

Literatur

Aktuell

ANTONOW-SCHLORKE 2011

Iwa Antonow-Schlorke et al., *Vulnerability of the fetal primate brain to moderate reduction in maternal global nutrient availability*. [PNAS 108 \(2011\), 3011–3016](#).

[pnas108-03011-Supplement.pdf](#), [pnas108-03011-Supplement1.doc](#), [pnas108-03011-Supplement2.doc](#), [pnas108-03011-Supplement3.doc](#)

Iwa Antonow-Schlorke, Matthias Schwab, Laura A. Cox, Cun Li, Kristina Stuchlik, Otto W. Witte, Peter W. Nathanielsz, and Thomas J. McDonald

Moderate maternal nutrient restriction during pregnancy occurs in both developing and developed countries. In addition to poverty, maternal dieting, teenage pregnancy, and uterine vascular problems in older mothers are causes of decreased fetal nutrition. We evaluated the impact of global 30 % maternal nutrient reduction (MNR) on early fetal baboon brain maturation. MNR induced major cerebral developmental disturbances without fetal growth restriction or marked maternal weight reduction. Mechanisms evaluated included neurotrophic factor suppression, cell proliferation and cell death imbalance, impaired glial maturation and neuronal process formation, down-regulation of gene ontological pathways and related gene products, and up-regulated transcription of cerebral catabolism. Contrary to the known benefits from this degree of dietary reduction on life span, MNR in pregnancy compromises structural fetal cerebral development, potentially having an impact on brain function throughout life.

brain development | fetus | environment | epigenetics | malnutrition

BEIERSDORFER 2011

P. Beiersdorfer, D. Layne, E. W. Magee & J. I. Katz, *Viscoelastic Suppression of Gravity-Driven Counterflow Instability*. [Physical Review Letters 106 \(2011\), 58301](#). <<http://dx.doi.org/10.1103/PhysRevLett.106.058301>>.

Attempts to achieve “top kill” of flowing oil wells by pumping dense drilling “muds,” i.e., slurries of dense minerals, from above will fail if the Kelvin-Helmholtz instability in the gravity-driven counterflow produces turbulence that breaks up the denser fluid into small droplets. Here we estimate the droplet size to be submillimeter for fast flows and suggest the addition of a shear-thickening or viscoelastic polymer to suppress turbulence. We find in laboratory experiments a variety of new physical effects for a viscoelastic shear-thickening liquid in a gravity-driven counterstreaming flow. There is a progression from droplet formation to complete turbulence suppression at the relevant high velocities. Thick descending columns show a viscoelastic analogue of the viscous buckling instability. Thinner streams form structures resembling globules on a looping filament.

BINGEL 2011

U. Bingel, V. Wanigasekera, K. Wiech, R. Ni Mhuircheartaigh, M. C. Lee, M. Ploner & I. Tracey, *The Effect of Treatment Expectation on Drug Efficacy: Imaging the Analgesic Benefit of the Opioid Remifentanyl*. [Science Translational Medicine 3 \(2011\), 70ra14](#). <<http://dx.doi.org/10.1126/scitranslmed.3001244>>.

Ulrike Bingel, Vishvarani Wanigasekera, Katja Wiech, Roisin Ni Mhuirheartaigh, Michael C. Lee, Markus Ploner and Irene Tracey

Evidence from behavioral and self-reported data suggests that the patients' beliefs and expectations can shape both therapeutic and adverse effects of any given drug. We investigated how divergent expectancies alter the analgesic efficacy of a potent opioid in healthy volunteers by using brain imaging. The effect of a fixed concentration of the μ -opioid agonist remifentanyl on constant heat pain was assessed under three experimental conditions using a within-subject design: with no expectation of analgesia, with expectancy of a positive analgesic effect, and with negative expectancy of analgesia (that is, expectation of hyperalgesia or exacerbation of pain). We used functional magnetic resonance imaging to record brain activity to corroborate the effects of expectations on the analgesic efficacy of the opioid and to elucidate the underlying neural mechanisms. Positive treatment expectancy substantially enhanced (doubled) the analgesic benefit of remifentanyl. In contrast, negative treatment expectancy abolished remifentanyl analgesia. These subjective effects were substantiated by significant changes in the neural activity in brain regions involved with the coding of pain intensity. The positive expectancy effects were associated with activity in the endogenous pain modulatory system, and the negative expectancy effects with activity in the hippocampus. On the basis of subjective and objective evidence, we contend that an individual's expectation of a drug's effect critically influences its therapeutic efficacy and that regulatory brain mechanisms differ as a function of expectancy. We propose that it may be necessary to integrate patients' beliefs and expectations into drug treatment regimes alongside traditional considerations in order to optimize treatment outcomes.

DUCKWORTH 2011

Angela L. Duckworth, *The significance of self-control*. *PNAS* **108** (2011), 2639–2640.

We human beings often want, and want to want, different things. Moffitt et al. provide convincing evidence that some of us are better than others at doing what we want to want and, further, that the capacity to govern ourselves effectively in the face of temptation has profound benefits across every major domain of life functioning.

GIUSSANI 2011

Dino A. Giussani, *The vulnerable developing brain*. *PNAS* **108** (2011), 2641–2642.

Reduction in nutrient delivery to the fetus is not only a problem of malnutrition during pregnancy in developing countries but also a consequence of maternal dieting, teenage pregnancy, or impaired placental perfusion in complicated pregnancies in developed societies. The study by Antonow-Schlorke et al. makes it clear that nutrient restriction during pregnancy should be avoided at all costs because the challenge has important consequences for the appropriate growth and development of the brain and implications for fetal programming of cognitive, behavioral, and neurophysiological deficits in later life. The study highlights a clear and growing need to investigate the impact of adverse intrauterine conditions, such as reductions in nutrient and oxygen delivery to the fetus, on the developmental programming of neurodegenerative diseases. Such studies should concentrate on providing insight into mechanisms underlying the association in order to identify plausible clinical intervention.

GOLLUB 2011

Randy L. Gollub & Jian Kong, *For Placebo Effects in Medicine, Seeing Is Believing*. *Science Translational Medicine* **3** (2011), 70ps5. <<http://dx.doi.org/10.1126/scitranslmed.3002120>>.

The gold standard for determining the efficacy of biomedical therapies is the detection of a significant difference between the therapeutic effects of an active pharmacological agent or procedure and a matched inert placebo in a randomized controlled trial. Detecting this difference has become a challenge for medicine, especially for outcomes that are based on patient self-rated scales. Yet factors that contribute to placebo responses have received scant attention. In this issue of *Science Translational Medicine*, Bingel et al. report on an example of how noninvasive whole-brain imaging contributes to our understanding of brain-based placebo effects. Here we highlight ways in which neuroimaging is catalyzing a revolution in society's perspective of placebo effects by providing a compelling visualization of how brain activities that reflect a person's thoughts, feelings, and past experiences can enhance or antagonize his or her response to a medical treatment.

HEIJTZ 2011

Rochellys Diaz Heijtz et al., *Normal gut microbiota modulates brain development and behavior*. [PNAS 108 \(2011\), 3047–3052](#).

[pnas108-03047-Supplement.pdf](#), [pnas108-03047-Supplement1.wmv](#), [pnas108-03047-Supplement2.wmv](#)

Rochellys Diaz Heijtz, Shugui Wang, Farhana Anuar, Yu Qian, Britta Björkholm, Annika Samuelsson, Martin L. Hibberd, Hans Forsberg and Sven Pettersson

Microbial colonization of mammals is an evolution-driven process that modulate host physiology, many of which are associated with immunity and nutrient intake. Here, we report that colonization by gut microbiota impacts mammalian brain development and subsequent adult behavior. Using measures of motor activity and anxiety-like behavior, we demonstrate that germ free (GF) mice display increased motor activity and reduced anxiety, compared with specific pathogen free (SPF) mice with a normal gut microbiota. This behavioral phenotype is associated with altered expression of genes known to be involved in second messenger pathways and synaptic long-term potentiation in brain regions implicated in motor control and anxiety-like behavior. GF mice exposed to gut microbiota early in life display similar characteristics as SPF mice, including reduced expression of PSD-95 and synaptophysin in the striatum. Hence, our results suggest that the microbial colonization process initiates signaling mechanisms that affect neuronal circuits involved in motor control and anxiety behavior.

developmental programming | microbiome | basal ganglia | cognitive behavior | synapse

KUPER 2011

Adam Kuper & Jonathan Marks, *Anthropologists unite!* [nature 470 \(2011\), 166–168](#).

Anthropology isn't in the crisis that parts of the media would have you believe, but it must do better, argue Adam Kuper and Jonathan Marks.

MOFFITT 2011

Terrie E. Moffitt et al., *A gradient of childhood self-control predicts health, wealth, and public safety*. [PNAS 108 \(2011\), 2693–2698](#).

[pnas108-02693-Supplement.pdf](#)

Terrie E. Moffitt, Louise Arseneault, Daniel Belsky, Nigel Dickson, Robert J. Hancox, HonaLee Harrington, Renate Houts, Richie Poulton, Brent W. Roberts, Stephen Ross, Malcolm R. Sears, W. Murray Thomson, and Avshalom Caspi

Policy-makers are considering large-scale programs aimed at selfcontrol to improve citizens' health and wealth and reduce crime. Experimental and economic studies suggest such programs could reap benefits. Yet, is self-control important for the health, wealth, and public safety of the population? Following a cohort of 1,000 children from birth to the age of 32 y, we show that childhood selfcontrol predicts physical health, substance dependence, personal finances, and criminal offending outcomes, following a gradient of

self-control. Effects of children's self-control could be disentangled from their intelligence and social class as well as from mistakes they made as adolescents. In another cohort of 500 sibling-pairs, the sibling with lower self-control had poorer outcomes, despite shared family background. Interventions addressing self-control might reduce a panoply of societal costs, save taxpayers money, and promote prosperity.
life course | longitudinal | public policy

SCHMELZ 2011

Martin Schmelz, Josep Call & Michael Tomasello, *Chimpanzees know that others make inferences*. [PNAS 108 \(2011\), 3077–3079](#).

[pnas108-03077-Supplement.pdf](#), [pnas108-03077-Supplement.wmv](#)

If chimpanzees are faced with two opaque boards on a table, in the context of searching for a single piece of food, they do not choose the board lying flat (because if food was under there it would not be lying flat) but, rather, they choose the slanted one—presumably inferring that some unperceived food underneath is causing the slant. Here we demonstrate that chimpanzees know that other chimpanzees in the same situation will make a similar inference. In a back-and-forth foraging game, when their competitor had chosen before them, chimpanzees tended to avoid the slanted board on the assumption that the competitor had already chosen it. Chimpanzees can determine the inferences that a conspecific is likely to make and then adjust their competitive strategies accordingly.

social cognition | competition | theory of mind

Anthropologie

DEMEÑOAL 2011

Peter B. deMenocal, *Climate and Human Evolution*. [science 331 \(2011\), 540–542](#).

Climate change and its effects on African ecosystems may have played a key role in human evolution.

MORAN 2011

Joseph M. Moran, Liane L. Young, Rebecca Saxe, Su Mei Lee, Daniel O'Young, Penelope L. Mavros & John D. Gabrieli, *Impaired theory of mind for moral judgment in high-functioning autism*. [PNAS 108 \(2011\), 2688–2692](#).

[pnas108-02688-Supplement.pdf](#)

High-functioning autism (ASD) is characterized by real-life difficulties in social interaction; however, these individuals often succeed on laboratory tests that require an understanding of another person's beliefs and intentions. This paradox suggests a theory of mind (ToM) deficit in adults with ASD that has yet to be demonstrated in an experimental task eliciting ToM judgments. We tested whether ASD adults would show atypical moral judgments when they need to consider both the intentions (based on ToM) and outcomes of a person's actions. In experiment 1, ASD and neurotypical (NT) participants performed a ToM task designed to test false belief understanding. In experiment 2, the same ASD participants and a new group of NT participants judged the moral permissibility of actions, in a 2 (intention: neutral/negative) × 2 (outcome: neutral/negative) design. Though there was no difference between groups on the false belief task, there was a selective difference in the moral judgment task for judgments of accidental harms, but not neutral acts, attempted harms, or intentional harms. Unlike the NT group, which judged accidental harms less morally wrong than attempted harms, the ASD group did not reliably judge accidental and attempted harms as morally different. In judging accidental harms, ASD participants

appeared to show an underreliance on information about a person's innocent intention and, as a direct result, an overreliance on the action's negative outcome. These findings reveal impairments in integrating mental state information (e.g., beliefs, intentions) for moral judgment.

Asperger disorder | social cognition | mentalizing

RAICHLIN 2011

David A. Raichlen, Hunter Armstrong & Daniel E. Lieberman, *Calcaneus length determines running economy: Implications for endurance running performance in modern humans and Neandertals*. [Journal of Human Evolution 60 \(2011\), 299–308](#).

The endurance running (ER) hypothesis suggests that distance running played an important role in the evolution of the genus *Homo*. Most researchers have focused on ER performance in modern humans, or on reconstructing ER performance in *Homo erectus*, however, few studies have examined ER capabilities in other members of the genus *Homo*. Here, we examine skeletal correlates of ER performance in modern humans in order to evaluate the energetics of running in Neandertals and early *Homo sapiens*. Recent research suggests that running economy (the energy cost of running at a given speed) is strongly related to the length of the Achilles tendon moment arm. Shorter moment arms allow for greater storage and release of elastic strain energy, reducing energy costs. Here, we show that a skeletal correlate of Achilles tendon moment arm length, the length of the calcaneal tuber, does not correlate with walking economy, but correlates significantly with running economy and explains a high proportion of the variance (80%) in cost between individuals. Neandertals had relatively longer calcaneal tubers than modern humans, which would have increased their energy costs of running. Calcaneal tuber lengths in early *H. sapiens* do not significantly differ from those of extant modern humans, suggesting Neandertal ER economy was reduced relative to contemporaneous anatomically modern humans. Endurance running is generally thought to be beneficial for gaining access to meat in hot environments, where hominins could have used pursuit hunting to run prey taxa into hyperthermia. We hypothesize that ER performance may have been reduced in Neandertals because they lived in cold climates. Keywords: Energetics; Locomotion; Achilles tendon; Moment arm

REED 1997

Kaye E. Reed, *Early hominid evolution and ecological change through the African Plio-Pleistocene*. [Journal of Human Evolution 32 \(1997\), 289–322](#).

The habitats in which extinct hominids existed has been a key issue in addressing the origin and extinction of early hominids, as well as in understanding various morphological and behavioral adaptations. Many researchers postulated that early hominids lived in an open savanna (Dart, 1925; Robinson, 1963; Howell, 1978). However, Vrba (1985, 1988) has noted that a major global climatic and environmental shift from mesic, closed to xeric, open habitats occurred in the late African Pliocene (approximately 2.5 m.y.a.), thus implying that the earliest hominids existed in these mesic, wooded environs. This climatic shift is also suggested to have contributed to a pulse in speciation events with turnovers of many bovid and possibly hominid species. Previous environmental reconstructions of hominid localities have concentrated on taxonomic identities and taxonomic uniformitarianism to provide habitat reconstructions (e.g., Vrba, 1975; Shipman & Harris, 1988). In addition, relative abundances of species are often used to reconstruct a particular environment, when in fact taphonomic factors could be affecting the proportions of taxa. This study uses the morphological adaptations of mammalian assemblages found with early hominids to reconstruct the habitat based on each species' ecological adaptations, thus minimizing problems introduced by taxonomy and taphonomy. Research presented here compares east and south African Plio-Pleistocene mammalian fossil assemblages with 31 extant mammalian

communities from eight different habitat types. All communities are analyzed through ecological diversity methods, that is, each species trophic and locomotor adaptations are used to reconstruct an ecological community and derive its vegetative habitat. Reconstructed habitats show that Australopithecus species existed in fairly wooded, well-watered regions. Paranthropus species lived in similar environs and also in more open regions, but always in habitats that include wetlands. Homo is the first hominid to exist in areas of fairly open, arid grassland. This change from closed to open habitats occurs gradually from about 4 m.y.a. until about 2 m.y.a. when there is a major increase in arid and grazing adapted mammals. Therefore, the appearance of open savannas do not appear to have influenced the origination or adaptations of the earliest hominids, but could have contributed to their demise. As Stanley (1992) hypothesized, Homo species appear the first to be adapted to open, arid environments.

Keywords: Australopithecus, Paranthropus, ecological diversity, paleoecology.

Klima

BENDLE 2011

James Bendle, *Core data from the Antarctic margin*. [nature 470 \(2011\), 181–182](#).

Sediments at the edge of Antarctica are a largely unexploited source of information about climate change. They have now provided a valuable local record of sea surface temperatures for the past 12,000 years.

BOBE 2004

René Bobe & Anna K. Behrensmeyer, *The expansion of grassland ecosystems in Africa in relation to mammalian evolution and the origin of the genus Homo*. [Palaeo 207 \(2004\), 399–420](#).

The relationship between climatic change and human evolution can be framed in terms of three major hypotheses. A modern version of the long-held savanna hypothesis posits that the expansion of grassland ecosystems in Africa was driven by global climatic change and led to the divergence of hominins from the apes and to the origin of the Homo clade. A related idea suggests that hominins originated in the late Miocene, and Homo in the late Pliocene, as constituents of broader pulses of faunal turnover synchronized by episodes of global climatic change. A more recent concept, the variability selection hypothesis, emphasizes the importance of fluctuating climates and environments, rather than any single trend, in shaping human adaptation and evolution. Here we evaluate these ideas for the Plio-Pleistocene in light of new analyses of fossil mammals from the Turkana Basin of Kenya and Ethiopia. Our results show that between 4 and 1 Ma (million years ago), there were profound faunal changes in the Turkana Basin. The most important of these changes include significant shifts in the abundance of the common families of mammals, episodes of high faunal turnover, and an increase in the number and abundance of species that show adaptations to grassland ecosystems. Episodes of relatively high faunal turnover occurred in the intervals 3.4–3.2, 2.8–2.6, 2.4–2.2, and 2.0–1.8 Ma. Paranthropus and Homo appear in the Turkana Basin during successive intervals of high turnover at 2.8–2.6 and at 2.4–2.2 Ma, while the appearance of Homo erectus is coupled to a major episode of turnover and grassland expansion after 2 Ma. Thus, there was not a single turnover pulse of relevance to late Pliocene hominins, but multiple events that successively led to the appearance of Paranthropus, early Homo, and H. erectus. Our results also show evidence of large-scale, 100 ky-periodicity shifts in the fauna beginning at 2.5 Ma, during the time that Homo and lithic artifacts first appear in the Turkana Basin, lending support to the variability selection hypothesis [Science 273 (1996) 922; Potts R., 1996b. *Humanity's Descent: The Consequences of Ecological Instability*. Avon Books, New York.] during the latest Pliocene.

The savanna hypothesis may not explain the divergence of hominins from other apes, but it could be correct in stressing the importance of grasslands to the early evolution of Homo. The fundamental importance of grasslands may lie in the complexity and heterogeneity they added to the range of habitats available to the early species of the genus Homo. The turnover pulse hypothesis [Vrba, E.S., 1988. Late Pliocene climatic events and hominid evolution. In: Grine, F.E (Ed.). *Evolutionary History of the "Robust" Australopithecines*. Aldine, New York, pp. 405-426; Vrba, E.S., 1995. The fossil record of African antelopes (Mammalia, Bovidae) in relation to human evolution and paleoclimate. In: Vrba, E.S., Denton, G.H., Partridge, T.C., Burckle, L.H. (Eds.). *Paleoclimate and Evolution, with Emphasis on Human Origins*. Yale Univ. Press, New Haven, pp. 385-424.] may be correct in linking critical events in human evolution to broader pulses of faunal change ultimately driven by climate, but our results show that any such link is complex, with at least four rather than one pulse of change during the Pliocene and early Pleistocene of the Turkana Basin.

Keywords: Plio-Pleistocene hominins; Homo; Paranthropus; Grasslands; Faunal change; Turkana basin; Lower Omo valley

BÜNTGEN 2011

Ulf Büntgen et al., *2500 Years of European Climate Variability and Human Susceptibility*. *science* **331** (2011), 578–582.

s331-0578-Supplement.pdf

Ulf Büntgen, Willy Tegel, Kurt Nicolussi, Michael McCormick, David Frank, Valerie Trouet, Jed O. Kaplan, Franz Herzig, Karl-Uwe Heussner, Heinz Wanner, Jürg Luterbacher & Jan Esper

Climate variations influenced the agricultural productivity, health risk, and conflict level of preindustrial societies. Discrimination between environmental and anthropogenic impacts on past civilizations, however, remains difficult because of the paucity of high-resolution paleoclimatic evidence. We present tree ring-based reconstructions of central European summer precipitation and temperature variability over the past 2500 years. Recent warming is unprecedented, but modern hydroclimatic variations may have at times been exceeded in magnitude and duration. Wet and warm summers occurred during periods of Roman and medieval prosperity. Increased climate variability from ≈ 250 to 600 C.E. coincided with the demise of the western Roman Empire and the turmoil of the Migration Period. Such historical data may provide a basis for counteracting the recent political and fiscal reluctance to mitigate projected climate change.

CERLING 1992

T. E. Cerling, *Development of grasslands and savannas in East Africa during the Neogene*. *Palaeo* **97** (1992), 241–247.

The development of savanna-type grasslands is a relatively recent phenomena in East Africa. The stable carbon isotopic composition of paleosol carbonates from fossil localities in East Africa show that C4 vegetation was present by about 8–9 Ma but made up only a relatively small proportion of the total biomass. Although the proportion of C4 vegetation increased in the Pliocene and Pleistocene there is no evidence for the development of virtually pure C4 grasslands, as is characterized by tropical grasslands today, until Middle Pleistocene times. This has important implications concerning the evolution of mammals in Africa, including hominids.

DOMACK 2001

E. Domack, A. Leventer, R. Dunbar, F. Taylor, S. Brachfeld, C. Sjunneskogs & ODP Leg 178 Scientific Party, *Chronology of the Palmer Deep site, Antarctic Peninsula: a Holocene palaeoenvironmental reference for the circum-Antarctic*. *The Holocene* **11** (2001), 1–9.

Palmer Deep sediment cores are used to produce the first high-resolution, continuous late Pleistocene to Holocene time-series from the Antarctic marine system. The sedimentary record is dated using accelerator mass spectrometer radiocarbon methods on acid insoluble organic matter and foraminiferal calcite. Fifty-four radiocarbon analyses are utilized in the dating which provides a calibrated timescale back to 13 ka BP. Reliability of resultant ages on organic matter is assured because duplicates produce a standard deviation from the surface age of less than laboratory error (i.e., ± 50 years). In addition, surface organic matter ages at the site are in excellent agreement with living calcite ages at the accepted reservoir age of ≈ 1260 years for the Antarctic Peninsula. Spectral analyses of the magnetic susceptibility record against the age model reveal unusually strong periodicity in the 400, ≈ 200 and 50-70 year frequency bands, similar to other high-resolution records from the Holocene but, so far, unique for the circum-Antarctic. Here we show that comparison to ice-core records of specific climatic events (e.g., the 'Little Ice Age', Neoglacial, Hypsithermal, and the Bølling/Allerød to Younger Dryas transition) provides improved focus upon the relative timing of atmosphere/ocean changes between the northern and southern high latitudes.

Key words: chronology, spectral analysis, periodicity, Palmer Deep, Antarctic Peninsula, Holocene, radiocarbon, sedimentology.

FEAKINS 2005

Sarah J. Feakins, Peter B. deMenocal & Timothy I. Eglinton, *Biomarker records of late Neogene changes in northeast African vegetation*. [Geology](#) **33** (2005), 977–980.

Open savannah grasslands (dominated by C4 plants) became a significant component of northeast African vegetation during the late Neogene. We present molecule-specific carbon isotopic measurements of terrestrial plant biomarkers preserved in marine sediments off northeast Africa that allow reconstruction of orbital-scale vegetation changes in short time windows over the past 9.4 m.y. The biomarker data show large-amplitude vegetation variability as early as 3.8 Ma, with the greatest C4 expansion occurring after 3.4 Ma. We sampled orbital-scale oscillations of up to 5‰, almost as large as the observed late Neogene range of 7‰, suggesting that large and repeated oscillations between more open and more closed landscapes were an important aspect of northeast African vegetation change during the past 4 m.y.

Keywords: $\delta^{13}\text{C}$, carbon isotopes, biomarker, Africa, vegetation, C4.

SHEVENELL 2011

A. E. Shevenell, A. E. Ingalls, E. W. Domack & C. Kelly, *Holocene Southern Ocean surface temperature variability west of the Antarctic Peninsula*. [nature](#) **470** (2011), 250–254.

n470-0250-Supplement1.pdf, n470-0250-Supplement2.xls

The disintegration of ice shelves, reduced sea-ice and glacier extent, and shifting ecological zones observed around Antarctica^{1,2} highlight the impact of recent atmospheric³ and oceanic warming⁴ on the cryosphere. Observations^{1,2} and models^{5,6} suggest that oceanic and atmospheric temperature variations at Antarctica's margins affect global cryosphere stability, ocean circulation, sea levels and carbon cycling. In particular, recent climate changes on the Antarctic Peninsula have been dramatic, yet the Holocene climate variability of this region is largely unknown, limiting our ability to evaluate ongoing changes within the context of historical variability and underlying forcing mechanisms. Here we show that surface ocean temperatures at the continental margin of the western Antarctic Peninsula cooled by 3-4 °C over the past 12,000 years, tracking the Holocene decline of local (65° S) spring insolation. Our results, based on TEX86 sea surface temperature (SST) proxy evidence from a marine sediment core, indicate the importance of regional summer duration as a driver of Antarctic seasonal sea-ice fluctuations⁷. On millennial timescales,

abrupt SST fluctuations of 2-4 °C coincide with globally recognized climate variability⁸. Similarities between our SSTs, Southern Hemisphere westerly wind reconstructions⁹ and El Niño/Southern Oscillation variability¹⁰ indicate that present climate teleconnections between the tropical Pacific Ocean and the western Antarctic Peninsula¹¹ strengthened late in the Holocene epoch. We conclude that during the Holocene, Southern Ocean temperatures at the western Antarctic Peninsula margin were tied to changes in the position of the westerlies, which have a critical role in global carbon cycling^{9,12}.

Kultur

BELLO 2011

Silvia M. Bello, Simon A. Parfitt & Chris B. Stringer, *Earliest Directly-Dated Human Skull-Cups*. *PLoS ONE* **6** (2011), e17026. <<http://dx.doi.org/10.1371/journal.pone.0017026>>.

Background: The use of human braincases as drinking cups and containers has extensive historic and ethnographic documentation, but archaeological examples are extremely rare. In the Upper Palaeolithic of western Europe, cut-marked and broken human bones are widespread in the Magdalenian (≈15 to 12,000 years BP) and skull-cup preparation is an element of this tradition.

Principal Findings: Here we describe the post-mortem processing of human heads at the Upper Palaeolithic site of Gough's Cave (Somerset, England) and identify a range of modifications associated with the production of skull-cups. New analyses of human remains from Gough's Cave demonstrate the skilled post-mortem manipulation of human bodies. Results of the research suggest the processing of cadavers for the consumption of body tissues (bone marrow), accompanied by meticulous shaping of cranial vaults. The distribution of cut-marks and percussion features indicates that the skulls were scrupulously 'cleaned' of any soft tissues, and subsequently modified by controlled removal of the facial region and breakage of the cranial base along a sub-horizontal plane. The vaults were also 'retouched', possibly to make the broken edges more regular. This manipulation suggests the shaping of skulls to produce skull-cups.

Conclusions: Three skull-cups have been identified amongst the human bones from Gough's Cave. New ultrafiltered radiocarbon determinations provide direct dates of about 14,700 cal BP, making these the oldest directly dated skull-cups and the only examples known from the British Isles.

Zündung

PATERSON 1919

Clifford C. Paterson & Norman Campbell, *Some Characteristics of the Spark Discharge and its Effect in Igniting Explosive Mixtures, Part I: The nature of the spark; Part II: Igniting power of spark discharge*. *ProcPhysSoc* **31** (1919), 168–228.

WEFELS 1991

Peter Wefels, *Verbesserung des ottomotorischen Verbrennungsprozesses durch ein weiterentwickeltes Plasmastrahl-Zündsystem*. Dissertation, RWTH Aachen ([Aachen 1991](#)).

ZIEGLER 1991

Gerhard F. W. Ziegler, *Entflammung magerer Methan/Luft-Gemische durch kurzzeitige Bogen- und Glimmentladungen*. Dissertation, Universität Stuttgart ([Stuttgart 1991](#)).