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Literatur

Aktuell

Fowler 2011

James H. Fowler, Jaime E. Settle & Nicholas A. Christakis, *Correlated genotypes in friendship networks*. PNAS **108** (2011), 1993–1997.

pnas108-01993-Supplement.pdf

It is well known that humans tend to associate with other humans who have similar characteristics, but it is unclear whether this tendency has consequences for the distribution of genotypes in a population. Although geneticists have shown that populations tend to stratify genetically, this process results from geographic sorting or assortative mating, and it is unknown whether genotypes may be correlated as a consequence of nonreproductive associations or other processes. Here, we study six available genotypes from the National Longitudinal Study of Adolescent Health to test for genetic similarity between friends. Maps of the friendship networks show clustering of genotypes and, after we apply strict controls for population stratification, the results show that one genotype is positively correlated (homophily) and one genotype is negatively correlated (heterophily). A replication study in an independent sample from the Framingham Heart Study verifies that DRD2 exhibits significant homophily and that CYP2A6 exhibits significant heterophily. These unique results show that homophily and heterophily obtain on a genetic (indeed, an allelic) level, which has implications for the study of population genetics and social behavior. In particular, the results suggest that association tests should include friends' genes and that theories of evolution should take into account the fact that humans might, in some sense, be metagenomic with respect to the humans around them.

social networks | gene-environment interaction | indirect genetic effects

Karpicke 2011

Jeffrey D. Karpicke & Janell R. Blunt, *Retrieval Practice Produces More Learning than Elaborative Studying with Concept Mapping*. sciencexpress (2011), 1199327. <http://dx.doi.org/10.1126/science.1199327>.

Educators rely heavily on learning activities that encourage elaborative studying, while activities that require students to practice retrieving and reconstructing knowledge are used less frequently. Here, we show that practicing retrieval produces greater gains in meaningful learning than elaborative studying with concept mapping. The advantage of retrieval practice generalized across texts identical to those commonly found in science education. The advantage of retrieval practice was observed with test questions that assessed comprehension and required students to make inferences. The advantage of retrieval practice occurred even when the criterial test involved creating concept maps. Our findings support the theory that retrieval practice enhances learning by retrieval-specific mechanisms rather than by elaborative study processes. Retrieval practice is an effective tool to promote conceptual learning about science.

Miller 2011

Greg Miller, *ESP Paper Rekindles Discussion About Statistics*. science **331** (2011), 272–273.

A p-value of less than .01 means, by definition, that there's less than a 1 % chance he would have observed these data—or data pointing to an even stronger ESP effect—if ESP

does not exist. “Some people would turn that around and say there’s a 99 % chance there’s something going on, but that’s wrong,” Raftery says.
Not only does this type of thinking reflect a misunderstanding of what a p-value is, but it also overestimates the probability that an effect is real, Raftery and other statisticians say. Work by Raftery, for example, suggests that p-values in the .001 to .01 range reflect a true effect only 86 % to 92 % of the time. The problem is more acute for larger samples, which can give rise to a small p-value even when the effect is negligible for practical purposes, Raftery says.

Radford 2011

Tim Radford, *Of course scientists can communicate.* nature **469** (2011), 445.
Tim Radford takes aim at the popular myth that researchers are hopeless at explaining their work to a general audience.
Enthusiasm is infectious, but to command an audience of readers, scientists should exploit their other natural gifts. One of these is training in clarity. Another is training in observation. And a third is knowledge.

Ruxton 2011

Graeme D. Ruxton, *Why are whales big?* nature **469** (2011), 481.
Different groups of diving vertebrates vary greatly in size, with whales being by far the largest. A comparative investigation of the links between swimming speed, size and metabolism provides clues to the reasons.

Zwane 2011

Alix Peterson Zwane et al., *Being surveyed can change later behavior and related parameter estimates.* PNAS **108** (2011), 1821–1826.
pnas108-01821-Supplement.ods, pnas108-01821-Supplement.xlsx
Alix Peterson Zwane, Jonathan Zinman, Eric Van Dusen, William Pariente, Clair Null, Edward Miguel, Michael Kremer, Dean S. Karlan, Richard Hornbeck, Xavier Giné, Esther Duflo, Florencia Devoto, Bruno Crepon and Abhijit Banerjee
Does completing a household survey change the later behavior of those surveyed? In three field studies of health and two of microlending, werandomly assigned subjects to be surveyedabout health and/or household finances and then measured subsequent use of a related product with data that does not rely on subjects’ self-reports. In the three health experiments, we find that being surveyed increases use of water treatment products and take-up of medical insurance. Frequent surveys on reported diarrhea also led to biased estimates of the impact of improved source water quality. In two microlending studies, we do not find an effect of being surveyed on borrowing behavior. The results suggest that limited attention could play an important but context-dependent role in consumer choice, with the implication that researchers should reconsider whether, how, and how much to survey their subjects.
measurement effects | question-behavior effects | Hawthorne effects | survey methodology | models of attention

Anthropologie

Shea 2011

John J. Shea, *Homo sapiens Is as Homo sapiens Was, Behavioral Variability versus “Behavioral Modernity” in Paleolithic Archaeology.* Current Anthropology **52** (2011), 1–35.
Paleolithic archaeologists conceptualize the uniqueness of Homo sapiens in terms of “behavioral modernity,” a quality often conflated with behavioral variability. The former is

qualitative, essentialist, and a historical artifact of the European origins of Paleolithic research. The latter is a quantitative, statistically variable property of all human behavior, not just that of Ice Age Europeans. As an analytical construct, behavioral modernity is deeply flawed at all epistemological levels. This paper outlines the shortcomings of behavioral modernity and instead proposes a research agenda focused on the strategic sources of human behavioral variability. Using data from later Middle Pleistocene archaeological sites in East Africa, this paper tests and falsifies the core assumption of the behavioral-modernity concept-the belief that there were significant differences in behavioral variability between the oldest H. sapiens and populations younger than 50 kya. It concludes that behavioral modernity and allied concepts have no further value to human origins research. Research focused on the strategic underpinnings of human behavioral variability will move Paleolithic archaeology closer to a more productive integration with other behavioral sciences.

Grundlagen

Eren 2008

Metin I. Eren, Aaron Greenspan & C. Garth Sampson, *Are Upper Paleolithic blade cores more productive than Middle Paleolithic discoidal cores? A replication experiment*. Journal of Human Evolution **55** (2008), 952–961.

It is widely believed that the change from discoidal flake production to prismatic blade-making during the Middle-Upper Paleolithic transition in Europe led to enhanced technological efficiency. Specifically, blade-making is thought to promote higher rates of blank production, more efficient and complete reduction of the parent core, and a large increase in the total length of cutting edge per weight of stone. Controlled replication experiments using large samples, computer-assisted measurements, and statistical tests of several different measures failed to support any of these propositions. When resharpened, the use-life of flake edges actually surpasses that of blades of equivalent mass because the narrower blades are more rapidly exhausted by retouch. Our results highlight the need to replace static measurements of edge length that promote an illusion of efficiency with a more dynamic approach that takes the whole reduction sequence into account. An unexpected by-product of our replications was the discovery that real gains in cutting-edge length per weight of stone are linked to surface area. There is now a need to test the proposition that all the perceived advantages currently bestowed upon blades only occurred during the shift from macroblade to bladelet production. If our results are duplicated in further experiments, the notion of "economical" blades will have to be rejected and alternative explanations sought for their appearance in the early Upper Paleolithic. While Aurignacian bladelet (Dufour) production could signal the advent of composite tool technology (wooden handles or shafts with bladelet inserts), this does not help to explain why macroblades were also produced in large numbers. We may need to reexamine the notion that macroblades were of more symbolic than functional significance to their makers.

Keywords: Blades; Flakes; Lithic cutting edge; Middle-Upper Paleolithic transition; Lithic reduction sequence

Tversky 1974

Amos Tversky & Daniel Kahneman, *Judgment under Uncertainty: Heuristics and Biases*. science **185** (1974), 1124–1131.

Biases in judgments reveal some heuristics of thinking under uncertainty.

Webster 2011

David L. Webster, *Backward Bottlenecks, Ancient Teosinte/Maize Selection*. Current Anthropology **52** (2011), 77–104.

Teosinte, the putative ancestor of maize, is rarely found in early Mesoamerican archaeological deposits, and maize later took a very long time to develop big ears and to become an effective staple grain. These patterns are best explained by the hypothesis of early nongrain use. Consumption of teosinte or maize for stalk sugar or as a green vegetable created reverse bottlenecks at odds with the default assumption that early selection targeted grain. Such bottlenecks were especially potent in small teosinte/maize populations outside their upland habitats. The ultimate products of plant domestication should not be confused with the selection behaviors of ancient people. Such behaviors are sometimes counterintuitive, producing an archaeological record that fails to match the expectations of our reconstructed logic.

Klima

Crimmins 2011

Shawn M. Crimmins, Solomon Z. Dobrowski, Jonathan A. Greenberg, John T. Abatzoglou & Alison R. Mynsberge, *Changes in Climatic Water Balance Drive Downhill Shifts in Plant Species' Optimum Elevations*. science **331** (2011), 324–327.

s331-0324-Supplement.pdf

Uphill shifts of species' distributions in response to historical warming are well documented, which leads to widespread expectations of continued uphill shifts under future warming. Conversely, downhill shifts are often considered anomalous and unrelated to climate change. By comparing the altitudinal distributions of 64 plant species between the 1930s and the present day within California, we show that climate changes have resulted in a significant downward shift in species' optimum elevations. This downhill shift is counter to what would be expected given 20th-century warming but is readily explained by species' niche tracking of regional changes in climatic water balance rather than temperature. Similar downhill shifts can be expected to occur where future climate change scenarios project increases in water availability that outpace evaporative demand.

Eiler 2004

John M. Eiler & Edwin Schauble, $^{18}O^{13}C^{16}O$ *in Earth's atmosphere*. Geochimica et Cosmochimica Acta **68** (2004), 4767–4777.

Abstract-The chemistry and budgets of atmospheric gases are constrained by their bulk stable isotope compositions (e.g., d13C values), which are based on mixing ratios of isotopologues containing one rare isotope (e.g., 16O13C16O). Atmospheric gases also have isotopologues containing two or more rare isotopes (e.g., 18O13C16O). These species have unique physical and chemical properties and could help constrain origins of atmospheric gases and expand the scope of stable isotope geochemistry generally. We present the first measurements of the abundance of 18O13C16O from natural and synthetic sources, discuss the factors influencing its natural distribution and, as an example of its applied use, demonstrate how its abundance constrains the sources of CO2 in the Los Angeles basin. The concentration of 18O13C16O in air can be explained as a combination of ca. 1‰ enrichment (relative to the abundance expected if C and O isotopes are randomly distributed among all possible isotopologues) due to enhanced thermodynamic stability of this isotopologue during isotopic exchange with leaf and surface waters, ca. 0.1‰ depletion due to diffusion through leaf stomata, and subtle (ca. 0.05‰) dilution by 18O13C16O-poor anthropogenic CO2. Some air samples are slightly (ca. 0.05‰) lower in 18O13C16O than can be explained by these factors alone. Our results suggest that 18O13C16O abundances should vary by up to ca. 0.2‰ with latitude and season, and might have measurable sensitivities to stomatal conductances of land plants. We suggest the greatest use of D47 measurements will be to "leverage" interpretation of the d18O of atmospheric CO2.

Ghosh 2006

Prosenjit Ghosh, Jess Adkins, Hagit Affek, Brian Balta, Weifu Guo, Edwin A. Schauble, Dan Schrag & John M. Eiler, *^{13}C–^{18}O bonds in carbonate minerals: A new kind of paleothermometer*. Geochimica et Cosmochimica Acta **70** (2006), 1439–1456.

The abundance of the doubly substituted CO2 isotopologue, 13C18O16O, in CO2 produced by phosphoric acid digestion of synthetic, inorganic calcite and natural, biogenic aragonite is proportional to the concentration of 13C-18O bonds in reactant carbonate, and the concentration of these bonds is a function of the temperature of carbonate growth. This proportionality can be described between 1 and 50 °C by the function: D47 = 0.0592 * 1E6 * T^-2 – 0.02, where D47 is the enrichment, in per mil, of 13C18O16O in CO2 relative to the amount expected for a stochastic (random) distribution of isotopes among all CO2 isotopologues, and T is the temperature in Kelvin. This relationship can be used for a new kind of carbonate paleothermometry, where the temperature-dependent property of interest is the state of ordering of 13C and 18O in the carbonate lattice (i.e., bound together vs. separated into different CO3^2- units), and not the bulk d18O or d13C values. Current analytical methods limit precision of this thermometer to ca. ± 2 °C, 1s. A key feature of this thermometer is that it is thermodynamically based, like the traditional carbonate-water paleothermometer, and so is suitable for interpolation and even modest extrapolation, yet is rigorously independent of the d18O of water and d13C of DIC from which carbonate grew. Thus, this technique can be applied to parts of the geological record where the stable isotope compositions of waters are unknown. Moreover, simultaneous determinations of D47 and d18O for carbonates will constrain the d18O of water from which they grew.

Kahmen 2011

Ansgar Kahmen, Dirk Sachse, Stefan K. Arndt, Kevin P. Tu, Heraldo Farrington, Peter M. Vitousek & Todd E. Dawson, *Cellulose $\delta^{18}O$ is an index of leaf-to-air vapor pressure difference (VPD) in tropical plants*. PNAS **108** (2011), 1981–1986.

pnas108-01981-Supplement.pdf

Cellulose in plants contains oxygen that derives in most cases from precipitation. Because the stable oxygen isotope composition, d18O, of precipitation is associated with environmental conditions, cellulose d18O should be as well. However, plant physiological models using d18O suggest that cellulose d18O is influenced by a complex mix of both climatic and physiological drivers. This influence complicates the interpretation of cellulose d18O values in a paleocontext. Here, we combined empirical data analyses with mechanistic model simulations to i) quantify the impacts that the primary climatic drivers humidity (ea) and air temperature (Tair) have on cellulose d18O values in different tropical ecosystems and ii) determine which environmental signal is dominating cellulose d18O values. Our results revealed that ea and Tair equally influence cellulose d18O values and that distinguishing which of these factors dominates the d18O values of cellulose cannot be accomplished in the absence of additional environmental information. However, the individual impacts of ea and Tair on the d18O values of cellulose can be integrated into a single index of plant-experienced atmospheric vapor demand: the leaf-to-air vapor pressure difference (VPD). We found a robust relationship between VPD and cellulose d18O values in both empirical and modeled data in all ecosystems that we investigated. Our analysis revealed therefore that d18O values in plant cellulose can be used as a proxy for VPD in tropical ecosystems. As VPD is an essential variable that determines the biogeochemical dynamics of ecosystems, our study has applications in ecological-, climate-, or forensic-sciences.
stable isotopes | plant-water relations | paleoecology | climate change | Hawaii

Mittelpaläolithikum

Moncel 2011

Marie-Hélène Moncel, Anne-Marie Moigne, Youssef Sam & Jean Combier, *The Emergence of Neanderthal Technical Behavior: New Evidence from Orgnac 3 (Level 1, MIS 8), Southeastern France*. Current Anthropology **52** (2011), 37–75.

CurrAnth52-037-Supplement.pdf

The archaeological sequence from the Orgnac 3 site presents the opportunity to observe behavioral aspects characterizing the beginnings of the main Neanderthal technological strategies employed in Europe until marine isotopic stage (MIS) 3. In this site, the Levallois debitage method appears in the middle of the sequence (MIS 9) and develops at about 300,000 BP at the top of the sequence (MIS 8). The Levallois method is best represented in level 1, making the site one of the oldest examples of Levallois technology. Orgnac 3 indicates the emergence of new technological behavior in southern France and Europe around the limit between isotopic stages 9 and 8. In order to provide new evidence on pre-Neanderthal behavior, new data from level 1 were obtained by comparing stone processing systems with faunal remains. Lithic and bone assemblages display evidence of one to several occupations by horse and bovid hunters during predominantly cool climatic conditions. Animal carcass processing is principally associated with standardized knapping, which produced most of the tool supports. Small and large flakes bear little retouch. Behavioral modifications appeared later than changes in human anatomical traits and did not follow a particular rhythm. New behavioral aspects emerged in Europe as early as MIS 12, as indicated by subsistence strategies, and specialized and selective hunting and butchering strategies. During MIS 10, new technological behavior (pre-Levallois knapping) appeared. However, at Orgnac 3, the archaeological record reveals several stages. From MIS 9-8 and until MIS 7, strategies adopted by Neanderthals became systematic, independent of climatic conditions. The results of this study contribute to a better understanding of early Neanderthal behavior, i.e., of human history.

Neolithikum

Bar-Yosef 1998

Ofer Bar-Yosef, *The Natufian Culture in the Levant, Threshold to the Origins of Agriculture*. Evolutionary Anthropology **6** (1998), 159–177.

The aim of this paper is to provide the reader with an updated description of the archeological evidence for the origins of agriculture in the Near East. Specifically, I will address the question of why the emergence of farming communities in the Near East was an inevitable outcome of a series of social and economic circumstances that caused the Natufian culture to be considered the threshold for this major evolutionary change.1-4 The importance of such an understanding has global implications. Currently, updated archeological information points to two other centers of early cultivation, central Mexico and the middle Yangtze River in China, that led to the emergence of complex civilizations.4 However, the best-recorded sequence from foraging to farming is found in the Near East. Its presence warns against the approach of viewing all three evolutionary sequences as identical in terms of primary conditions, economic and social motivations and activities, and the resulting cultural, social, and ideological changes.

Ozeanien

Terrell 2011

John Edward Terrell, *Recalibrating Polynesian prehistory*. PNAS **108** (2011), 1753–1754.

Wilmshurst 2011

Janet M. Wilmshurst, Terry L. Hunt, Carl P. Lipo & Atholl J. Anderson, *High-precision radiocarbon dating shows recent and rapid initial human colonization of East Polynesia*. PNAS **108** (2011), 1815–1820.

pnas108-01815-Supplement.docx, pnas108-01815-Supplement.odt

The 15 archipelagos of East Polynesia, including New Zealand, Hawaii, and Rapa Nui, were the last habitable places on earth colonized by prehistoric humans. The timing and pattern of this colonization event has been poorly resolved, with chronologies varying by >1000 y, precluding understanding of cultural change and ecological impacts on these pristine ecosystems. In a meta-analysis of 1,434 radiocarbon dates from the region, reliable short-lived samples reveal that the colonization of East Polynesia occurred in two distinct phases: earliest in the Society Islands A.D. ≈1025-1120, four centuries later than previously assumed; then after 70-265 y, dispersal continued in one major pulse to all remaining islands A.D. ≈1190-1290. We show that previously supported longer chronologies have relied upon radiocarbon-dated materials with large sources of error, making them unsuitable for precise dating of recent events. Our empirically based and dramatically shortened chronology for the colonization of East Polynesia resolves longstanding paradoxes and offers a robust explanation for the remarkable uniformity of East Polynesian culture, human biology, and language. Models of human colonization, ecological change and historical linguistics for the region now require substantial revision.

Physik

Carroll 2004

Sean M. Carroll, Vikram Duvvuri, Mark Trodden & Michael S. Turner, *Is cosmic speed-up due to new gravitational physics?* Physical Review D **70** (2004), 43528. <http://dx.doi.org/10.1103/PhysRevD.70.043528>.

We show that cosmic acceleration can arise due to very tiny corrections to the usual gravitational action of general relativity, of the form Rˆ-n with n>0. This model eliminates the need for a nonzero cosmological constant or any other form of dark energy, attributing a purely gravitational origin to the acceleration of the universe.