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References

Afrika

Wright 2011

David K. Wright, *Frontier animal husbandry in the Northeast and East African Neolithic, A Multiproxy Paleoenvironmental and Paleodemographic Study.* Journal of Anthropological Research **67** (2011), 213–244.

Domesticated animals spread from their ancestral heartland in northern Africa and southwestern Asia into eastern and southern Africa after 4000 bp. Three theories account for the relatively slow spread of domesticated animals into the southern latitudes between 4000 and 3000 bp. The first theory posits that arid climates hindered the dispersal of domesticated animals beyond the Lake Turkana basin until pluvial conditions set in after 3000 bp. The second theory argues that epizootic diseases were the inhibiting factors. Finally, indigenous cultural reticence to alter their primary modes of subsistence in favor of animal husbandry accords with the archaeological data from sites that date to this period. A single normative paradigm explaining the shift from a primarily foraging subsistence economy to one that relied heavily on domesticates is unlikely. This review of the current archaeological and paleoenvironmental state of knowledge finds the "static frontier" likely resulted from a combination of all of these factors.

Keywords: Pastoralism, East Africa, Neolithic, Frontier, Paleoenvironments, Epizootic diseases

Aktuell

Berent 2015

Iris Berent et al., *Role of the motor system in language knowledge.* PNAS **112** (2015), 1983–1988.

Iris Berent, Anna-Katharine Brem, Xu Zhao, Erica Seligson, Hong Pan, Jane Epstein, Emily Stern, Albert M. Galaburda & Alvaro Pascual-Leone

All spoken languages express words by sound patterns, and certain patterns (e.g., blog) are systematically preferred to others (e.g., lbog). What principles account for such preferences: does the language system encode abstract rules banning syllables like lbog, or does their dislike reflect the increased motor demands associated with speech production? More generally, we ask whether linguistic knowledge is fully embodied or whether some linguistic principles could potentially be abstract. To address this question, here we gauge the sensitivity of English speakers to the putative universal syllable hierarchy (e.g., blif.bnif.bdif.lbif) while undergoing transcranial magnetic stimulation (TMS) over the cortical motor representation of the left orbicularis oris muscle. If syllable preferences reflect motor simulation, then worse-formed syllables (e.g., lbif) should (i) elicit more errors; (ii) engage more strongly motor brain areas; and (iii) elicit stronger effects of TMS on these motor regions. In line with the motor account, we found that repetitive TMS pulses impaired participants' global sensitivity to the number of syllables, and functional MRI confirmed that the cortical stimulation site was sensitive to the syllable hierarchy. Contrary to the motor account, however, ill-formed syllables

were least likely to engage the lip sensorimotor area and they were least impaired by TMS. Results suggest that speech perception automatically triggers motor action, but this effect is not causally linked to the computation of linguistic structure. We conclude that the language and motor systems are intimately linked, yet distinct. Language is designed to optimize motor action, but its knowledge includes principles that are disembodied and potentially abstract.

Keywords: embodiment | TMS | fMRI | phonology | language universals

Centola 2015

Damon Centola & Andrea Baronchelli, *The spontaneous emergence of conventions, An experimental study of cultural evolution.* PNAS **112** (2015), 1989–1994.

How do shared conventions emerge in complex decentralized social systems? This question engages fields as diverse as linguistics, sociology, and cognitive science. Previous empirical attempts to solve this puzzle all presuppose that formal or informal institutions, such as incentives for global agreement, coordinated leadership, or aggregated information about the population, are needed to facilitate a solution. Evolutionary theories of social conventions, by contrast, hypothesize that such institutions are not necessary in order for social conventions to form. However, empirical tests of this hypothesis have been hindered by the difficulties of evaluating the real-time creation of new collective behaviors in large decentralized populations. Here, we present experimental results—replicated at several scales—that demonstrate the spontaneous creation of universally adopted social conventions and show how simple changes in a population's network structure can direct the dynamics of normformation, driving human populations with noambition for large scale coordination to rapidly evolve shared social conventions.

Keywords: social conventions | spontaneous emergence | complex systems | empirical testing | network science

Eckhardt 2015

Robert B. Eckhardt, Maciej Henneberg, Sakdapong Chavanaves, Alexander S. Weller & Kenneth J. Hsü, *Mandibular misrepresentations fail to support the invalid species Homo floresiensis, Reply to Westaway et al.* PNAS **112** (2015), E606.

For all of these reasons, the inexpert statements made about the Liang Bua mandibles represent yet another attempted diversion from the inability of archaeologists to establish a valid primitive hominin species on the basis of unfossilized bones found at one site, despite a decade of searches.

Falk 2015

Emily B. Falk et al., *Self-affirmation alters the brain's response to health messages and subsequent behavior change.* PNAS **112** (2015), 1977–1982.

Emily B. Falk, Matthew Brook O'Donnell, Christopher N. Cascio, Francis Tinney, Yoona Kang, Matthew D. Lieberman, Shelley E. Taylor, Lawrence An, Kenneth Resnicow & Victor J. Strecher

Health communications can be an effective way to increase positive health behaviors and decrease negative health behaviors; however, those at highest risk are often most defensive and least open to such messages. For example, increasing physical activity among sedentary individuals affects a wide range of important mental and physical health outcomes, but has proven a challenging task. Affirming core values (i.e., self-affirmation) before message exposure is a psychological

technique that can increase the effectiveness of a wide range of interventions in health and other domains; however, the neural mechanisms of affirmation's effects have not been studied. We used functional magnetic resonance imaging (fMRI) to examine neural processes associatedwith affirmation effects during exposure to potentially threatening health messages. We focused on an a priori defined region of interest (ROI) in ventromedial prefrontal cortex (VMPFC), a brain region selected for its association with self-related processing and positive valuation. Consistent with our hypotheses, those in the self-affirmation condition produced more activity in VMPFC during exposure to health messages and went on to increase their objectively measured activity levels more. These findings suggest that affirmation of core values may exert its effects by allowing at-risk individuals to see the self-relevance and value in otherwise-threatening messages.

Keywords: self-affirmation | fMRI | behavior change | VMPFC | physical activity

Schopf 2015

J. William Schopf et al., *Sulfur-cycling fossil bacteria from the 1.8-Ga Duck Creek Formation provide promising evidence of evolution's null hypothesis*. PNAS **112** (2015), 2087–2092.

pnas112-02087-Supplement.xls

J. William Schopf, Anatoliy B. Kudryavtsev, Malcolm R. Walter, Martin J. Van Kranendonk, Kenneth H. Williford, Reinhard Kozdon, John W. Valley, Victor A. Gallardo, Carola Espinoza & David T. Flannery

The recent discovery of a deep-water sulfur-cycling microbial biota in the ≈2.3-Ga Western Australian Turee Creek Group opened a new window to life's early history. We now report a second such subseafloor-inhabiting community from the Western Australian ≈1.8-Ga Duck Creek Formation. Permineralized in cherts formed during and soon after the 2.4- to 2.2-Ga "Great Oxidation Event," these two biotas may evidence an opportunistic response to the mid-Precambrian increase of environmental oxygen that resulted in increased production of metabolically useable sulfate and nitrate. The marked similarity of microbial morphology, habitat, and organization of these fossil communities to their modern counterparts documents exceptionally slow (hypobradytelic) change that, if paralleled by their molecular biology, would evidence extreme evolutionary stasis.

Keywords: Great Oxidation Event | microbial evolution | null hypothesis | Precambrian microorganisms | sulfur bacteria

Sumaila 2015

U. Rashid Sumaila et al., *Winners and losers in a world where the high seas is closed to fishing*. Scientific Reports **5** (2015), 8481. DOI:10.1038/srep08481.

SciRep05-08481-Supplement.pdf

U. Rashid Sumaila, Vicky W. Y. Lam, Dana D. Miller, Louise Teh, Reg A. Watson, Dirk Zeller, William W. L. Cheung, Isabelle M. Côté, Alex D. Rogers, Callum Roberts, Enric Sala & Daniel Pauly

Fishing takes place in the high seas and Exclusive Economic Zones (EEZs) of maritime countries. Closing the former to fishing has recently been proposed in the literature and is currently an issue of debate in various international fora. We determine the degree of overlap between fish caught in these two areas of the ocean, examine how global catch might change if catches of straddling species or taxon groups increase within EEZs as a result of protection of adjacent high seas; and identify countries that are likely to gain or lose in total catch quantity and value following high-seas closure. We find that ,0.01 % of the quantity and value of commercial fish taxa are obtained from catch taken exclusively in the high seas,

and if the catch of straddling taxa increases by 18 % on average following closure because of spillover, there would be no loss in global catch. The Gini coefficient, which measures income inequality, would decrease from 0.66 to 0.33. Thus, closing the high seas could be catch-neutral while inequality in the distribution of fisheries benefits among the world's maritime countries could be reduced by 50 %.

Tao 2015

Shengli Tao, Jingyun Fang, Xia Zhao, Shuqing Zhao, Haihua Shen, Huifeng Hu, Zhiyao Tang, Zhiheng Wang & Qinghua Guo, *Rapid loss of lakes on the Mongolian Plateau*. PNAS **112** (2015), 2281–2286.

Lakes are widely distributed on the Mongolian Plateau and, as critical water sources, have sustained Mongolian pastures for hundreds of years. However, the plateau has experienced significant lake shrinkage and grassland degradation during the past several decades. To quantify the changes in all of the lakes on the plateau and the associated driving factors, we performed a satellitebased survey using multitemporal Landsat images from the 1970s to 2000s, combined with ground-based censuses. Our results document a rapid loss of lakes on the plateau in the past decades: the number of lakes with a water surface area >1 km2 decreased from 785 in the late 1980s to 577 in 2010, with a greater rate of decrease (34.0 %) in Inner Mongolia of China than in Mongolia (17.6 %). This decrease has been particularly pronounced since the late 1990s in Inner Mongolia and the number of lakes >10 km2 has declined by 30.0 %. The statistical analyses suggested that in Mongolia precipitation was the dominant driver for the lake changes, and in Inner Mongolia coal mining was most important in its grassland area and irrigation was the leading factor in its cultivated area. The deterioration of lakes is expected to continue in the following decades not only because of changing climate but also increasing exploitation of underground mineral and groundwater resources on the plateau. To protect grasslands and the indigenous nomads, effective action is urgently required to save these valuable lakes from further deterioration.

Keywords: Mongolia | lake shrinkage | mining | irrigation | climate change

Underwood 2015

Emily Underwood, *A New Drug War*. science **347** (2015), 469–473.

As a growing wave of designer drugs hits the streets, researchers try to forecast which will prove most popular—and dangerous.

Synthetic cannabinoids, humanmade chemicals designed to mimic THC, ... are typically sprayed onto dried plant material so they can be smoked. They are billed as providing marijuanalike highs while eluding drug tests. Sold since the early 2000s under brand names such as K2 and Spice, they act on the same brain receptors as THC but are up to 100 times more potent, leading to dangerous side effects such as heart attack, kidney failure, psychosis, and sometimes death. Many people underestimate the risk of synthetic cannabinoids because they see marijuana as benign, says Marilyn Huestis, a toxicologist at the U.S. National Institute on Drug Abuse (NIDA) who is developing tests for the drugs in blood, saliva, urine, and breath. "People are less afraid of a joint than they are of a white powder."

Westaway 2015

Michael Carrington Westaway, Arthur C. Durband, Colin P. Groves & Mark Collard, *Mandibular evidence supports Homo floresiensis as a distinct species*. PNAS **112** (2015), E604–E605.

Many interesting questions about the Liang Bua fossils remain unanswered, but whether LB1 is a pathological H. sapiens is not one of them. As we have demonstrated, the available mandibular evidence is already sufficient to discount this possibility.

You 2015

Jia You, *Camouflaging searches in a sea of fake queries*. science **347** (2015), 502.

For consumers who want to continue using their favorite search services but with added protection, researchers at New York University in New York City have developed a browser extension that produces dummy search requests that drown out a user's real queries, thwarting any attempt to profile them.

Amerika

Pestle 2015

William J. Pestle, Christina Torres-Rouff, Francisco Gallardo, Benjamín Ballester & Alejandro Clarot, *Mobility and Exchange among Marine Hunter-Gatherer and Agropastoralist Communities in the Formative Period Atacama Desert*. Current Anthropology **56** (2015), 121–133.

Northern Chile's Atacama Desert is one of the most unforgiving landscapes on the planet; however, a variety of complex risk-mitigation strategies facilitated long-term human occupation of the region. Using a burgeoning corpus of human, floral, and faunal stable carbon and nitrogen isotope data, the present work examines patterns of mobility, exchange, and social interaction in northern Chile's Formative Period (1500 BC–AD 400). While the geographic barriers and harsh climatic conditions of the Atacama Desert, in concert with substantial logistic considerations, established constraints on human diet at the site and local levels, regional dietary variation speaks to frequent and possibly even regular interzonalmovements of people and/or foodstuffs. Through isotopic analysis of the remains of 86 individuals, we examine regional patterns of dietary variation in light of recently advanced hypotheses concerning the nature of mobility, exchange, and social interaction in Formative Period northern Chile. These data indicate both systematic regional exchange in foods and other goods and the central role of sites in the Calama oases in facilitating this exchange and movement.

Biologie

Zidan 2014

Jamal Zidan, Dan Ben-Avraham, Shai Carmi, Taiseer Maray, Eitan Friedman & Gil Atzmon, *Genotyping of geographically diverse Druze trios reveals substructure and a recent bottleneck*. European Journal of Human Genetics (2014), preprint, 1–7. DOI:10.1038/ejhg.2014.218.

EuJHumGen2014-Zidan-Supplement1.xlsx, EuJHumGen2014-Zidan-Supplement2.xlsx, EuJHumGen2014-Zidan-Supplement3.xlsx, EuJHumGen2014-Zidan-Supplement4.xlsx

Druze individuals rarely marry outside their faith (often practicing consanguinity) and are thus believed to form a genetic isolate. To comprehensively characterize the genetic structure of the Druze population, we recruited and genotyped 40

parent-offspring trios from the Upper Galilee in Israel and the Golan Heights, attempting to capture different extended families (clans) across various geographical locations. Principal component (PC) and ADMIXTURE analyses demonstrated that Druze are close to, yet distinct from, other Middle-Eastern groups (Bedouins and Palestinians), supporting the Druze's Middle-Eastern origin and their recent genetic isolation. Reconstruction of the Druze demographic history using identical-by-descent (IBD) segments suggested an .15-fold reduction in population size taking place .22–47 generations ago, close to the documented time of the foundation of the Druze faith at the 11th century. Combining the Galilee and Golan Druze genotypes with previously published data on Druze from the Carmel (Israel) and Lebanon demonstrated that all four Druze communities are genetically distinct. The Lebanese group shared less IBD segments (within the group and with other groups) compared with the Israeli Druze and showed higher heterozygosity (suggesting less consanguinity), but was less diverse in PC space. These findings suggest complex recent and ancient demographic history of the Druze population.

Klima

Laliberté 2015

F. Laliberté, J. Zika, L. Mudryk, P. J. Kushner, J. Kjellsson & K. Döös, *Constrained work output of the moist atmospheric heat engine in a warming climate*. science **347** (2015), 540–543.

s347-0540-Supplement.pdf

Incoming and outgoing solar radiation couple with heat exchange at Earth's surface to drive weather patterns that redistribute heat and moisture around the globe, creating an atmospheric heat engine. Here, we investigate the engine's work output using thermodynamic diagrams computed from reanalyzed observations and from a climate model simulation with anthropogenic forcing.We show that the work output is always less than that of an equivalent Carnot cycle and that it is constrained by the power necessary to maintain the hydrological cycle. In the climate simulation, the hydrological cycle increases more rapidly than the equivalent Carnot cycle. We conclude that the intensification of the hydrological cycle in warmer climates might limit the heat engine's ability to generate work.

Ward 2014

D. S. Ward, N. M. Mahowald & S. Kloster, *Potential climate forcing of land use and land cover change*. Atmospheric Chemistry and Physics **14** (2014), 12701–12724. DOI:10.5194/acp-14-12701-2014.

Pressure on land resources is expected to increase as global population continues to climb and the world becomes more affluent, swelling the demand for food. Changing climate may exert additional pressures on natural lands as present-day productive regions may shift, or soil quality may degrade, and the recent rise in demand for biofuels increases competition with edible crops for arable land. Given these projected trends there is a need to understand the global climate impacts of land use and land cover change (LULCC). Here we quantify the climate impacts of global LULCC in terms of modifications to the balance between incoming and outgoing radiation at the top of the atmosphere (radiative forcing, RF) that are caused by changes in long-lived and short-lived greenhouse gas concentrations, aerosol effects, and land surface albedo. We attribute historical changes in terrestrial carbon storage, global fire emissions, secondary organic aerosol emissions, and surface albedo to LULCC using simulations with the Community Land Model version 3.5. These LULCC emissions are combined with estimates of agricultural emissions

of important trace gases and mineral dust in two sets of Community Atmosphere Model simulations to calculate the RF of changes in atmospheric chemistry and aerosol concentrations attributed to LULCC. With all forcing agents considered together, we show that 40 % (±16 %) of the present-day anthropogenic RF can be attributed to LULCC. Changes in the emission of non-CO2 greenhouse gases and aerosols from LULCC enhance the total LULCC RF by a factor of 2 to 3 with respect to the LULCC RF from CO2 alone. This enhancement factor also applies to projected LULCC RF, which we compute for four future scenarios associated with the Representative Concentration Pathways. We attribute total RFs between 0.9 and 1.9Wm-2 to LULCC for the year 2100 (relative to a preindustrial state). To place an upper bound on the potential of LULCC to alter the global radiation budget, we include a fifth scenario in which all arable land is cultivated by 2100. This theoretical extreme case leads to a LULCC RF of 3.9Wm-2 (±0.9Wm-2) suggesting that not only energy policy but also land policy is necessary to minimize future increases in RF and associated climate changes.

Kultur

Bromham 2015

Lindell Bromham, Xia Hua, Thomas G. Fitzpatrick & Simon J. Greenhill, *Rate of language evolution is affected by population size*. PNAS **112** (2015), 2097–2102.

The effect of population size on patterns and rates of language evolution is controversial. Do languages with larger speaker populations change faster due to a greater capacity for innovation, or do smaller populations change faster due to more efficient diffusion of innovations? Do smaller populations suffer greater loss of language elements through founder effects or drift, or do languages with more speakers lose features due to a process of simplification? Revealing the influence of population size on the tempo and mode of language evolution not only will clarify underlying mechanisms of language change but also has practical implications for the way that language data are used to reconstruct the history of human cultures. Here, we provide, to our knowledge, the first empirical, statistically robust test of the influence of population size on rates of language evolution, controlling for the evolutionary history of the populations and formally comparing the fit of different models of language evolution. We compare rates of gain and loss of cognate words for basic vocabulary in Polynesian languages, an ideal test case with a well-defined history. We demonstrate that larger populations have higher rates of gain of new words whereas smaller populations have higher rates of word loss. These results show that demographic factors can influence rates of language evolution and that rates of gain and loss are affected differently. These findings are strikingly consistent with general predictions of evolutionary models.

Keywords: language evolution | sister-pair comparison | Austronesian | lexical change | Poisson regression

Significance: Evolutionary methods are increasingly being applied to investigating linguistic change. But does language change conform to the predictions of evolutionary theory? Here, we use data from closely related pairs of languages to show that a key prediction of evolutionary theory is met: rates of gain of new words are higher in larger populations whereas rates of word loss are greater in small populations. Our analysis provides, to our knowledge, the first statistically robust evidence of an influence of population size on rate of language change. These results demonstrate the potential for demographic factors to influence language evolution.

Metallzeiten

MELLER 2002
Harald Meller, *Die Himmelsscheibe von Nebra, Ein frühbronzezeitlicher Fund von außergewöhnlicher Bedeutung.* Archäologie in Sachsen-Anhalt **2002**, 7–20.

Mittelpaläolithikum

MONCEL 2011
Marie-Helene Moncel & Florent Rivals, *On the question of short-term Neanderthal site occupations, Payre, France (MIS 8–7), and Taubach/Weimar, Germany (MIS 5).* Journal of Anthropological Research **67** (2011), 47–75.

We analyze and compare the evidence of human behavior from two Middle Paleolithic localities with short-term (seasonal) occupations: Payre in France (level F, correlated to MIS 8-7) and Taubach in Germany (correlated to MIS 5e). We focus on the lithic assemblages from these occupation levels. Our analysis takes the density of lithic material, technological choices, and the typological composition of the assemblages in the two localities into account. In light of previously published models, the results are partially consistent with various types of land-use as supported by analysis of the lithic assemblages. Our results confirm that Neanderthals were able to develop diverse behaviors in different locations. Although flexible and highly adaptable among the different seasons and landscapes of Western Europe, different types of short occupations may indicate the same kinds of technical and typological strategies.

Keywords: Middle Paleolithic, Neanderthal behavior, Occupation duration, Payre, Taubach, Weimar

Ostasien

JOORDENS 2015
Josephine C. A. Joordens et al., *Homo erectus at Trinil on Java used shells for tool production and engraving.* nature **518** (2015), 228–231.

n518-0228-Supplement1.mov, n518-0228-Supplement2.pdf, n518-0228-Supplement3.zip

Josephine C. A. Joordens, Francesco d'Errico, Frank P. Wesselingh, Stephen Munro, John de Vos, Jakob Wallinga, Christina Ankjærgaard, Tony Reimann, Jan R. Wijbrans, Klaudia F. Kuiper, Herman J. Mücher, Hélène Coqueugniot, Vincent Prié, Ineke Joosten, Bertil van Os, Anne S. Schulp, Michel Panuel, Victoria van der Haas, Wim Lustenhouwer, John J. G. Reijmer & Wil Roebroeks

The manufacture of geometric engravings is generally interpreted as indicative of modern cognition and behaviour1. Key questions in the debate on the origin of such behaviour are whether this innovation is restricted to Homo sapiens, and whether it has a uniquely African origin. Here we report on a fossil freshwater shell assemblage from the Hauptknochenschicht ('main bone layer') of Trinil (Java, Indonesia), the type locality of Homo erectus discovered by Eugène Dubois in 1891. In the Dubois collection (in the Naturalis museum, Leiden,The Netherlands) we found evidence for freshwater shellfish consumption by hominins, one unambiguous shell tool, and a shell with a geometric engraving.We dated sediment contained in

the shells with 40Ar/39Ar and luminescence dating methods, obtaining a maximumage of 0.54 ± 0.10 million years and a minimum age of 0.43 ± 0.05 million years. This implies that the Trinil Hauptknochenschicht is younger than previously estimated. Together, our data indicate that the engraving was made by Homo erectus, and that it is considerably older than the oldest geometric engravings described so far. Although it is at present not possible to assess the function or meaning of the engraved shell, this discovery suggests that engraving abstract patterns was in the realm of Asian Homo erectus cognition and neuromotor control.

Story or Book

Mervis 2015

Jeffrey Mervis, *An education that closed doors.* science **347** (2015), 578.

Tamer Elsayed, Inadmissible, ISBN: 978-0990782803

Although chastened by all that has happened, Elsayed doesn't apologize. "I was well aware of my fraudulent actions," he writes in his book. "Looking back, there was really no excuse for my deeds. But at that time, I had felt that to play only the cards I'd been dealt—being an Egyptian citizen without the financial means to achieve what I knew I was academically qualified to achieve—would leave me with nothing.