

Literatur

Aktuell

SCHOOLER 2011

Jonathan Schooler, *Unpublished results hide the decline effect*. [nature 470 \(2011\), 437](#).

Some effects diminish when tests are repeated. Jonathan Schooler says being open about findings that don't make the scientific record could reveal why. We need a better record to learn how well science distinguishes truth from fallacy.

Anthropologie

BROSNAN 2011

Sarah F. Brosnan et al., *Responses to the Assurance game in monkeys, apes, and humans using equivalent procedures*. [PNAS 108 \(2011\), 3442–3447](#).
[pnas108-03442-Supplement.pdf](#)

Sarah F. Brosnan, Audrey Parrish, Michael J. Beran, Timothy Flemming, Lisa Heimbauer, Catherine F. Talbot, Susan P. Lambeth, Steven J. Schapiro and Bart J. Wilson

There is great interest in the evolution of economic behavior. In typical studies, species are asked to play one of a series of economic games, derived from game theory, and their responses are compared. The advantage of this approach is the relative level of consistency and control that emerges from the games themselves; however, in the typical experiment, procedures and conditions differ widely, particularly between humans and other species. Thus, in the current study, we investigated how three primate species, capuchin monkeys, chimpanzees, and humans, played the Assurance (or Stag Hunt) game using procedures that were, to the best of our ability, the same across species, particularly with respect to training and pretesting. Our goal was to determine what, if any, differences existed in the ways in which these species made decisions in this game. We hypothesized differences along phylogenetic lines, which we found. However, the species were more similar than might be expected. In particular, humans who played using “nonhuman primate-friendly” rules did not behave as is typical. Thus, we find evidence for similarity in decision-making processes across the order Primates. These results indicate that such comparative studies are possible and, moreover, that in any comparison rating species' relative abilities, extreme care must be taken in ensuring that one species does not have an advantage over the others due to methodological procedures.

cooperation | coordination | comparative behavior | evolution of behavior

Biologie

GARRIGAN 2011

Patrick Garrigan, Charles P. Ratliff, Jennifer M. Klein, Peter Sterling, David H. Brainard & Vijay Balasubramanian, *Design of a Trichromatic Cone Array*. [PLoS Bio 6 \(2011\), ii, e1000677](#).

Cones with peak sensitivity to light at long (L), medium (M) and short (S) wavelengths are unequal in number on the human retina: S cones are rare (<10%) while increasing in

fraction from center to periphery, and the L/M cone proportions are highly variable between individuals. What optical properties of the eye, and statistical properties of natural scenes, might drive this organization? We found that the spatial-chromatic structure of natural scenes was largely symmetric between the L, M and S sensitivity bands. Given this symmetry, short wavelength attenuation by ocular media gave L/M cones a modest signal-to-noise advantage, which was amplified, especially in the denser central retina, by long-wavelength accommodation of the lens. Meanwhile, total information represented by the cone mosaic remained relatively insensitive to L/M proportions. Thus, the observed cone array design along with a long-wavelength accommodated lens provides a selective advantage: it is maximally informative.

MYLES 2011

Sean Myles et al., *Genetic structure and domestication history of the grape*. [PNAS](#) **108** (2011), 3530–3535.

[pnas108-03530-Supplement.pdf](#)

Sean Myles, Adam R. Boyko, Christopher L. Owens, Patrick J. Brown, Fabrizio Grassi, Mallikarjuna K. Aradhya, Bernard Prins, Andy Reynolds, Jer-Ming Chia, Doreen Ware, Carlos D. Bustamante and Edward S. Buckler

The grape is one of the earliest domesticated fruit crops and, since antiquity, it has been widely cultivated and prized for its fruit and wine. Here, we characterize genome-wide patterns of genetic variation in over 1,000 samples of the domesticated grape, *Vitis vinifera* subsp. *vinifera*, and its wild relative, *V. vinifera* subsp. *sylvestris* from the US Department of Agriculture grape germplasm collection. We find support for a Near East origin of *vinifera* and present evidence of introgression from local *sylvestris* as the grape moved into Europe. High levels of genetic diversity and rapid linkage disequilibrium (LD) decay have been maintained in *vinifera*, which is consistent with a weak domestication bottleneck followed by thousands of years of widespread vegetative propagation. The considerable genetic diversity within *vinifera*, however, is contained within a complex network of close pedigree relationships that has been generated by crosses among elite cultivars. We show that first-degree relationships are rare between wine and table grapes and among grapes from geographically distant regions. Our results suggest that although substantial genetic diversity has been maintained in the grape subsequent to domestication, there has been a limited exploration of this diversity. We propose that the adoption of vegetative propagation was a double-edged sword: Although it provided a benefit by ensuring true breeding cultivars, it also discouraged the generation of unique cultivars through crosses. The grape currently faces severe pathogen pressures, and the long-term sustainability of the grape and wine industries will rely on the exploitation of the grape's tremendous natural genetic diversity.

genomics | SNP array | positive selection | genome-wide association

TKAČIK 2011

Gašper Tkačik et al., *Natural images from the birthplace of the human eye*. [arXiv](#) (2011), 1102.0817v1. <<http://arxiv.org/pdf/1102.0817v1>>.

Gašper Tkačik, Patrick Garrigan, Charles Ratliff, Grega Milčinski, Jennifer M. Klein, Lucia H. Seyfarth, Peter Sterling, David Brainard and Vijay Balasubramanian

Here we introduce a database of calibrated natural images publicly available through an easy-to-use web interface. Using a Nikon D70 digital SLR camera, we acquired about 5000 six-megapixel images of Okavango Delta of Botswana, a tropical savanna habitat similar to where the human eye is thought to have evolved. Some sequences of images were captured unsystematically while following a baboon troop, while others were designed to vary a single parameter such as aperture, object distance, time of day or position on the horizon. Images are available in the raw RGB format and in grayscale. Images are also available in units relevant to the physiology of human cone photoreceptors, where pixel

values represent the expected number of photoisomerizations per second for cones sensitive to long (L), medium (M) and short (S) wavelengths. This database is distributed under a Creative Commons Attribution-Noncommercial Unported license to facilitate research in computer vision, psychophysics of perception, and visual neuroscience.

Datierung

HIGHAM 2011

Thomas Higham, *European Middle and Upper Palaeolithic radiocarbon dates are often older than they look: problems with previous dates and some remedies*. *Antiquity* **85** (2011), 235–249.

Few events of European prehistory are more important than the transition from ancient to modern humans around 40 000 years ago, a period that unfortunately lies near the limit of radiocarbon dating. This paper shows that as many as 70 per cent of the oldest radiocarbon dates in the literature may be too young, due to contamination by modern carbon. Future dates can be made more secure — and previous dates revised — using more refined methods of pre-treatment described here.

Keywords: Middle Palaeolithic, Upper Palaeolithic, Neanderthal, anatomically modern humans, radiocarbon dating, sampling, pre-treatment, contamination

Grundlagen

BOROJEVIC 2011

Ksenija Borojevic, *Interpreting, dating, and reevaluating the botanical assemblage from tell Kedesh: a case study of historical contamination*. *Journal of Archaeological Science* **38** (2011), 829–842.

Botanical assemblage including charred and mineralized macro plant remains were examined from tell Kedesh in the Upper Galilee, Israel. Flotation samples were collected from various contexts within and outside a large Persian-Hellenistic administrative building complex at tell Kedesh, dated to the 5th to the 2nd century BC, based on the archaeological material. Four AMS radiocarbon dates were obtained on plant macro remains recovered from the flotation samples from the complex. The radiocarbon dates range from the 9th century BC to 17th century AD. The discrepancy among the radiocarbon dates obtained from plant remains and those based on archaeological material can be attributed to bioturbation, including the deep burrowing of harvester ants. The study demonstrates the need for direct radiocarbon dating of the charred plant remains generally assumed to be of ancient origin. This research improves the understanding of depositional and postdepositional processes of plant macro remains and explains their mode of arrival, relevant for the sites with a long occupational history by humans and animals.

Keywords: Charred plants; Postdepositional processes; Bioturbation; Harvester ants; Tell

Klima

FAWCETT 2011

Peter J. Fawcett et al., *Extended megadroughts in the southwestern United States during Pleistocene interglacials*. *nature* **470** (2011), 518–521.

n470-0518-Supplement1.pdf, n470-0518-Supplement2.xls

Peter J. Fawcett, Josef P. Werne, R. Scott Anderson, Jeffrey M. Heikoop, Erik T. Brown, Melissa A. Berke, Susan J. Smith, Fraser Goff, Linda Donohoo-Hurley, Luz M. Cisneros-Dozal, Stefan Schouten, Jaap S. Sinninghe Damsté, Yongsong Huang, Jaime Toney, Julianna Fessenden, Giday WoldeGabriel, Viorel Atudorei, John W. Geissman & Craig D. Allen

The potential for increased drought frequency and severity linked to anthropogenic climate change in the semi-arid regions of the southwestern United States (US) is a serious concern¹. Multi-year droughts during the instrumental period² and decadal-length droughts of the past two millennia^{1,3} were shorter and climatically different from the future permanent, ‘dust-bowl-like’ megadrought conditions, lasting decades to a century, that are predicted as a consequence of warming⁴. So far, it has been unclear whether or not such megadroughts occurred in the southwestern US, and, if so, with what regularity and intensity. Here we show that periods of aridity lasting centuries to millennia occurred in the southwestern US during mid-Pleistocene interglacials. Using molecular palaeotemperature proxies⁵ to reconstruct the mean annual temperature (MAT) in mid-Pleistocene lacustrine sediment from the Valles Caldera, New Mexico, we found that the driest conditions occurred during the warmest phases of interglacials, when the MAT was comparable to or higher than the modern MAT. A collapse of drought-tolerant C4 plant communities during these warm, dry intervals indicates a significant reduction in summer precipitation, possibly in response to a poleward migration of the subtropical dry zone. Three MAT cycles 2–6°C in amplitude occurred within Marine Isotope Stage (MIS) 11 and seem to correspond to the muted precessional cycles within this interglacial. In comparison with MIS 11, MIS 13 experienced higher precessional-cycle amplitudes, larger variations in MAT (4–6°C) and a longer period of extended warmth, suggesting that local insolation variations were important to interglacial climatic variability in the southwestern US. Comparison of the early MIS 11 climate record with the Holocene record shows many similarities and implies that, in the absence of anthropogenic forcing, the region should be entering a cooler and wetter phase.

WILLIAMS 2011

John (Jack) Williams, *Old droughts in New Mexico*. [nature 470 \(2011\), 473–474](#).

A long climate record reveals abrupt hydrological variations during past interglacials in southwestern North America. These data set a natural benchmark for detecting human effects on regional climates.

Kultur

AYALA 2011

Francisco J. Ayala, *Elixir of life: In vino veritas*. [PNAS 108 \(2011\), 3457–3458](#).

Wild grapes dangle in clusters that are small compared with cultivated grapes but are strikingly beautiful and must have attracted early human gatherers because they are sweeter and juicier than other fruits, and thus desirable as food and drink. Cultivation of grapes likely started in the Paleolithic before human gatherers discovered the food value of grass seeds and started cultivating cereals. A gatherer of grapes would surely preserve the surplus clusters by hanging them or storing them in a nook or vessel, where oozing juice would quickly ferment. Sooner or later, the juice would be tasted and wine discovered. This is more or less how the discovery and use of wine are recorded in early mythologies.

PIANTADOSI 2011

Steven T. Piantadosi, Harry Tily & Edward Gibson, *Word lengths are optimized for efficient communication*. [PNAS 108 \(2011\), 3526–3529](#).

pnas108-03526-Supplement.pdf

We demonstrate a substantial improvement on one of the most celebrated empirical laws in the study of language, Zipf's 75-y-old theory that word length is primarily determined by frequency of use. In accord with rational theories of communication, we show across 10 languages that average information content is a much better predictor of word length than frequency. This indicates that human lexicons are efficiently structured for communication by taking into account interword statistical dependencies. Lexical systems result from an optimization of communicative pressures, coding meanings efficiently given the complex statistics of natural language use.

information theory | rational analysis

SPAEPEN 2011

Elizabet Spaepen, Marie Coppola, Elizabeth S. Spelke, Susan E. Carey & Susan Goldin-Meadow, *Number without a language model*. [PNAS 108 \(2011\), 3163–3168](#).

pnas108-03163-Supplement.pdf

Cross-cultural studies suggest that access to a conventional language containing words that can be used for counting is essential to develop representations of large exact numbers. However, cultures that lack a conventional counting system typically differ from cultures that have such systems, not only in language but also in many other ways. As a result, it is difficult to isolate the effects of language on the development of number representations. Here we examine the numerical abilities of individuals who lack conventional language for number (deaf individuals who do not have access to a usable model for language, spoken or signed) but who live in a numerate culture (Nicaragua) and thus have access to other aspects of culture that might foster the development of number. These deaf individuals develop their own gestures, called homesigns, to communicate. We show that homesigners use gestures to communicate about number. However, they do not consistently extend the correct number of fingers when communicating about sets greater than three, nor do they always correctly match the number of items in one set to a target set when that target set is greater than three. Thus, even when integrated into a numerate society, individuals who lack input from a conventional language do not spontaneously develop representations of large exact numerosities.

numerical cognition | language and thought | deafness | gestural communication

Physik

MCGAUGH 2011

Stacy S. McGaugh, *A Novel Test of the Modified Newtonian Dynamics with Gas Rich Galaxies*. [arXiv \(2011\), 1102.3913v1](#). <<http://arxiv.org/pdf/1102.3913v1>>.

The current cosmological paradigm, Λ CDM, requires that the mass-energy of the universe be dominated by invisible components: dark matter and dark energy. An alternative to these dark components is that the law of gravity be modified on the relevant scales. A test of these ideas is provided by the Baryonic Tully-Fisher Relation (BTFR), an empirical relation between the observed mass of a galaxy and its rotation velocity. Here I report a test using gas rich galaxies for which both axes of the BTFR can be measured independently of the theories being tested and without the systematic uncertainty in stellar mass that affects the same test with star dominated spirals. The data fall precisely where predicted a priori by the modified Newtonian dynamics (MOND). The scatter in the BTFR is attributable entirely to observational uncertainty. This is consistent with the action of a single effective force law but poses a serious fine-tuning problem for Λ CDM.