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References

Aktuell

Editorial 2016

Mothers' milk. nature **533** (2016), 145.

The safe use of medicines during breastfeeding is not an easy topic to study, but new parents deserve better information on the risks and benefits.

Luby 2016

Joan L. Luby, Andy Belden, Michael P. Harms, Rebecca Tillman & Deanna M. Barch, *Preschool is a sensitive period for the influence of maternal support on the trajectory of hippocampal development*. PNAS **113** (2016), 5742–5747.

Building on well-established animal data demonstrating the effects of early maternal support on hippocampal development and adaptive coping, a fewlongitudinal studies suggest that early caregiver support also impacts human hippocampal development. How caregiving contributes to human hippocampal developmental trajectories, whether there are sensitive periods for these effects, as well as whether related variation in hippocampal development predicts later childhood emotion functioning are of major public health importance. The current study investigated these questions in a longitudinal study of preschoolers assessed annually for behavioral and emotional development, including observed caregiver support. One hundred and twenty-seven children participated in three waves of magnetic resonance brain imaging through school age and early adolescence. Multilevel modeling of the effects of preschool and school-age maternal support on hippocampal volumes across the three waves was conducted. Hippocampal volume increased faster for those with higher levels of preschool maternal support. Subjects with support 1 SD above the mean had a 2.06 times greater increase in total hippocampus volume across the three scans than those with 1 SD below the mean (2.70 % vs. 1.31 %). No effect of school-age support was found. Individual slopes of hippocampus volume were significantly associated with emotion regulation at scan 3. The findings demonstrate a significant effect of early childhood maternal support on hippocampal volume growth across school age and early adolescence and suggest an early childhood sensitive period for these effects. They also show that this growth trajectory is associated with later emotion functioning.

Keywords: maternal support | hippocampus | sensitive period | preschool | emotions

Significance: Data from a longitudinal neuroimaging study beginning in the preschool period and including three brain scans through school age and early adolescence were used to investigate the effects of maternal support on the development of the hippocampus. Consistent with animal findings showing that early support enhances hippocampal development and later adaptive coping, findings demonstrated that early childhood maternal support predicted a steeper hippocampal growth trajectory. The data also suggested that early childhood was a sensitive period when the effects of support had a more powerful effect on hippocampal growth. The hippocampal growth trajectory was associated with better emotion regulation in early adolescence. Findings suggest that enhancing early childhood

maternal support fosters healthy childhood brain development and emotion functioning.

Pérez-Cornejo 2016

Patricia Pérez-Cornejo, *A researcher discovers teaching*. science **352** (2016), 262.

When I had my first research experience, as a college student in a campus laboratory, I found that I loved collecting data to understand intriguing biological phenomena. I enjoyed exploring new ideas every day in the lab, and I appreciated the freedom I had to independently plan my experiments. So I decided that I wanted to be an academic scientist. My later scientific training left me well equipped to work in a lab—and that is where, 20 years later, I feel most comfortable. But it never prepared me for another responsibility that is now part of my job as a professor: teaching.

A new mentor came along who encouraged me to see teaching in a different light. She was working at my university on a sabbatical from her home institution, where she conducted research on education. I began working with her to explore this type of research for myself. At first I was hesitant, but when she told me that my classroom was my lab, I was intrigued. Although my graduate training hadn't taught me how to teach, it provided the foundation I needed to conduct research in this new discipline.

Schiermeier 2016

Quirin Schiermeier, *Close inspection*. nature **533** (2016), 279–281.

To improve your own papers, learn how to evaluate other scientists' work. Assessing the work of others nurtures critical thinking in ways that few other ventures can match.

Tomkins 2016

Andrew G. Tomkins, Lara Bowlt, Matthew Genge, Siobhan A. Wilson, Helen E. A. Brand & Jeremy L. Wykes, *Ancient micrometeorites suggestive of an oxygen-rich Archaean upper atmosphere*. nature **533** (2016), 235–238.

It is widely accepted that Earth's early atmosphere contained less than 0.001 per cent of the present-day atmospheric oxygen (O2) level, until the Great Oxidation Event resulted in a major rise in O2 concentration about 2.4 billion years ago1. There are multiple lines of evidence for low O2 concentrations on early Earth, but all previous observations relate to the composition of the lower atmosphere2 in the Archaean era; to date no method has been developed to sample the Archaean upper atmosphere. We have extracted fossil micrometeorites from limestone sedimentary rock that had accumulated slowly 2.7 billion years ago before being preserved in Australia's Pilbara region. We propose that these micrometeorites formed when sand-sized particles entered Earth's atmosphere and melted at altitudes of about 75 to 90 kilometres (given an atmospheric density similar to that of today3). Here we show that the FeNi metal in the resulting cosmic spherules was oxidized while molten, and quench-crystallized to form spheres of interlocking dendritic crystals primarily of magnetite (Fe3O4), with wüstite (FeO)+metal preserved in a few particles. Our model of atmospheric micrometeorite oxidation suggests that Archaean upper-atmosphere oxygen concentrations may have been close to those of the present-day Earth, and that the ratio of oxygen to carbon monoxide was sufficiently high to prevent noticeable inhibition of oxidation by carbon monoxide. The anomalous sulfur isotope (.33S) signature of pyrite

(FeS2) in seafloor sediments from this period, which requires an anoxic surface environment4, implies that there may have been minimal mixing between the upper and lower atmosphere during the Archaean.

ZAHNLE 2016

Kevin Zahnle & Roger Buick, *Ancient air caught by shooting stars.* nature **533** (2016), 184–186.

Ashes of ancient meteors recovered from a 2.7-billion-year-old lake bed imply that the upper atmosphere was rich in oxygen at a time when all other evidence implies that the atmosphere was oxygen-free.

Amerika

HALLIGAN 2016

Jessi J. Halligan et al., *Pre-Clovis occupation 14,550 years ago at the Page-Ladson site, Florida, and the peopling of the Americas.* Science Advances **2** (2016), e1600375. DOI:10.1126/sciadv.1600375.

Jessi J. Halligan, Michael R. Waters, Angelina Perrotti, Ivy J. Owens, Joshua M. Feinberg, Mark D. Bourne, Brendan Fenerty, Barbara Winsborough, David Carlson, Daniel C. Fisher, Thomas W. Stafford Jr. & James S. Dunbar

Stone tools andmastodon bones occur in an undisturbed geological context at the Page-Ladson site, Florida. Seventy-one radiocarbon ages showthat ≈14,550 calendar years ago (cal yr B.P.), people butchered or scavenged amastodon next to a pond in a bedrock sinkhole within the Aucilla River. This occupation surface was buried by ≈4m of sediment during the late Pleistocenemarine transgression, which also left the site submerged. Sporormiella and other proxy evidence fromthe sediments indicate that hunter-gatherers along the Gulf Coastal Plain coexisted with and utilized megafauna for ≈2000 years before these animals became extinct at ≈12,600 cal yr B.P. Page-Ladson expands our understanding of the earliest colonizers of the Americas and human-megafauna interaction before extinction.

Anthropologie

DÁVID-BARRETT 2016

Tamás Dávid-Barrett & Robin I. M. Dunbar, *Bipedality and hair loss in human evolution revisited, The impact of altitude and activity scheduling.* Journal of Human Evolution **94** (2016), 72–82.

JHumEvo094-0072-Supplement.docx

Bipedality evolved early in hominin evolution, and at some point was associated with hair loss over most of the body. One classic explanation (Wheeler 1984: J. Hum. Evol. 13, 91–98) was that these traits evolved to reduce heat overload when australopiths were foraging in more open tropical habitats where they were exposed to the direct effects of sunlight at midday. A recent critique of this model (Ruxton & Wilkinson 2011a: Proc. Natl. Acad. Sci. USA 108, 20965-20969) argued that it ignored the endogenous costs of heat generated by locomotion, and concluded that only hair loss provided a significant reduction in heat load. We add two crucial corrections to this model (the altitude at which australopiths actually lived and activity scheduling) and show that when these are included there are substantial reductions in heat load for bipedal locomotion even for furred animals. In addition, we add one further consideration to the model: we extend the analysis

across the full 24 h day, and show that fur loss could not have evolved until much later because of the thermoregulatory costs this would have incurred at the altitudes where australopiths actually lived. Fur loss is most likely associated with the exploitation of open habitats at much lower altitudes at a much later date by the genus Homo.

Keywords: Australopiths | Thermoregulation | Incident radiation | Ambient temperature | Activity patterns

Marean 2016

Curtis W. Marean, *Der Siegeszug des Homo sapiens*. Spektrum der Wissenschaft **2016**, vi, 48–55.

Zwei Eigenschaften ermöglichten es dem modernen Menschen, die ganze Erde zu besiedeln und jede Konkurrenz auszustechen: seine ausgeprägte Begabung zur Kooperation und seine technologischen Fähigkeiten.

Überlegen durch Kooperation und Waffen

1 Der Homo sapiens hat als einzige Menschenart die gesamte Welt erobert. Die Voraussetzungen dafür erwarb er vermutlich während einer schwierigen Klimaphase in Afrika.

2 Damals lernte er, in Küstenhabitaten von Meeresfrüchten zu leben. Diese Ressource auszubeuten, förderte hohe Sozial kompetenz sowie aggressive Territorialität. Unter diesen Bedingungen entstand zugleich eine neuartige Technologie für effektivere Waffen.

3 Beides zusammen machte den modernen Menschen so überlegen, dass er in für ihn völlig neue Umwelten vordringen konnte, wo er nach Meinung des Autors archaische Menschen ausrottete und ganze Großtierbestände vernichtete.

Moorjani 2016

Priya Moorjani, Sriram Sankararaman, Qiaomei Fu, Molly Przeworski, Nick Patterson & David Reich, *A genetic method for dating ancient genomes provides a direct estimate of human generation interval in the last 45,000 years*. PNAS **113** (2016), 5652–5657.

The study of human evolution has been revolutionized by inferences from ancient DNA analyses. Key to these studies is the reliable estimation of the age of ancient specimens. High-resolution age estimates can often be obtained using radiocarbon dating, and, while precise and powerful, this method has some biases, making it of interest to directly use genetic data to infer a date for samples that have been sequenced. Here, we report a genetic method that uses the recombination clock. The idea is that an ancient genome has evolved less than the genomes of present-day individuals and thus has experienced fewer recombination events since the common ancestor. To implement this idea, we take advantage of the insight that all non-Africans have a common heritage of Neanderthal gene flow into their ancestors. Thus, we can estimate the date since Neanderthal admixture for present-day and ancient samples simultaneously and use the difference as a direct estimate of the ancient specimen's age. We apply our method to date five Upper Paleolithic Eurasian genomes with radiocarbon dates between 12,000 and 45,000 y ago and show an excellent correlation of the genetic and 14C dates. By considering the slope of the correlation between the genetic dates, which are in units of generations, and the 14C dates, which are in units of years, we infer that the mean generation interval in humans over this period has been 26–30 y. Extensions of this methodology that use older shared events may be applicable for dating beyond the radiocarbon frontier.

Keywords: molecular clock | generation interval | ancient DNA | branch shortening

Significance: We report a method for dating ancient human samples that uses the recombination clock. To infer the age of ancient genomes, we take advantage of the shared history of Neanderthal gene flowinto non-Africans that occurred around 50,000 y ago and measure the amount of "missing evolution" in terms of recombination breakpoints in the ancient genome compared with present-day samples. We show that this method provides age estimates that are highly correlated to radiocarbon dates, thus documenting the promise of this approach. By studying the linear relationship between the dates of Neanderthal admixture and the radiocarbon dates, we obtain, to our knowledge, the first direct estimate of the historical generation interval of 26–30 y.

Tavor 2016

I. Tavor, O. Parker Jones, R. B. Mars, S. M. Smith, T. E. Behrens & S. Jbabdi, *Task-free MRI predicts individual differences in brain activity during task performance*. science **352** (2016), 216–220.

s352-0216-Supplement.pdf

When asked to perform the same task, different individuals exhibit markedly different patterns of brain activity. This variability is often attributed to volatile factors, such as task strategy or compliance. We propose that individual differences in brain responses are, to a large degree, inherent to the brain and can be predicted from task-independent measurements collected at rest. Using a large set of task conditions, spanning several behavioral domains, we train a simple model that relates task-independent measurements to task activity and evaluate the model by predicting task activation maps for unseen subjects using magnetic resonance imaging. Our model can accurately predict individual differences in brain activity and highlights a coupling between brain connectivity and function that can be captured at the level of individual subjects.

Bibel

Lisowsky 1958

Gerhard Lisowsky, *Konkordanz zum Hebräischen Alten Testament, nach dem von Paul Kahle in der Biblia Hebraica edidit Rudolf Kittel besorgten Masoretischen Text*. (Stuttgart ^{2}1958).

Judentum

Aberbach 1964

Moshe Aberbach, *Did Rabban Gamaliel II impose the ban on Rabbi Eliezer ben Hiyrcanus?* Jewish Quarterly Review **54** (1964), 201–207.

Even more decisively in favor of the assumption that R. Joshua was responsible for the ban is the fact that legally it could not be revoked at all if any of its original sponsors had died. Later generations were deeply impressed by the spectacle of a great Tanna of R. Eliezer's stature being placed under the ban by his closest colleagues. People could not imagine the peace-loving R. Joshua acting in this peremptory fashion against his lifelong friend. Rabban Gamaliel II, on the other hand, who had himself treated R. Joshua in a high-handed manner, seemed to be the obvious personality strong-minded enough to take this extreme step against R. Eliezer, even though he was his brother-in-law. Hence it was only a step for legends characteristic of Rabban Gamaliel's general attitude on unity and discipline,

and of R. Eliezer's reputation of unbending stubbornness, to be woven around the central characters of the drama. But even legend could not obscure R. Joshua's central role during the actual dispute, and it is partly thanks to this that we are able to reconstruct what appears to have been the true course of events.

Büchler 1932
A. Büchler, *Die Erlösung Eliša' b. Abujahs aus dem Höllenfeuer*. Monatsschrift für Geschichte und Wissenschaft des Judentums **76** (1932), 412–456.

Klima

Alley 2016
Richard B. Alley, *A heated mirror for future climate*. science **352** (2016), 151–152.

Climatic changes 55.9 million years ago resemble those expected in the future.

Most estimates of the total CO2 added to the atmosphere during the PETM are similar to, or somewhat lower than, the total CO2 that would arise from burning all fossilfuel resources estimated to exist on Earth—especially if, as suggested by the PETM and by current understanding, warming releases additional carbon from reservoirs such as tundra soils and seafloor hydrates. However, the initial CO2 rise during the PETM took place over the course of a few millennia, about a factor of 10 slower than if humans burned the remaining fossil-fuel resources under a business-as-usual scenario. PETM CO2 remained elevated for more than 150,000 years, confirming the long persistence expected for human-released CO2. The strong PETM warming suggests that climate is highly sensitive to rising CO2. This implies a higher climate sensitivity than the lower end adopted for somewhat shorter times by the Intergovernmental Panel on Climate Change (IPCC), and perhaps larger than the higher end. Thus, temperatures may rise more than currently projected.

Mohtadi 2016
Mahyar Mohtadi, Matthias Prange & Stephan Steinke, *Palaeoclimatic insights into forcing and response of monsoon rainfall*. nature **533** (2016), 191–199.

Monsoons are the dominant seasonal mode of climate variability in the tropics and are critically important conveyors of atmospheric moisture and energy at a global scale. Predicting monsoons, which have profound impacts on regions that are collectively home to more than 70 per cent of Earth's population, is a challenge that is difficult to overcome by relying on instrumental data from only the past few decades. Palaeoclimatic evidence of monsoon rainfall dynamics across different regions and timescales could help us to understand and predict the sensitivity and response of monsoons to various forcing mechanisms. This evidence suggests that monsoon systems exhibit substantial regional character.

Kultur

Patzschke 2016
Renate Patzschke & Peter R. Fuchs, *Am Anfang war der Tempel*. Spektrum der Wissenschaft **2016**, v, 64–69.

Von den Moche bis zu den Inka: Im alten Südamerika dienten Städte in erster Linie als Zentren für Kult und Religion. Die Ursprünge dieser Tradition können Archäologen nun in Sechín Bajo bis in das 4. Jahrtausend v. Chr. zurückverfolgen.

Plätze für den Kult

1 Im Casmatal in Nordperu erforschen deutsche Archäologen die Baugeschichte des Tempelkomplexes Sechín Bajo, der bis 3600 v. Chr. zurückreicht und damit der nach heutigem Forschungsstand älteste Amerikas ist.

2 Die Befunde zeigen, dass dort Bautraditionen für zeremonielle Zentren entwickelt wurden, die bis in die Inkazeit Bestand hatten. Dazu gehört die Anlage von Plattformen mit eingetieften Plätzen wie auch die Unterscheidung von öffentlich zugänglichen und abgeschlossenen Bereichen.

3 Anders als in Mesoamerika oder Europa wuchsen Städte im Andenraum stets im Umfeld bedeutender Kultzentren. Marktwirtschaftliche Gründe spielten keine Rolle.

Mittelpaläolithikum

Radini 2016

Anita Radini, Stephen Buckley, Antonio Rosas, Almudena Estalrrich, Marco de la Rasilla & Karen Hardy, *Neanderthals, trees and dental calculus, New evidence from El Sidrón.* Antiquity **90** (2016), 290–301.

Analysis of dental calculus is increasingly important in archaeology, although the focus has hitherto been on dietary reconstruction. Non-edible material has, however, recently been extracted from the dental calculus of a Neanderthal population from the 49 000-year-old site of El Sidrón, Spain, in the form of fibre and chemical compounds that indicate conifer wood. Associated dental wear confirms that the teeth were being used for non-dietary activities. These results highlight the importance of dental calculus as a source of wider biographical information, and demonstrate the need to include associated data within research, in particular tooth wear, to maximise this valuable resource.

Keywords: Spain | El Sidrón | Neanderthals | dental calculus | wood | conifer | microscopy | gas | chromatography | mass spectrometry

Politik

Broockman 2016

David Broockman & Joshua Kalla, *Durably reducing transphobia, A field experiment on door-to-door canvassing.* science **352** (2016), 220–224.

s352-0220-Supplement.pdf

Existing research depicts intergroup prejudices as deeply ingrained, requiring intense intervention to lastingly reduce. Here, we show that a single approximately 10-minute conversation encouraging actively taking the perspective of others can markedly reduce prejudice for at least 3 months. We illustrate this potential with a door-to-door canvassing intervention in South Florida targeting antitransgender prejudice. Despite declines in homophobia, transphobia remains pervasive. For the intervention, 56 canvassers went door to door encouraging active perspective-taking with 501 voters at voters' doorsteps. A randomized trial found that these conversations substantially reduced transphobia, with decreases greater than Americans' average decrease in homophobia from 1998 to 2012. These effects persisted for 3 months, and both transgender and nontransgender canvassers were

effective. The intervention also increased support for a nondiscrimination law, even after exposing voters to counterarguments.

Paluck 2016

Elizabeth Levy Paluck, *How to overcome prejudice*. science **352** (2016), 147.

A brief conversation can have a lasting effect on prejudice.

It remains to be shown whether the scripted discussions were successful because they asked voters to recall a time when they were judged negatively to understand a transgender person's perspective ("analogic perspective-taking"). Rather than investigating the psychological processes responsible for the ef ect, Broockman and Kalla focus on whether the canvassing intervention produced substantive and durable changes that are detectable in a nonlaboratory environment.

Story or Book

Hall 2016

Charles Hall, *Predicting peak oil*. science **352** (2016), 155.

A new biography probes M. King Hubbert's controversial mid-century energy pronouncement.

The Oracle of Oil. A Maverick Geologist's Quest for a Sustainable Future. Mason Inman. Norton, 2016. 429 pp.

Global production of conventional oil has remained more or less flat since about 2005 (Hubbert's predicted "undulating plateau"), but new technologies have enabled the exploitation of low-grade source rocks in North Dakota and Texas and ever deeper of shore exploration. This has led to a second, somewhat smaller, U.S. oil peak, which appears to be on the decline as well. However, these new reserves are much more expensive to harness, causing a continued decline in energy return on investment. In Hubbert's words, "when the energy cost of recovering a barrel of oil becomes greater than the energy content of the oil, production will cease no matter what the monetary price may be."

Peplow 2016

Mark Peplow, *A chemist's contradictions*. nature **533** (2016), 175–176.

Mark Peplow parses a book on Humphry Davy's dazzling mix of personas.

The Experimental Self: Humphry Davy and the Making of a Man of Science. Jan Golinski. University of Chicago Press: 2016.

Increasingly, Davy's carefully constructed personas caused problems. He became president of the Royal Society in 1820, but his charisma cut less ice there. His suggestion that women should be allowed to attend evening meetings at the society, as at the RI, was rejected, and even led some to question his masculinity. Meanwhile, a younger generation of scientists resented his dependence on public display and aristocratic patronage. They wanted to be elected to the society on merit, funded by governments rather than lords. As the age of the professional scientist dawned, Davy started to look like an anachronism.