupation punctuated by volcanic events. Fifty-nine radiocarbon agesmake Mochena Borago one of the best-dated Late Pleistocene archaeological sites in eastern and northeastern Africa. However, complex site formation processes, dramatic stratigraphic differences between non-contiguous excavation areas, and "outlier" dates that appear in various parts of Mochena Borago's sequence, complicate efforts to develop a secure and detailed chronology for local and regional behavioral changes. This

article focuses on contiguous squares within the Block Excavation Area (BXA) trench at the northern end of the shelter. Bayesian modeling of thirty-seven dates from six major lithostratigraphic units within the BXA yields a revised series of age ranges; these differ from the previous age model (derived from weighted means) in subtle but important ways. Perspectives gained through Bayesian analysis stimulate more careful consideration of the complex site formation processes operating at Mochena Borago, the contextual integrity of the site's robust and distinctive flaked stone artifact assemblages (lithics), and potential correlations between lithic changes and environmental events that occur on local, regional, and global scales. As these factors comeinto focus, Mochena Borago can serve as an important chronological benchmark to better understand human behavior in eastern and northeastern Africa around the time of the second major dispersal of Homo sapiens.

Keywords: MIS 3 | Ethiopia | Lithic technology | Radiocarbon | Late Pleistocene | Bayesian modeling

Energie

Huang 2019

Shuai Huang, Tie Li, Zhifei Zhang & Pengfei Ma, *Rotational and vibrational temperatures in the spark plasma by various discharge energies and strategies*. Applied Energy **251** (2019), 113358, 1–11.

Highlights:

- Time-resolved rotational and vibrational temperatures in spark plasma are measured.
- These plasma temperatures are related to the energy release rates to the plug gap.
- The plasma is in the non-thermal equilibrium state during the discharge processes.
- Continuous discharge generate a stable long-time non-thermal equilibrium plasma.

Increasing discharge energies and employing advanced discharge strategies have been deemed to be effective Methods for improving the ignition processes, especially for diluted or lean combustion. However, so far knowledge on the relevant mechanism is far from adequate. In particular, the effects of the plasma produced between the spark plug electrodes on spark ignition processes need to be further clarified. The plasma temperatures are important as they are closely related to the chemical reaction rate. In this study, the vibrational and rotational temperatures of the discharge plasma are quantitatively evaluated by a time series of spectral measurements with different discharge energies and strategies in air under atmospheric pressure, based on the N2 second positive molecular emission spectra. The vibrational and rotational temperatures show a perfect consistent trend with the release rates of delivered energy to the spark plug gap. This indicates that the two temperatures can be enhanced by the higher energy release rates and can be effectively controlled by different discharge strategies. The vibrational and rotational temperatures measured in this study are in the range of 3700–4300 K and 1400–2600 K, respectively. The temperature differences between the vibrational and rotational temperatures exceed 1600 K, increasing with the energy release rate decreasing. This indicates that the spark discharge plasma is in a state of non-thermal equilibrium with the existence of the discharge energies under the non-flow conditions. These results would be a reference to further develop the advanced discharge strategies and improve the ignition stability.

Keywords: Spark discharge | Emission spectra | Vibrational and rotational temperatures | Discharge energies | Discharge strategies

Xu 2019

Zidan Xu, Yahui Zhang., Huanyu Di & Tielong Shen, *Combustion variation control strategy with thermal efficiency optimization for lean combustion in spark-ignition engines*. Applied Energy **251** (2019), 113329, 1–9.

Highlights:

- A combustion variation control strategy with efficiency optimization is proposed.
- A Hypothesis Test-based method is used to reduce cylinder-to-cylinder variation.
- Thermal efficiency is maximized online using Extremum Seeking method.
- The effectiveness of the proposed strategy is validated on a production SI engine.

A widespread consensus among internal combustion engine researchers is that higher thermal efficiency can be achieved with lean combustion. However, compared with a normal combustion mode (i.e., under a stoichiometric air-fuel ratio), combustion variation under lean operation is much more distinct, creating a bottleneck of thermal efficiency maximization. In this paper, a combustion variation control strategy that considers thermal efficiency optimization is proposed. This proposed strategy consists of two main components. One component focuses on diminishing combustion variation from cylinder to cylinder using a hypothesis test-based method. The other component provides the optimal value by searching for spark timing to maximize thermal efficiency. The effectiveness and performance of the proposed method are experimentally validated on a production sparkignited gasoline engine test bench. From the experimental results, a notable combustion variation restrain performance with an average of 27 % variation reduction is achieved using the proposed method. In addition, the self-optimization performance of spark timing under environmental changes is proven to be effective.

Keywords: Lean combustion | Variation control | Thermal efficiency optimization | Spark-ignition engine

Klima

Heinsohn 2019

Gunnar Heinsohn, *Migration aus Afrika*, *Es gibt Gründe für die Flucht aus dem Sahel – Das Klima ist keiner*. Die Welt **2019**, Aug. 22.

Geografische und geologische Recherchen haben zur Überraschung der Experten überdies ergeben, daß sich die Sahara "keineswegs nach Süden ausgedehnt hat". Die agrarische Beeinträchtigung aber bestätigen sie.

Was aber schleift diese Burgen, wenn es das Klima nicht ist? Die Hauptkampfgebiete in Mali, Niger und Burkina Faso verzeichnen zwischen 1950 und 2019 einen Bevölkerungsanstieg von zehn auf über 60 Millionen Einwohner. 2050 sollen sie bei 130 Millionen stehen. Nimmt man den Tschad und Kamerun als ebenfalls terrorbetroffene Nachbargebiete hinzu, geht es zwischen 1950 und 2019 von 18 auf 105 Millionen – durch Überweidung und Denaturierung der Böden – die Lebensgrundlage für alle unterminieren.

Tan 2019

Liangcheng Tan, Chuan-Chou Shen, Yanjun Cai, Sebastian F. M. Breitenbach, Hai Cheng, Judson W. Partin & Ola Kwiecien, *Rainfall variations in central Indo-Pacific over the past 2,700 y*. PNAS **116** (2019), 17201–17206.

pnas116-17201-Supplement1.pdf, pnas116-17201-Supplement2.xls, pnas116-17201-Supplement3.xls

Tropical rainfall variability is closely linked to meridional shifts of the Intertropical Convergence Zone (ITCZ) and zonal movements of the Walker circulation. The characteristics and mechanisms of tropical rainfall variations on centennial to decadal scales are, however, still unclear. Here, we reconstruct a replicated stalagmite-based 2,700-y-long, continuous record of rainfall for the deeply convective northern central Indo-Pacific (NCIP) region. Our record reveals decreasing rainfall in the NCIP over the past 2,700 y, similar to other records from the northern tropics. Notable centennial- to decadal-scale dry climate episodes occurred in both the NCIP and the southern central Indo-Pacific (SCIP) during the 20th century [Current Warm Period (CWP)] and the Medieval Warm Period (MWP), resembling enhanced El Niño-like conditions. Further, we developed a 2,000-y-long ITCZ shift index record that supports an overall southward ITCZ shift in the central Indo-Pacific and indicates southward mean ITCZ positions during the earlyMWP and the CWP. As a result, the drying trend since the 20th century in the northern tropics is similar to that observed during the past warm period, suggesting that a possible anthropogenic forcing of rainfall remains indistinguishable from natural variability.

Liangcheng Tan, Chuan-Chou Shen, Ludvig Löwemark, Sakonvan Chawchai, R. Lawrence Edwards, Yanjun Cai, Sebastian F. M. Breitenbach, Hai Cheng, Yu-Chen Chou, Helmut Duerrast, Judson W. Partin, Wenju Cai, Akkaneewut Chabangborn, Yongli Gao, Ola Kwiecien, Chung-Che Wu, Zhengguo Shi, Huang-Hsiung Hsu & Barbara Wohlfarth

Keywords: central Indo-Pacific | rainfall | ENSO | ITCZ | stalagmite

Significance: We present a high-resolution, replicated speleothem d18O record from Klang Cave in southern Thailand that characterizes rainfall variation in NCIP over the past 2,700 y. This record reveals notable dry climate conditions during the current and past warm periods, similar to the observations in SCIP, which resemble enhanced El Nino-like conditions. Using a newly developed ITCZ shift index, we find a southward shifted ITCZ during the early MWP and the CWP. Our results suggest that detecting changes in rainfall due to anthropogenic forcing still remains indistinguishable from natural variability in the northern tropics.

Methoden

Fox 2019

Keolu Fox & John Hawks, *Use ancient remains more wisely*. nature **572** (2019), 581–583.

Researchers rushing to apply powerful sequencing techniques to ancient-human remains must think harder about safeguarding, urge Keolu Fox and John Hawks.

Many of the great archaeological sites of prehistory are now empty thanks to early archaeologists — sometimes little more than treasure-hunters — commanding armies of unskilled workers to scoop up the contents of caves, tombs and burial grounds. When so little was known, the bar was low; any discovery was interesting, and little or nothing was left for future generations. In fact, even as late as the 1990s, large sections of ancient human skeletons were destroyed for radiocarbon and other analyses that can now be accomplished using much smaller portions of bone.

Rather than repeat the mistakes of the past, future generations of scientists — from all countries of the world and from all sectors of society — must be given the opportunity to interpret our shared history.

Sellier 2019

Anne-Laure Sellier, Irene Scopelliti & Carey K. Morewedge, *Debiasing Training Improves Decision Making in the Field*. Psychological Science (2019), preprint, 1–9. DOI:10.1177/0956797619861429.

The primary objection to debiasing-training interventions is a lack of evidence that they improve decision making in field settings, where reminders of bias are absent. We gave graduate students in three professional programs (N = 290) a one-shot training intervention that reduces confirmation bias in laboratory experiments. Natural variance in the training schedule assigned participants to receive training before or after solving an unannounced business case modeled on the decision to launch the Space Shuttle Challenger. We used case solutions to surreptitiously measure participants' susceptibility to confirmation bias. Trained participants were 29 % less likely to choose the inferior hypothesis-confirming solution than untrained participants. Analysis of case write-ups suggests that a reduction in confirmatory hypothesis testing accounts for their improved decision making in the case. The results provide promising evidence that debiasing-training effects transfer to field settings and can improve decision making in professional and private life.

Keywords: debiasing | training | confirmation bias | confirmatory hypothesis testing | judgment and decision making | open data

Neolithikum

Frantz 2019

Laurent A. F. Frantz, Audrey T. Lin, Kurt J. Gron, Peter Rowley-Conwy, Melinda Zeder, Joris Peters & Greger Larson, *Ancient pigs reveal a near-complete genomic turnover following their introduction to Europe*. PNAS **116** (2019), 17231–17238.

pnas116-17231-Supplement1.pdf, pnas116-17231-Supplement2.xlsx, pnas116-17231-Supplement3.xlsx

Archaeological evidence indicates that pig domestication had begun by ≈10,500 y before the present (BP) in the Near East, and mitochondrial DNA (mtDNA) suggests that pigs arrived in Europe alongside farmers ≈8,500 y BP. A few thousand years after the introduction of Near Eastern pigs into Europe, however, their characteristic mtDNA signature disappeared and was replaced by haplotypes associated with European wild boars. This turnover could be accounted for by substantial gene flow from local European wild boars, although it is also possible that European wild boars were domesticated independently without any genetic contribution from the Near East. To test these hypotheses, we obtained mtDNA sequences from 2,099 modern and ancient pig samples and 63 nuclear ancient genomes from Near Eastern and European pigs. Our analyses revealed that European domestic pigs dating from 7,100 to 6,000 y BP possessed both Near Eastern and European nuclear ancestry, while later pigs possessed no more than 4 % Near Eastern ancestry, indicating that gene flow from European wild boars resulted in a near-complete disappearance of Near East ancestry. In addition, we demonstrate that a variant at a locus encoding black coat color likely originated in the Near East and persisted in European pigs. Altogether, our results indicate that while pigs were not independently domesticated in Europe, the vast majority of human-mediated selection over the past 5,000 y focused on the genomic fraction derived from the European wild boars, and not on the fraction that was selected by early Neolithic farmers over the first 2,500 y of the domestication process.

Laurent A. F. Frantz, James Haile, Audrey T. Lin, Amelie Scheu, Christina Geörg, Norbert Benecke, Michelle Alexander, Anna Linderholm, Victoria E. Mullin, Kevin G. Daly, Vincent M. Battista, Max Price, Kurt J. Gron, Panoraia Alexandri, Rose-Marie Arbogast, Benjamin Arbuckle, Adrian Bălăşescu, Ross Barnett, László Bartosiewicz, Gennady Baryshnikov, Clive Bonsall, Dušan Borić, Adina Boroneanţ, Jelena Bulatović, Canan Çakirlar, José-Miguel Carretero, John Chapman, Mike Church, Richard Crooijmans, Bea De Cupere, Cleia Detry, Vesna Dimitrijevic, Valentin Dumitraşcu, Louis du Plessis, Ceiridwen J. Edwards, Cevdet Merih Erek, Asli Erim-Özdoğan, Anton Ervynck, Domenico Fulgione, Mihai Gligor, Anders Götherström, Lionel Gourichon, Martien A. M. Groenen, Daniel Helmer, Hitomi Hongo, Liora K. Horwitz, Evan K. Irving-Pease, Ophélie Lebrasseur, Joséphine Lesur, Caroline Malone, Ninna Manaseryan, Arkadiusz Marciniak, Holley Martlew, Marjan Mashkour, Roger Matthews, Giedre Motuzaite Matuzeviciute, Sepideh Maziar, Erik Meijaard, Tom McGovern, Hendrik-Jan Megens, Rebecca Miller, Azadeh Fatemeh Mohaseb, Jörg Orschiedt, David Orton, Anastasia Papathanasiou, Mike Parker Pearson, Ron Pinhasi, Darko Radmanović, François-Xavier Ricaut, Mike Richards, Richard Sabin, Lucia Sarti, Wolfram Schier, Shiva Sheikhi, Elisabeth Stephan, John R. Stewart, Simon Stoddart, Antonio Tagliacozzo, Nenad Tasić, Katerina Trantalidou, Anne Tresset, Cristina Valdiosera, Youri van den Hurk, Sophie Van Poucke, Jean-Denis Vigne, Alexander Yanevich, Andrea Zeeb-Lanz, Alexandros Triantafyllidis, M. Thomas P. Gilbert, Jörg Schibler, Peter Rowley-Conwy, Melinda Zeder, Joris Peters, Thomas Cucchi, Daniel G. Bradley, Keith Dobney, Joachim Burger, Allowen Evin, Linus Girdland-Flink & Greger Larson

Keywords: domestication | evolution | gene flow | Neolithic

Significance: Archaeological evidence indicates that domestic pigs arrived in Europe, alongside farmers from the Near East ≈8,500 y ago, yet mitochondrial genomes of modern European pigs are derived from European wild boars. To address this conundrum, we obtained mitochondrial and nuclear data frommodern and ancient Near Eastern and European pigs. Our analyses indicate that, aside from a coat color gene, most Near Eastern ancestry in the genomes of European domestic pigs disappeared over 3,000 y as a result of interbreeding with local wild boars. This implies that pigs were not domesticated independently in Europe, yet the first 2,500 y of human-mediated selection applied by Near Eastern Neolithic farmers played little role in the development of modern European pigs.

Physik

Do 2019

Tuan Do et al., *Relativistic redshift of the star S0-2 orbiting the Galactic Center supermassive black hole.* science **365** (2019), 664–668.

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Tuan Do, Aurelien Hees, Andrea Ghez, Gregory D. Martinez, Devin S. Chu, Siyao Jia, Shoko Sakai, Jessica R. Lu, Abhimat K. Gautam, Kelly Kosmo O'Neil, Eric E. Becklin, Mark R. Morris, Keith Matthews, Shogo Nishiyama, Randy Campbell, Samantha Chappell, Zhuo Chen, Anna Ciurlo, Arezu Dehghanfar, Eulalia Gallego-Cano, Wolfgang E. Kerzendorf, James E. Lyke, Smadar Naoz, Hiromi Saida, Rainer Schödel, Masaaki Takahashi, Yohsuke Takamori, Gunther Witzel & Peter Wizinowich

All authors participated in writing and discussions of the paper.

The general theory of relativity predicts that a star passing close to a supermassive black hole should exhibit a relativistic redshift. In this study, we used observations of the Galactic Center star S0-2 to test this prediction. We combined

existing spectroscopic and astrometric measurements from 1995–2017, which cover S0-2's 16-year orbit, with measurements from March to September 2018, which cover three events during S0-2's closest approach to the black hole. We detected a combination of special relativistic and gravitational redshift, quantified using the redshift parameter γ. Our result, $\gamma = 0.88 \pm 0.17$, is consistent with general relativity ($\gamma = 1$) and excludes a Newtonian model ($\gamma = 0$) with a statistical significance of $5\,\sigma$.

Sprachlehre

Gray 2007

David K. H. Gray, *A New Analysis of a Key Hebrew Term, The Semantics of Galah ('To Go into Exile')*. Tyndale Bulletin **58** (2007), 43–59.

This study is an attempt to update James Barr's work on the semantics of biblical language by analysing one Hebrew term: גלה II (galah II) 'to go into exile'. The article criticises existing entries in theological dictionaries, as well as providing a new analysis. The writer is one of the researchers on the Key Terms of Biblical Hebrew project. The project should benefit others who would like to dig deeper into the meaning of Hebrew terms as they are used in the Old Testament.

Story or Book

Kiser 2019

Barbara Kiser, *How to Be a Dictator*. nature **572** (2019), 585.

How to Be a Dictator. Frank Dikötter. Bloomsbury (2019)

For this magisterial study on the misuse of power, historian Frank Dikötter analysed the strategies of eight brutal twentieth-century dictators. The result reveals how weak, largely unelectable men such as Adolf Hitler and Joseph Stalin maintained cults of personality through tireless self-glorification, aided by propaganda and the illusion of popular consent. Dikötter's insights into their modus operandi — "to sow confusion, to destroy common sense, to enforce obedience, to isolate individuals and crush their dignity" — make for salutary reading at a time of persistent attacks on democracy.