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References

Aktuell

Boland 2016

Julie E. Boland & Robin Queen, *If You're House Is Still Available, Send Me an Email, Personality Influences Reactions to Written Errors in Email Messages*. PLoS ONE **11** (2016), e149885. DOI:10.1371/journal.pone.0149885.

The increasing prevalence of social media means that we often encounter written language characterized by both stylistic variation and outright errors. How does the personality of the reader modulate reactions to non-standard text? Experimental participants read 'email responses' to an ad for a housemate that either contained no errors or had been altered to include either typos (e.g., teh) or homophonous grammar errors (grammos, e.g., to/too, it's/ its). Participants completed a 10-item evaluation scale for each message, which measured their impressions of the writer. In addition participants completed a Big Five personality assessment and answered demographic and language attitude questions. Both typos and grammos had a negative impact on the evaluation scale. This negative impact was not modulated by age, education, electronic communication frequency, or pleasure reading time. In contrast, personality traits did modulate assessments, and did so in distinct ways for grammos and typos.

Gaspar 2016

John M. Gaspar, Gregory J. Christie, David J. Prime, Pierre Jolicœur & John J. McDonald, *Inability to suppress salient distractors predicts low visual working memory capacity*. PNAS **113** (2016), 3693–3698.

According to contemporary accounts of visual working memory (vWM), the ability to efficiently filter relevant from irrelevant information contributes to an individual's overall vWM capacity. Although there is mounting evidence for this hypothesis, very little is known about the precise filtering mechanism responsible for controlling access to vWM and for differentiating low- and high-capacity individuals. Theoretically, the inefficient filtering observed in low-capacity individuals might be specifically linked to problems enhancing relevant items, suppressing irrelevant items, or both. To find out, we recorded neurophysiological activity associated with attentional selection and active suppression during a competitive visual search task. We show that high-capacity individuals actively suppress salient distractors, whereas low-capacity individuals are unable to suppress salient distractors in time to prevent those items from capturing attention. These results demonstrate that individual differences in vWM capacity are associated with the timing of a specific attentional control operation that suppresses processing of salient but irrelevant visual objects and restricts their access to higher stages of visual processing.

Keywords: suppression | attention | working memory | event-related potentials | distractor positivity

Significance: Humans can remember the features of three or four visual objects for short periods of time. Individual differences in this working memory capacity, which accurately predict fluid intelligence and performance in numerous cognitive tasks, have been hypothesized to reflect variations in attentional processes that

govern access to the memory system. However, the specific attention mechanism that differentiates high- and low-capacity individuals is unknown. Here, we show that differences in working memory capacity are specifically related to distractorsuppression activity in visual cortex. Our electrophysiological measures reveal that although high-capacity individuals are able to actively suppress distractors, low-capacity individuals cannot suppress them in time to prevent distractors from capturing attention.

Getzin 2016

Stephan Getzin et al., *Discovery of fairy circles in Australia supports self-organization theory*. PNAS **113** (2016), 3551–3556.

Stephan Getzin, Hezi Yizhaq, Bronwyn Bell, Todd E. Erickson, Anthony C. Postle, Itzhak Katra, Omer Tzuk, Yuval R. Zelnik, Kerstin Wiegand, Thorsten Wiegand & Ehud Meron

Vegetation gap patterns in arid grasslands, such as the "fairy circles" of Namibia, are one of nature's greatest mysteries and subject to a lively debate on their origin. They are characterized by small-scale hexagonal ordering of circular bare-soil gaps that persists uniformly in the landscape scale to form a homogeneous distribution. Pattern-formation theory predicts that such highly ordered gap patterns should be found also in other water-limited systems across the globe, even if the mechanisms of their formation are different. Here we report that so far unknown fairy circles with the same spatial structure exist 10,000 km away from Namibia in the remote outback of Australia. Combining fieldwork, remote sensing, spatial pattern analysis, and process-based mathematical modeling, we demonstrate that these patterns emerge by self-organization, with no correlation with termite activity; the driving mechanism is a positive biomass–water feedback associated with water runoff and biomass-dependent infiltration rates. The remarkable match between the patterns of Australian and Namibian fairy circles and model results indicate that both patterns emerge from a nonuniform stationary instability, supporting a central universality principle of pattern-formation theory. Applied to the context of dryland vegetation, this principle predicts that different systems that go through the same instability type will show similar vegetation patterns even if the feedback mechanisms and resulting soil–water distributions are different, as we indeed found by comparing the Australian and the Namibian fairy-circle ecosystems. These results suggest that biomass–water feedbacks and resultant vegetation gap patterns are likely more common in remote drylands than is currently known.

Keywords: drylands | spatial pattern | Triodia grass | Turing instability | vegetation gap

Significance: Pattern-formation theory predicts that vegetation gap patterns, such as the fairy circles of Namibia, emerge through the action of pattern-forming biomass–water feedbacks and that such patterns should be found elsewhere in water-limited systems around the world. We report here the exciting discovery of fairycircle patterns in the remote outback of Australia. Using fieldwork, remote sensing, spatial pattern analysis, mathematical modeling, and pattern-formation theory we show that the Australian gap patterns share with their Namibian counterparts the same characteristics but are driven by a different biomass– water feedback. These observations are in line with a central universality principle of pattern-formation theory and support the applicability of this theory to wider contexts of spatial selforganization in ecology.

Hood 2016

Bruce Hood, *Make recycled goods covetable*. nature **531** (2016), 438–440.

To reduce consumption and waste we must overcome our squeamishness about repurposing pre-owned possessions, says Bruce Hood.

Lawson 2016

David W. Lawson, Susan James, Esther Ngadaya, Bernard Ngowi, Sayoki G. M. Mfinanga & Monique Borgerhoff Mulder, *Context matters when studying purportedly harmful cultural practices, Reply to Rieger and Wagner*. PNAS **113** (2016), E1771–E1772.

Wagner and Rieger's cross-national study identifies considerable heterogeneity, with confidence intervals crossing zero for 15 of 26 countries and a positive (statistically nonsignificant) association between polygyny and HAZ in Tanzania. Africa is a diverse continent and polygyny a diverse institution, encompassing variable norms of residence, resource sharing, and spousal recruitment. A true understanding of polygyny can only be gained by acknowledging this diversity and designing analyses that take context into account.

However, our data are not suitable to test for age dependencies, which can only be confidently assessed via longitudinal analysis. Furthermore to achieve adequate sample size, Rieger and Wagner resort to (i) pooling data across ethnic groups, and so cannot rule out confounding with ethnicity, and (ii) crude comparisons neglecting wife rank (proxied by household head sex) that proved crucial in our original analysis.

McKinlay 2016

Roger McKinlay, *Use or lose our navigation skills*. nature **531** (2016), 573–575.

Automatic wayfinding is eroding natural abilities, warns Roger McKinlay.

Drivers in a simulator who follow satellitenavigation instructions find it more difficult to work out where they have been than those who use maps. Instructed drivers also fail to notice that they have been led past the same point twice. Mountain-rescue teams are tired of searching for people with drained smartphone batteries, no sense of direction and no paper map. As we age, our spatial knowledge and our capabilities for route learning and recall also decline. Loss of spatial orientation is an early indicator of dementia. Those who are affected are often moved to unfamiliar places such as care homes, which can exacerbate disorientation.

Rieger 2016

Matthias Rieger & Natascha Wagner, *Polygyny and child health revisited*. PNAS **113** (2016), E1769–E1770.

The study's claim that child health is positively or not correlated with polygyny is not fully supported by the data for four main reasons.

Height-for-age is systematically and negatively correlated with polygyny both at the individual and the village levels. In most specifications the effect is imprecisely estimated, which may be attributed to the small sample size.

Fourth, it is well known that children across Africa are born with relatively similar height and weight, yet the adverse effects of resource-poor settings, as well as maternal conditions for child growth, magnify with age. In other words, being born into a polygynous household is not the same as growing up in a polygynous household. The models should take into account such age heterogeneities resulting in growth faltering.

Schlichting 2016

H. Joachim Schlichting, *Hüpf, Steinchen, hüpf!* Spektrum der Wissenschaft **2016**, iv, 46–47.

Treffen flache Kiesel unter kleinem Winkel auf eine Wasseroberfläche, wirkt diese wie eine Sprungschanze. Das kann sich einige Male wiederholen.

Shevenell 2016

Amelia E. Shevenell, *Drilling and modeling studies expose Antarctica's Miocene secrets*. PNAS **113** (2016), 3419–3421.

The MCO is of particular interest because geologic records indicate that atmospheric pCO2 fluctuated within a narrow range [280–500 parts per million by volume (ppmv)] (11), encompassing both present day concentrations and predictions for the next half-century (12). Average global MCO temperatures were 3–4 °C warmer than present with reduced equator-topole thermal gradients (10, 13, 14). Deep-sea stable isotopes suggest substantial Antarctic ice sheet variability and a shift in global carbon cycling (3–6, 9, 10). Thus, Miocene geologic data suggest that either Earth's climate system is so sensitive to pCO2 that slight increases above modern levels may result in substantial warming through positive feedbacks, or that MCO warmth, MMCT cooling, and the associated Antarctic ice sheet response was decoupled from carbon cycling (9–14). To date, MCO warmth and MMCT cooling cannot be explained by simply changing atmospheric pCO2, indicating that a combination of influences (e.g., tectonically driven ocean circulation changes and orbital forcing) worked to increase middle Miocene climate sensitivity (9–11, 13, 14).

Stahel 2016

Walter R. Stahel, *Circular economy*. nature **531** (2016), 435–438.

A new relationship with our goods and materials would save resources and energy and create local jobs, explains Walter R. Stahel.

It would change economic logic because it replaces production with sufficiency: reuse what you can, recycle what cannot be reused, repair what is broken, remanufacture what cannot be repaired. A study of seven European nations found that a shift to a circular economy would reduce each nation's greenhousegas emissions by up to 70 % and grow its workforce by about 4 % — the ultimate low-carbon economy.

And circular-economy concepts have been successfully applied on small scales since the 1990s in eco-industrial parks such as the Kalundborg Symbiosis in Denmark, and in companies that include Xerox (selling modular goods as services), Caterpillar (remanufacturing used diesel engines) and USM Modular Furniture. Selling services rather than goods is familiar in hotels and in public transport; it needs to become mainstream in the consumer realm. Few researchers are taking note. Excellence in metallurgical and chemical sciences is a precondition for a circular economy to succeed. Yet there is too little research on finding ways to disassemble material blends at the atomic level. The body of a modern car incorporates more than a dozen steel and aluminium alloys, each of which needs to be retrieved.

Tollefson 2016

Jeff Tollefson, *Trigger seen for Antarctic collapse*. nature **531** (2016), 562.

Continued growth of greenhouse-gas emissions this century could raise sea levels more than 15 metres by 2500.

They found that by including all of these processes, they could better simulate key geological periods that have long puzzled scientists. Incorporating the physics of ice melt driven by atmospheric warming, along with cliff collapse, helped DeConto and Pollard to reproduce these key periods with their model. “That was sort of an epiphany that maybe we were on to something,” DeConto says. Still, Golledge cautions, scientists know little about how the atmosphere and ocean affected ancient glaciers. “We don’t really have a great handle on what the climate was like in the past,” he says.

A third Nature study, published in December 4, suggested that Antarctic melting was unlikely to produce more than 30 centimetres of sea-level rise by 2100. But its authors noted that newly identified processes such as surface melting and the collapse of ice cliffs could increase ice loss. As such, DeConto and Pollard’s projections “are consistent with our recent study”, says co-author Tamsin Edwards.

Anthropologie

Goupil 2016

Louise Goupil, Margaux Romand-Monnier & Sid Kouider, *Infants ask for help when they know they don’t know*. PNAS **113** (2016), 3492–3496.

Uncertainty monitoring is a core property of metacognition, allowing individuals to adapt their decision-making strategies depending on the state of their knowledge. Although it has been argued that other animals share these metacognitive abilities, only humans seem to possess the ability to explicitly communicate their own uncertainty to others. It remains unknown whether this capacity is present early in development, or whether it emerges later with the ability to verbally report one’s own mental states. Here, using a nonverbal memory-monitoring paradigm, we show that 20-month-olds can monitor and report their own uncertainty. Infants had to remember the location of a hidden toy before pointing to indicate where they wanted to recover it. In an experimental group, infants were given the possibility to ask for help through nonverbal communication when they had forgotten the toy location. Compared with a control group in which infants had no other option but to decide by themselves, infants given the opportunity to ask for help used this option strategically to improve their performance. Asking for help was used selectively to avoid making errors and to decline difficult choices. These results demonstrate that infants are able to successfully monitor their own uncertainty and share this information with others to fulfill their goals.

Keywords: infants | cognition | metacognition | performance monitoring | uncertainty

Significance: Although many animals have been shown to monitor their own uncertainty, only humans seem to have the ability to explicitly communicate their uncertainty to others. It remains unknown whether this ability is present early in development, or whether it only emerges later alongside language development. Here, using a nonverbal memory-monitoring paradigm, we show that infants are able to strategically ask for help to avoid making mistakes. These findings reveal that infants are capable of monitoring and communicating their own uncertainty. We propose that explicit metacognition develops earlier than previously thought, enabling infants to communicate their own uncertainty nonverbally to gain knowledge from others.

Meyer 2016

Matthias Meyer et al., *Nuclear DNA sequences from the Middle Pleistocene Sima de los Huesos hominins*. nature **531** (2016), 504–507.

n531-0504-Supplement.pdf

Matthias Meyer, Juan-Luis Arsuaga, Cesare de Filippo, Sarah Nagel, Ayinuer Aximu-Petri, Birgit Nickel, Ignacio Martínez, Ana Gracia, José María Bermúdez de Castro, Eudald Carbonell, Bence Viola, Janet Kelso, Kay Prüfer & Svante Pääbo

A unique assemblage of 28 hominin individuals, found in Sima de los Huesos in the Sierra de Atapuerca in Spain, has recently been dated to approximately 430,000 years ago1. An interesting question is how these Middle Pleistocene hominins were related to those who lived in the Late Pleistocene epoch, in particular to Neanderthals in western Eurasia and to Denisovans, a sister group of Neanderthals so far known only from southern Siberia. While the Sima de los Huesos hominins share some derived morphological features with Neanderthals, the mitochondrial genome retrieved from one individual from Sima de los Huesos is more closely related to the mitochondrial DNA of Denisovans than to that of Neanderthals2. However, since the mitochondrial DNA does not reveal the full picture of relationships among populations, we have investigated DNA preservation in several individuals found at Sima de los Huesos. Here we recover nuclear DNA sequences from two specimens, which show that the Sima de los Huesos hominins were related to Neanderthals rather than to Denisovans, indicating that the population divergence between Neanderthals and Denisovans predates 430,000 years ago. A mitochondrial DNA recovered from one of the specimens shares the previously described relationship to Denisovan mitochondrial DNAs, suggesting, among other possibilities, that the mitochondrial DNA gene pool of Neanderthals turned over later in their history.

Bibel

Berlin 1997

Adele Berlin, *On Reading Biblical Poetry*, *The Role of Metaphor*. In: John Adney Emerton (Hrsg.), *Cambridge 1995*, *The Fifteenth Congress of the International Organization for the Study of the Old Testament*. Vetus Testamentum Supplements 66 (Leiden 1997), 25–36.

To sum up, I have suggested that metaphor is as important a constituent of poetry as parallelism, and that they both achieve their effects through the juxtaposition of things that are alike and yet different. I have suggested some directions that a study of metaphor might take, and have offered interpretations of specific passages. I have not addressed the interesting question how we recognize metaphors; nor have I discussed over-arching metaphors drawn from the biblical narrative itself—like the creation and the exodus. I would again stress the importance of the study of biblical metaphor, for to understand the Bible's use of imagery is to perceive the network of relationships in the biblical text and in the view of the world that it represents. Therein lies the meaning of the biblical message.

Clines 2012

David J. A. Clines, *Source Analysis*, *The Flood Narrative*. unknown (2012), preprint, 1–10.

Surprisingly, perhaps, there is for the Pentateuch a category known as 'Pentateuchal criticism' when there is not, as far as I know, a similar category of 'Wisdom criticism' or 'Prophets criticism' or 'Historical Books criticism'. 'Pentateuchal criticism', of course, is all about source analysis, whether in a narrower sense—in reference to the detection of sources—or a broader sense—in reference to the consideration of those sources in their historical setting or literary

relationships. The function and the force of this 'Pentateuchal criticism' has been to affirm, or at least suggest, that what is not source-critical in relationship to the Pentateuch is not criticism. Whatever else we may do on the Pentateuch, it is implied, if it is not founded on the source analysis, is not worthy of the name of scholarship, it is not 'criticism'.

The moment we put it like that we know that is absurd. As with other books of the Hebrew Bible, there is a multitude of scholarly activities and a host of scholarly questions we can be absorbed in beyond questions of origins.

Even if the Pentateuch was composed from pre-existing sources, it is not those sources that one is studying when answering questions about the text that now exists, and that has indeed been the only text that has existed for the last two thousand years and more.

Faust 1999

Avraham Faust, *Differences in Family Structure Between Cities and Villages in Iron Age II*. Tel Aviv: Archaeology **26** (1999), 233–252.

The written texts and the research of Israelite society in the period of the Monarchy indicate that the two family types, the nuclear and the extended, existed concurrently. The nuclear family apparently was prevalent mainly in the city, while the extended family remained the predominant type in the more conservative village.

The archaeological finds indicate the considerable differences in the size of dwellings in the village and those in the city. These differences were probably caused by the family type that dwelt in the different houses. The large four-room houses in the villages and farms were inhabited by extended families, while nuclear families dwelt in most of the small four-room houses in the city.

This distinction also explains the differences in the quantitative data presented by the different researchers who have attempted to determine the number of individuals living in the four-room house, as well as the different opinions regarding the prevalent family type during this period.

This conclusion is strengthened by the differences in internal division of houses in the two sectors and by the differing distribution of production installations that indicates different economic systems.

The conclusions drawn in this article can be argued or even rejected. But even if the conclusion are not accepted, it is important to draw attention to the rural sector which comprises the majority of the population in this period, but was almost totally neglected by the tell-minded (Ahlstrom 1982a:25) modern research.

Faust 2005

Avraham Faust, *The Israelite Village, Cultural Conservatism and Technological Innovation*. Tel Aviv: Archaeology **32** (2005), 204–219.

The dynamics of innovation and change have been the focus of much interest over the years, with many studies examining the causes, mechanisms and consequences of cultural change. Using the Israelite Iron Age village as a test-case, the present paper analyzes these dynamics in a traditional society and examines the apparent tension between conservatism and innovation within the context of Iron Age Israel.

Not only did the settlers face a new environment, but the entire sociotechnological system, of which the innovation was but a component, was undergoing change. The rural highland society which evolved during the Iron Age stressed the importance of the community, and at least some of the new elements fitted this society well. The construction of terraces was not only a technological innovation but first and foremost a social one, as it required appropriate social grouping-that

of the 'supra-household' unit; in other words, the rural community. It is clear, therefore, that the terracing and the rural community evolved together. As the two are components of the highland system, the question of contradictions becomes irrelevant. Moreover, an examination of the 'conservative' component ofthe highland society also indicates that things are not so simple. The Iron I highland society was a dynamic frontier society, and not necessarily conservative in the passive sense of the word. During the Iron Age I, the settlers defined themselves in relation to their neighbours, and in the negotiations with more hierarchical groups and their complex material culture, the settlers defined themselves as different and non-hierarchical. For this, they adopted a simple material culture, which appears to us to be conservative. This, however, is an invented and active' conservatism'. Therefore, we are not discussing a closed and conservative society, and there is no need to use the 'excuse', real in itself, that conservative societies can absorb technological innovations for reasons of adaptation. We can actually say that what we call 'conservatism' (and better termed 'simplicity') is, in a way, a cultural invention that was adopted in tandem with the technological innovations as part of the social system that evolved in the hilly part of the Land ofIsrael in the early stages of the Iron Age

Faust 2006

Avraham Faust, *Trade, Ideology, and Boundary Maintenance in Iron Age Israelite Society*. In: Marcel Poorthuis & Joshua J. Schwartz (Hrsg.), *A Holy People, Jewish And Christian Perspectives on Religious Communal Identity*. Jewish and Christian Perspectives 12 (Leiden 2006), 17–35.

Like all groups, the Israelites used and avoided various elements of material culture in maintaining boundaries with their neighbors. While the level of boundary maintenance changed through time and space, it appears that the avoidance of imported pottery was one of the mechanisms through which the Israelites kept themselves separate and distinct from other groups.

It is also possible that that the absence of imported pottery, as well as decoration, resulted from an ideology of egalitarianism and simplicity. Such an ideology was proposed in the past for ancient Israel on various grounds, and though it has been greatly criticized, it seems to correspond with other elements in this society's material culture (e.g., the lack of decoration). A discussion of the possible roots of such ideology are beyond the scope of the present paper, but it seems to be part of Israel's ethnogenesis (as part of a self definition when facing other groups). Much of the local ceramics of Cyprus, Phoenicia, Philistia, Ammon, Edom, etc., was decorated, and Israel and Judah stand as a clear exception. This cannot be explained by functional or economic reasons, and must be a result of cultural attitudes toward decoration.

Biologie

Boback 2007

Scott M. Boback, Christian L. Cox, Brian D. Ott, Rachel Carmody, Richard W. Wrangham & Stephen M. Secor, *Cooking and grinding reduces the cost of meat digestion*. Comparative Biochemistry and Physiology, Part A **148** (2007), 651–656.

The cooking of food is hypothesized to have played a major role in human evolution partly by providing an increase in net energy gain. For meat, cooking compromises the structural integrity of the tissue by gelatinizing the collagen. Hence,

cooked meat should take less effort to digest compared to raw meat. Likewise, less energy would be expended digesting ground meat compared to intact meat. We tested these hypotheses by assessing how the cooking and/or grinding of meat influences the energy expended on its digestion, absorption, and assimilation (i.e., specific dynamic action, SDA) using the Burmese python, Python molurus. Pythons were fed one of four experimental diets each weighing 25 % of the snake's body mass: intact raw beef, intact cooked beef, ground raw beef, and ground cooked beef. We measured oxygen consumption rates of snakes prior to and up to 14 days following feeding and calculated SDA from the extra oxygen consumed above standard metabolic rate. Postprandial peak in oxygen consumption, the scope of peak rates, and SDA varied significantly among meal treatments. Pythons digesting raw or intact meals exhibited significantly larger postprandial metabolic responses than snakes digesting the cooked ground meals. We found cooking to decrease SDA by 12.7 %, grinding to decrease SDA by 12.4 %, and the combination of the two (cooking and grinding) to have an additive effect, decreasing SDA by 23.4 %. These results support the hypothesis that the consumption of cooked meat provides an energetic benefit over the consumption of raw meat.

Keywords: Cooking | Grinding | Meat | Pythons | Specific dynamic action

Mattson 2016

Mark P. Mattson, *Was dich nicht umbringt ....* Spektrum der Wissenschaft **2016**, iv, 28–34.

Chemische Verbindungen, mit denen Pflanzen Schädlinge abwehren, machen das Gehirn weniger anfällig gegenüber Alzheimer, Parkinson und anderen neurodegenerativen Erkrankungen.

Gesundes Gift

1 Pflanzen können ihren Fressfeinden nicht entfliehen. Daher haben sie chemische Abwehrmechanismen entwickelt, um Insekten und andere Tiere auf Distanz zu halten.

2 Toxische Stoffe, die Pflanzen zur Selbstverteidigung einsetzen, nehmen wir in geringen Mengen zu uns, wenn wir Obst und Gemüse essen. Sie verursachen leichte Stressreaktionen, welche die Zellen unseres Körper widerstandsfähiger machen.

3 Die Anpassung an solch moderaten Stress nennt man Hormesis. Man kann sie nutzen, um Hirnerkrankungen und anderen Störungen vorzubeugen – etwa durch Verzehr von Brokkoli und Heidelbeeren.

Den Körper mit "Radikalfängern" zu überschwemmen, könnte beispielsweise seine natürlichen Stressreaktionen hemmen. In einer Studie aus dem Jahr 2009 zeigten Wissenschaftler der Friedrich-Schiller-Universität in Jena: Bei Männern, die einen Monat lang körperlich trainierten und außerdem antioxidative Nahrungszusätze erhielten, verbesserten sich weder die Blutzuckerregulation noch andere Gesundheitsindikatoren. Teilnehmer hingegen, die zwar trainiert, aber keine Antioxidantien bekommen hatten, zeigten solche Verbesserungen. Nahrungsergänzungsmittel, die sich gegen oxidativen Stress richten, scheinen somit die gesundheitsfördernde Wirkung des Sports zunichtezumachen – möglicherweise, indem sie Hormesis-Effekte unterbinden.

Biologie Anthropologie

Zink 2016

Katherine D. Zink & Daniel E. Lieberman, *Impact of meat and Lower Palaeolithic food processing techniques on chewing in humans.* nature **531** (2016), 500–503.

The origins of the genus Homo are murky, but by H. erectus, bigger brains and bodies had evolved that, along with larger foraging ranges, would have increased the daily energetic requirements of hominins1,2. Yet H. erectus differs from earlier hominins in having relatively smaller teeth, reduced chewing muscles, weaker maximum bite force capabilities, and a relatively smaller gut3–5. This paradoxical combination of increased energy demands along with decreased masticatory and digestive capacities is hypothesized to have been made possible by adding meat to the diet6–8, by mechanically processing food using stone tools7,9,10, or by cooking11,12. Cooking, however, was apparently uncommon until 500,000 years ago13,14, and the effects of carnivory and Palaeolithic processing techniques on mastication are unknown. Here we report experiments that tested how Lower Palaeolithic processing technologies affect chewing force production and efficacy in humans consuming meat and underground storage organs (USOs). We find that if meat comprised one-third of the diet, the number of chewing cycles per year would have declined by nearly 2 million (a 13 % reduction) and total masticatory force required would have declined by 15 %. Furthermore, by simply slicing meat and pounding USOs, hominins would have improved their ability to chew meat into smaller particles by 41 %, reduced the number of chews per year by another 5 %, and decreased masticatory force requirements by an additional 12 %. Although cooking has important benefits, it appears that selection for smaller masticatory features in Homo would have been initially made possible by the combination of using stone tools and eating meat.

Datierung

Damon 1989

P. E. Damon et al., *Radiocarbon dating of the Shroud of Turin*. nature **337** (1989), 611–615.

P. E. Damon, D. J. Donahue , B. H. Gore, A. L. Hatheway, A. J. T. Jull, T. W. Linick, P. J. Sercel, L. J. Toolin, C. R. Bronk, E. T. Hall, R. E. M. Hedges, R. Housley, I. A. Law, C. Perry, G. Bonani, S. Trumbore, W. Woelfli, J. C. Ambers, S. G. E. Bowman, M. N. Leese & M. S. Tite

Very small samples from the Shroud of Turin have been dated by accelerator mass spectrometry in laboratories at Arizona, Oxford and Zurich. As controls, three samples whose ages had been determined independently were also dated. The results provide conclusive evidence that the linen of the Shroud of Turin is mediaeval.

Klima

Bauska 2016

Thomas K. Bauska et al., *Carbon isotopes characterize rapid changes in atmospheric carbon dioxide during the last deglaciation*. PNAS **113** (2016), 3465–3470.

Thomas K. Bauska, Daniel Baggenstos, Edward J. Brook, Alan C. Mix, Shaun A. Marcott, Vasilii V. Petrenko, Hinrich Schaefer, Jeffrey P. Severinghaus & James E. Lee

An understanding of the mechanisms that control CO2 change during glacial-interglacial cycles remains elusive. Here we help to constrain changing sources with a high-precision, high-resolution deglacial record of the stable isotopic composition

of carbon in CO2 (d13C-CO2) in air extracted from ice samples from Taylor Glacier, Antarctica. During the initial rise in atmospheric CO2 from 17.6 to 15.5 ka, these data demarcate a decrease in d13C-CO2, likely due to a weakened oceanic biological pump. From 15.5 to 11.5 ka, the continued atmospheric CO2 rise of 40 ppm is associated with small changes in d13C-CO2, consistent with a nearly equal contribution from a further weakening of the biological pump and rising ocean temperature. These two trends, related to marine sources, are punctuated at 16.3 and 12.9 ka with abrupt, century-scale perturbations in d13C-CO2 that suggest rapid oxidation of organic land carbon or enhanced air-sea gas exchange in the Southern Ocean. Additional century-scale increases in atmospheric CO2 coincident with increases in atmospheric CH4 and Northern Hemisphere temperature at the onset of the B©¬lling (14.6-14.3 ka) and Holocene (11.6-11.4 ka) intervals are associated with small changes in d13C-CO2, suggesting a combination of sources that included rising surface ocean temperature.

Keywords: ice cores | paleoclimate | carbon cycle | atmospheric CO2 | last deglaciation

Significance: Antarctic ice cores provide a precise, well-dated history of increasing atmospheric CO2 during the last glacial to interglacial transition. However, the mechanisms that drive the increase remain unclear. Here we reconstruct a key indicator of the sources of atmospheric CO2 by measuring the stable isotopic composition of CO2 in samples spanning the period from 22,000 to 11,000 years ago from Taylor Glacier, Antarctica. Improvements in precision and resolution allow us to fingerprint CO2 sources on the centennial scale. The data reveal two intervals of rapid CO2 rise that are plausibly driven by sources from land carbon (at 16.3 and 12.9 ka) and two others that appear fundamentally different and likely reflect a combination of sources (at 14.6 and 11.5 ka).

DeConto 2016

Robert M. DeConto & David Pollard, *Contribution of Antarctica to past and future sea-level rise*. nature **531** (2016), 591–597.

n531-0591-Supplement.zip

Polar temperatures over the last several million years have, at times, been slightly warmer than today, yet global mean sea level has been 6–9 metres higher as recently as the Last Interglacial (130,000 to 115,000 years ago) and possibly higher during the Pliocene epoch (about three million years ago). In both cases the Antarctic ice sheet has been implicated as the primary contributor, hinting at its future vulnerability. Here we use a model coupling ice sheet and climate dynamics—including previously underappreciated processes linking atmospheric warming with hydrofracturing of buttressing ice shelves and structural collapse of marine-terminating ice cliffs—that is calibrated against Pliocene and Last Interglacial sea-level estimates and applied to future greenhouse gas emission scenarios. Antarctica has the potential to contribute more than a metre of sea-level rise by 2100 and more than 15 metres by 2500, if emissions continue unabated. In this case atmospheric warming will soon become the dominant driver of ice loss, but prolonged ocean warming will delay its recovery for thousands of years.

Evan 2016

Amato T. Evan, Cyrille Flamant, Marco Gaetani & Françoise Guichard, *The past, present and future of African dust*. nature **531** (2016), 493–495.

African dust emission and transport exhibits variability on diurnal1 to decadal2 timescales and is known to influence processes such as Amazon productivity3, Atlantic climate modes4, regional atmospheric composition and radiative balance5

and precipitation in the Sahel6. To elucidate the role of African dust in the climate system, it is necessary to understand the factors governing its emission and transport. However, African dust is correlated with seemingly disparate atmospheric phenomena, including the El Niño/Southern Oscillation7,8, the North Atlantic Oscillation9, the meridional position of the intertropical convergence zone10,11, Sahelian rainfall8 and surface temperatures over the Sahara Desert12, all of which obfuscate the connection between dust and climate. Here we show that the surface wind field responsible for most of the variability in North African dust emission reflects the topography of the Sahara, owing to orographic acceleration of the surface flow. As such, the correlations between dust and various climate phenomena probably arise from the projection of the winds associated with these phenomena onto an orographically controlled pattern of wind variability. A 161-year time series of dust from 1851 to 2011, created by projecting this wind field pattern onto surface winds from a historical reanalysis13, suggests that the highest concentrations of dust occurred from the 1910s to the 1940s and the 1970s to the 1980s, and that there have been three periods of persistent anomalously low dust concentrations—in the 1860s, 1950s and 2000s. Projections of the wind pattern onto climate models give a statistically significant downward trend in African dust emission and transport as greenhouse gas concentrations increase over the twenty-first century, potentially associated with a slow-down of the tropical circulation. Such a dust feedback, which is not represented in climate models, may be of benefit to human and ecosystem health in West Africa via improved air quality14 and increased rainfall6. This feedback may also enhance warming of the tropical North Atlantic15, which would make the basin more suitable for hurricane formation and growth16.

Gasson 2016

Edward Gasson, Robert M. DeConto, David Pollard & Richard H. Levy, *Dynamic Antarctic ice sheet during the early to mid-Miocene.* PNAS **113** (2016), 3459–3464.

Geological data indicate that there were major variations in Antarctic ice sheet volume and extent during the early to midMiocene. Simulating such large-scale changes is problematic because of a strong hysteresis effect, which results in stability once the ice sheets have reached continental size. A relatively narrow range of atmospheric CO2 concentrations indicated by proxy records exacerbates this problem. Here, we are able to simulate large-scale variability of the early to mid-Miocene Antarctic ice sheet because of three developments in our modeling approach. (i) We use a climate–ice sheet coupling method utilizing a high-resolution atmospheric component to account for ice sheet–climate feedbacks. (ii) The ice sheet model includes recently proposed mechanisms for retreat into deep subglacial basins caused by ice-cliff failure and ice-shelf hydrofracture. (iii)We account for changes in the oxygen isotopic composition of the ice sheet by using isotope-enabled climate and ice sheet models. We compare our modeling results with ice-proximal records emerging from a sedimentological drill core from the Ross Sea (Andrill-2A) that is presented in a companion article. The variability in Antarctic ice volume that we simulate is equivalent to a seawater oxygen isotope signal of 0.52–0.66 ‰, or a sea level equivalent change of 30–36 m, for a range of atmospheric CO2 between 280 and 500 ppm and a changing astronomical configuration. This result represents a substantial advance in resolving the long-standing model data conflict of Miocene Antarctic ice sheet and sea level variability.

Keywords: Miocene | Antarctic ice sheet | oxygen isotopes | sea level

Significance: Atmospheric concentrations of carbon dioxide are projected to exceed 500 ppm in the coming decades. It is likely that the last time such levels of

atmospheric CO2 were reached was during the Miocene, for which there is geologic data for large-scale advance and retreat of the Antarctic ice sheet. Simulating Antarctic ice sheet retreat is something that ice sheet models have struggled to achieve because of a strong hysteresis effect. Here, a number of developments in our modeling approach mean that we are able to simulate large-scale variability of the Antarctic ice sheet for the first time. Our results are also consistent with a recently recovered sedimentological record from the Ross Sea presented in a companion article.

Levy 2016

Richard Levy et al., *Antarctic ice sheet sensitivity to atmospheric CO_2 variations in the early to mid-Miocene*. PNAS **113** (2016), 3453–3458.

pnas113-03453-Supplement.doc

Richard Levy, David Harwood, Fabio Florindo, Francesca Sangiorgi, Robert Tripati, Hilmar von Eynatten, Edward Gasson, Gerhard Kuhn, Aradhna Tripati, Robert DeConto, Christopher Fielding, Brad Field, Nicholas Golledge, Robert McKay, Timothy Naish, Matthew Olney, David Pollard, Stefan Schouten, Franco Talarico, Sophie Warny, Veronica Willmott, Gary Acton, Kurt Panter, Timothy Paulsen, Marco Taviani & SMS Science Team

Geological records from the Antarctic margin offer direct evidence of environmental variability at high southern latitudes and provide insight regarding ice sheet sensitivity to past climate change. The early to mid-Miocene (23–14 Mya) is a compelling interval to study as global temperatures and atmospheric CO2 concentrations were similar to those projected for coming centuries. Importantly, this time interval includes the Miocene Climatic Optimum, a period of global warmth during which average surface temperatures were 3–4 °C higher than today. Miocene sediments in the ANDRILL-2A drill core from the Western Ross Sea, Antarctica, indicate that the Antarctic ice sheet (AIS) was highly variable through this key time interval. A multiproxy dataset derived from the core identifies four distinct environmental motifs based on changes in sedimentary facies, fossil assemblages, geochemistry, and paleotemperature. Four major disconformities in the drill core coincide with regional seismic discontinuities and reflect transient expansion of grounded ice across the Ross Sea. They correlate with major positive shifts in benthic oxygen isotope records and generally coincide with intervals when atmospheric CO2 concentrations were at or below preindustrial levels (≈280 ppm). Five intervals reflect ice sheet minima and air temperatures warm enough for substantial ice mass loss during episodes of high (≈500 ppm) atmospheric CO2. These new drill core data and associated ice sheet modeling experiments indicate that polar climate and the AIS were highly sensitive to relatively small changes in atmospheric CO2 during the early to mid-Miocene.

Keywords: Antarctica | ice sheet | Climate Optimum | Ross Sea | Miocene

Significance: New information from the ANDRILL-2A drill core and a complementary ice sheet modeling study show that polar climate and Antarctic ice sheet (AIS) margins were highly dynamic during the early to mid-Miocene. Changes in extent of the AIS inferred by these studies suggest that high southern latitudes were sensitive to relatively small changes in atmospheric CO2 (between 280 and 500 ppm). Importantly, reconstructions through intervals of peak warmth indicate that the AIS retreated beyond its terrestrial margin under atmospheric CO2 conditions that were similar to those projected for the coming centuries.

Kultur

Halama 2016

Simon M. Halama, *Die ersten Metropolen*. Spektrum der Wissenschaft **2016**, iv, 54–60.

Nirgendwo entwickelten sich so früh so viele urbane Zentren wie im Land zwischen Euphrat und Tigris, nirgends erreichten Verwaltung, Politik und Kultur eine solche Blüte. Heute bedrohen Krieg und Raubgräberei die Wiege städtischer Zivilisation – während viele Fragen der Forschung noch ihrer Antworten harren.

Frühes Königtum

1 Ab dem 4. Jahrtausend erblühte in Mesopotamien, dem heutigen Südirak, eine urbane Zivilisation. Zehntausende Menschen lebten in Stadtstaaten wie Uruk und Babylon, was Innovationen wie die Schrift förderte.

2 Die Gründe dieser umfassenden Urbanisierung liegen noch im Dunkeln. Sicherlich stellten große Tempel und ein frühes Königtum die nötige Organisationsstruktur; dank künstlicher Bewässerung konnte die wachsende Bevölkerung ernährt werden.

3 Wohnviertel bildeten vermutlich soziale Gruppen vergleichbar den Dorfgemeinschaften, jedoch heterogen aufgebaut, also ohne familiären Zusammenhalt. Auf verschiedenen Ebenen der urbanen Gesellschaft gab es Personen, die als Mittler zwischen Bewohnern und Obrigkeit dienten.

Für die Stadtbewohner wurden urbane Zentren im Lauf der Jahrhunderte zu einer solchen Selbstverständlichkeit, dass ein anderes Leben nahezu undenkbar war. Allerdings stammen auch alle Texte, die wir kennen, aus solchen Orten. Über das Leben auf dem Land wissen wir hingegen kaum etwas. Städte waren der Inbegriff von Zivilisation, ebenso ein Geschenk der Götter wie alle Künste und Handwerke, in der Urzeit der Schöpfung begründet und dem Menschen zum Aufenthalt bestimmt. Seine Wurzeln hat dieses Denken wohl im 3. Jahrtausend v. Chr. Zu dieser Zeit hatten sich bereits etwa 30 Stadtstaaten im Zweistromland etabliert, und Schätzungen zufolge lebten bis zu 80 Prozent der Bevölkerung in Städten mit einer Größe von 40 Hektar oder mehr.

Grundeinheit eines Haushalts war Schriftquellen der Zeit zufolge im Allgemeinen wohl die Kernfamilie, das heißt ein Elternpaar mit seinen unverheirateten Kindern. Bei Wohlhabenden kamen vermutlich noch einige Bedienstete oder Sklaven hinzu. Es gibt keine stichhaltigen Beweise dafür, dass weiter entfernte Angehörige im selben Viertel oder gar Wohnblock lebten. Wo Hauseigentümer anhand von Urkunden iden tifiziert werden konnten, lassen sich nur selten Verwandtschaftsbeziehungen zwischen Nachbarn feststellen. Vereinzelt scheinen Berufsgemeinschaften zusammengelebt und gearbeitet zu haben, doch auch das war offenbar keine Regel.

Kultur Anthropologie

Gächter 2016

Simon Gächter & Jonathan F. Schulz, *Intrinsic honesty and the prevalence of rule violations across societies*. nature **531** (2016), 496–499.

n531-0496-Supplement.pdf

Deception is common in nature and humans are no exception1. Modern societies have created institutions to control cheating, but many situations remain where only intrinsic honesty keeps people from cheating and violating rules. Psychological2, sociological3 and economic theories4 suggest causal pathways to explain how the prevalence of rule violations in people's social environment, such as corruption, tax evasion or political fraud, can compromise individual intrinsic honesty.

Here we present cross-societal experiments from 23 countries around the world that demonstrate a robust link between the prevalence of rule violations and intrinsic honesty. We developed an index of the 'prevalence of rule violations' (PRV) based on country-level data from the year 2003 of corruption, tax evasion and fraudulent politics. We measured intrinsic honesty in an anonymous die-rolling experiment5. We conducted the experiments with 2,568 young participants (students) who, due to their young age in 2003, could not have influenced PRV in 2003. We find individual intrinsic honesty is stronger in the subject pools of low PRV countries than those of high PRV countries. The details of lying patterns support psychological theories of honesty6,7. The results are consistent with theories of the cultural co-evolution of institutions and values8, and show that weak institutions and cultural legacies9–11 that generate rule violations not only have direct adverse economic consequences, but might also impair individual intrinsic honesty that is crucial for the smooth functioning of society.

Given that PRV captures rule violations for selfish gains and evidence suggesting rule breakers tend to be more selfish, we predict that income maximizers is positively correlated with PRV. We find, however, that they are unrelated. Thus, a society's PRV does not systematically affect maximal cheating in this experiment. This result is in contrast to the observation that the estimated fraction of fully honest people and PRV are significantly negatively related. Our experiments from around the globe also provide support for arguments that for many people lying is psychologically costly. More specifically, theories of honesty posit that many people are either honest, or (self-deceptively) bend rules or lie gradually to an extent that is compatible with maintaining an honest self-image.

Shalvi 2016

Shaul Shalvi, *Corruption corrupts*. nature **531** (2016), 456–457.

see: Greene, PNAS 106 (2009), 12506–11 for intrinsic honesty

A cross-cultural experiment involving thousands of people worldwide shows that the prevalence of rule violations in a society, such as tax evasion and fraudulent politics, is detrimental to individuals' intrinsic honesty.

The authors show that a country's prevalence of rule violations, which for this study included tax evasion, corruption and political fraud, is positively associated with the tendency for residents of that country to lie for a small amount of extra cash.

The underlying assumption of Gächter and Schulz's work is that country-level PRV score shapes country members' honesty, which is intrinsic and thus stable across situations. However, ample work suggests that the same person may be both honest and dishonest, according to situation.

Metallzeiten

Kienlin 2006

Tobias L. Kienlin, *Waffe – Werkzeug – Barren, Zur Deutung frühbronzezeitlicher Randleistenbeile in Depotfunden des nordalpinen Raums*. In: Hans-Peter Wotzka (Hrsg.), *Grundlegungen: Beiträge zur europäischen und afrikanischen Archäologie, Festschrift für Manfred K. H. Eggert*. (Tübingen 2006), 461–476.

Bei keinem der untersuchten Typen konnte nachgewiesen werden, daß sich Beile unterschiedlicher Fundumstände systematisch in Herstellungstechnik und Materialeigenschaften unterscheiden. Von Ausnahmen abgesehen verließen den Kontext der Herstellung sorgfältig in Hinblick auf eine starke Beanspruchung ausgearbeitete

Stücke, die sicher nicht von vorneherein als (Votiv-)Gaben gedacht waren oder als Barren vor Ablauf ihrer natürlichen Lebensdauer, das heißt bei Unbrauchbarkeit, wieder eingeschmolzen werden sollten. Als eine der massivsten Metallformen des in Frage stehenden Zeitabschnitts werden abgenutzte Beile ganz sicher eingeschmolzen worden sein und eine wichtige Grundlage der Erzeugung neuer Werkzeuge und Waffen oder anderer Objektgruppen gebildet haben. Der Austausch von Beilen wird damit eine wichtige Rolle in der Verbreitung des Rohstoffs Metall gespielt haben, jedoch zeigt alle verfügbare Evidenz – vom Gefüge über die Fertigstellung bis zum Vorhandensein stark abgenutzter Stücke –, daß dies nicht in Form von 'Beilrohlingen' oder 'Beilbarren' geschah.

Auf den gesamten nordalpinen Raum gesehen stellt der heute noch faßbare Bestand zahlreicher Einzelfunde, gelegentlicher Depotfunde und seltenerer Grab-, Gewässer- und Siedlungsfunde das Resultat zahlreicher Einzelereignisse dar. Zu unterschiedlichen Zeitpunkten ihres Lebenszyklus gelangten neue oder abgenutzte Beile beabsichtigt oder unbeabsichtigt in den Boden. Als Verlust, endgültige oder aus unterschiedlichen Gründen nicht mehr geborgene, vorläufige Niederlegung verblieben sie dort, statt wiedereingeschmolzen zu werden – ein Bild, das sich uns heute nur durch weitere Filter wie die Auffindungsbedingung vermittelt und keiner übergreifenden Deutung unterworfen werden darf.