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References

Aktuell

Albers 2015

Casper J. Albers, *Dutch research funding, gender bias, and Simpson's paradox*. PNAS **112** (2015), E6828–E6829.

Bosch 2015

Marjolein D. Bosch et al., *Critical evaluation of the Ksâr 'Akil chronologies, Reply to Douka et al.* PNAS **112** (2015), E7035.

Marjolein D. Bosch, Marcello A. Mannino, Amy L. Prendergast, Tamsin C. O'Connell, Beatrice Demarchi, Sheila M. Taylor, Laura Niven, Johannes van der Plicht & Jean-Jacques Hublin

Douka et al. also propose including dates from lower in the sequence. We rejected this option, as all available dates are of uncertain provenience and/or obtained on compromised samples.

In conclusion, differences in the Bayesian models used do not appear to explain the divergence between our dates and those reported by Douka et al. Our data provide reliable estimates for modern humans and the IUP at Ksâr 'Akil and support our initial conclusions for an early chronology for modern humans in the Levant.

Douka 2015

Katerina Douka, Thomas F. G. Higham & Christopher A. Bergman, *Statistical and archaeological errors invalidate the proposed chronology for the site of Ksar Akil*. PNAS **112** (2015), E7034.

A simple reading of a complex sequence is unjustifiable when relying on secondary sources. Instead a comprehensive, integrating, and cautious approach is advisable.

van der Lee 2015

Romy van der Lee & Naomi Ellemers, *Acceptance of empirical evidence for gender disparities in Dutch research funding, Reply to Albers*. PNAS **112** (2015), E6830.

van der Lee 2015

Romy van der Lee & Naomi Ellemers, *Multiple indicators point toward gender disparities in grant funding success in The Netherlands, Reply to Volker and Steenbeek*. PNAS **112** (2015), E7038.

Results revealed that the awarding rates of women were significantly lower than those of men in the disciplines with a high proportion of female applicants (and overall relatively low success rates). This gender difference within scientific disciplines cannot be explained from Simpson's paradox. Simpson's paradox also cannot account for the observation that in every step of the review procedure women are less likely than men to be prioritized.

Scudellari 2015

Megan Scudellari, *Myths that will not die*. nature **528** (2015), 322–325.

False beliefs and wishful thinking about the human experience are common. They are hurting people — and holding back science.

Stern 2015

Chadly Stern, Tessa V. West & Nicholas O. Rule, *Conservatives negatively evaluate counterstereotypical people to maintain a sense of certainty*. PNAS **112** (2015), 15337–15342.

People frequently use physical appearance stereotypes to categorize individuals when their group membership is not directly observable. Recent research indicates that political conservatives tend to use such stereotypes more than liberals do because they express a greater desire for certainty and order. In the present research, we found that conservatives were also more likely to negatively evaluate and distribute fewer economic resources to people who deviate from the stereotypes of their group. This occurred for people belonging to both preexisting and novel groups, regardless of whether the stereotypes were real or experimentally fabricated. Critically, conservatives only negatively evaluated counterstereotypical people when the stereotypes were functional—that is, when they expected that they would need to use the stereotypes at a later point to categorize individuals into groups. Moreover, increasing liberals' desire for certainty led them to negatively evaluate counterstereotypical people just like conservatives did. Thus, conservatives are not only more likely to use stereotypes than are liberals, but are especially likely to negatively evaluate counterstereotypical people to organize the social world with greater certainty.

Keywords: ideology | stereotyping | social evaluation

Volker 2015

Beate Volker & Wouter Steenbeek, *No evidence that gender contributes to personal research funding success in The Netherlands, A reaction to van der Lee and Ellemers*. PNAS **112** (2015), E7036–E7037.

In short, we find no convincing evidence for gender inequality. However, based on our findings, we also may not conclude that there is no gender inequality in NWO grant application success. Rather, it is too soon to spend public money on changing the evaluation procedures and gender balancing programs within the Science Foundation in The Netherlands.

Amerika

Gibbons 2015

Ann Gibbons, *Humans may have reached Chile by 18,500 years ago*. science **350** (2015), 898.

Monte Verde stone tools may be the oldest in the Americas.

But in 2013, fearing another team's survey might damage the site, he returned, hoping to spend a few weeks collecting new evidence of ancient plants and climate by digging 50 small test trenches across a 20,000-square-meter area. But the dig turned up 39 stone artifacts, including flakes, a "chopper," and cores, embedded near plants or animal bones that had been burned in small fires at 12 areas. This suggests a "spotty, ephemeral presence," he says.

Not everyone is convinced. Archaeologist Michael Waters of Texas A& M University in College Station questions whether the stone artifacts were actually human-made, and says that the team hasn't eliminated the possibility that the fires were

natural. Dillehay concedes that his team found few unequivocal stone tools, which are the strongest evidence of a human presence. But he notes that about one-third of the tools were made from exotic materials such as limestone and white quartz from outside the area, suggesting that people transported the stone. Meltzer finds this compelling.

Anthropologie

Llorente 2015

M. Gallego Llorente et al., *Ancient Ethiopian genome reveals extensive Eurasian admixture throughout the African continent.* science **350** (2015), 820–822.

s350-0820-Supplement.pdf

M. Gallego Llorente, E. R. Jones, A. Eriksson, V. Siska, K. W. Arthur, J. W. Arthur, M. C. Curtis, J. T. Stock, M. Coltorti, P. Pieruccini, S. Stretton, F. Brock, T. Higham, Y. Park, M. Hofreiter, D. G. Bradley, J. Bhak, R. Pinhasi & A. Manica

Characterizing genetic diversity in Africa is a crucial step for most analyses reconstructing the evolutionary history of anatomically modern humans. However, historic migrations from Eurasia into Africa have affected many contemporary populations, confounding inferences. Here, we present a 12.5× coverage ancient genome of an Ethiopian male ("Mota") who lived approximately 4500 years ago. We use this genome to demonstrate that the Eurasian backflow into Africa came from a population closely related to Early Neolithic farmers, who had colonized Europe 4000 years earlier. The extent of this backflow was much greater than previously reported, reaching all the way to Central, West, and Southern Africa, affecting even populations such as Yoruba and Mbuti, previously thought to be relatively unadmixed, who harbor 6 to 7 % Eurasian ancestry.

Bibel

Sanders 2002

Seth L. Sanders, *Old Light on Moses' Shining Face.* Vetus Testamentum **52** (2002), 400–406.

The crux of Moses' shining face in Ex. xxxiv is explained by first-millennium Mesopotamian astronomical and lexical sources which attest an ancient understanding of light as material. Moses' face could, quite literally, radiate horns of light, and the need to translate the term as either divine radiance or physical protuberance is a sideeffect of modem conceptual categories, irrelevant to ancient Israelite ideas. Furthermore, the well known ancient Jewish tradition of Moses' coronation, and his divine physical transformation attested in newly published Midrashic sources suggests an authentic ancient reading of the text that resolves the contradiction between Ex. xxxiii and xxxiv. While no human could see God and live, in Ex. xxxiv, the Israelites recoil from a transformed Moses who is no longer precisely human.

Sanders 2014

Seth L. Sanders, *What if There Aren't Any Empirical Models for Pentateuchal Criticism?* unknown (2014), preprint, 1–39. .

The narrative coherence and verbal symmetry of each flood story in Genesis 6–9 with each creation story in Genesis 1–3 shows that each was part of its own integrated narrative edifice. The combination of coherence with respect to plot,

theme and wording shows that each must have been part of a cycle or collection that existed before the two were interwoven to create the Pentateuch's Primeval history. The result is that Genesis is radically incoherent, yet still readable because of the way it was interwoven.

Biologie

Bocarsly 2015

Miriam E. Bocarsly et al., *Obesity diminishes synaptic markers, alters microglial morphology, and impairs cognitive function.* PNAS **112** (2015), 15731–15736.

Miriam E. Bocarsly, Maria Fasolino, Gary A. Kane, Elizabeth A. LaMarca, Gregory W. Kirschen, Ilia N. Karatsoreos, Bruce S. McEwen & Elizabeth Gould

Obesity is a major public health problem affecting overall physical and emotional well-being. Despite compelling data suggesting an association between obesity and cognitive dysfunction, this phenomenon has received relatively little attention. Neuroimaging studies in obese humans report reduced size of brain regions involved in cognition, but few studies have investigated the cellular processes underlying cognitive decline in obesity or the influence of obesity on cognition in the absence of obesity-related illnesses. Here, a rat model of diet-induced obesity was used to explore changes in brain regions important for cognition. Obese rats showed deficits on cognitive tasks requiring the prefrontal and perirhinal cortex. Cognitive deficits were accompanied by decreased dendritic spine density and synaptic marker expression in both brain regions. Microglial morphology was also changed in the prefrontal cortex. Detrimental changes in the prefrontal cortex and perirhinal cortex occurred before metabolic syndrome or diabetes, suggesting that these brain regions may be particularly vulnerable to early stage obesity.

Keywords: obesity | prefrontal cortex | cognition | dendritic spine | microglia

Significance: In humans, obesity impairs cognition and produces atrophy of brain regions associated with learning and memory, but few studies have investigated the underlying cellular mechanisms. We used a diet-induced model of obesity in rats to study excessive weight gain and found that early stage obesity, before the onset of diabetes or metabolic syndrome, produced deficits on cognitive tasks that require the prefrontal cortex. Impaired cognition was associated with synapse loss, including reduced numbers of dendritic spines and expression of synaptic proteins, as well as structural alterations in the brain's immune cells, the microglia. These results strongly suggest that obesity must be considered as a contributing factor to brain dysfunction, with implications for its increasing frequency in contemporary western society.

Librado 2015

Pablo Librado et al., *Tracking the origins of Yakutian horses and the genetic basis for their fast adaptation to subarctic environments.* PNAS **112** (2015), E6889–E6897.

Pablo Librado, Clio Der Sarkissian, Luca Ermini, Mikkel Schubert, Hákon Jónsson, Anders Albrechtsen, Matteo Fumagalli, Melinda A. Yang, Cristina Gamba, Andaine Seguin-Orlando, Cecilie D. Mortensen, Bent Petersen, Cindi A. Hoover, Belen Lorente-Galdos, Artem Nedoluzhko, Eugenia Boulygina, Svetlana Tsygankova, Markus Neuditschko, Vidhya Jagannathan, Catherine Thèves, Ahmed H. Alfarhan, Saleh A. Alquraishi, Khaled A. S. Al-Rasheid, Thomas Sicheritz-Ponten, Ruslan Popov, Semyon Grigoriev, Anatoly N. Alekseev, Edward M. Rubin, Molly McCue, Stefan Rieder, Tosso Leeb, Alexei Tikhonov, Eric Crubézy, Montgomery

Slatkin, Tomas Marques-Bonet, Rasmus Nielsen, Eske Willerslev, Juha Kantanen, Egor Prokhortchouk & Ludovic Orlando

Yakutia, Sakha Republic, in the Siberian Far East, represents one of the coldest places on Earth, with winter record temperatures dropping below 70 °C. Nevertheless, Yakutian horses survive all year round in the open air due to striking phenotypic adaptations, including compact body conformations, extremely hairy winter coats, and acute seasonal differences in metabolic activities. The evolutionary origins of Yakutian horses and the genetic basis of their adaptations remain, however, contentious. Here, we present the complete genomes of nine present-day Yakutian horses and two ancient specimens dating from the early 19th century and ≈5,200 y ago. By comparing these genomes with the genomes of two Late Pleistocene, 27 domesticated, and three wild Przewalski's horses, we find that contemporary Yakutian horses do not descend from the native horses that populated the region until the mid-Holocene, but were most likely introduced following the migration of the Yakut people a few centuries ago. Thus, they represent one of the fastest cases of adaptation to the extreme temperatures of the Arctic. We find cis-regulatory mutations to have contributed more than nonsynonymous changes to their adaptation, likely due to the comparatively limited standing variation within gene bodies at the time the population was founded. Genes involved in hair development, body size, and metabolic and hormone signaling pathways represent an essential part of the Yakutian horse adaptive genetic toolkit. Finally, we find evidence for convergent evolution with native human populations and woolly mammoths, suggesting that only a few evolutionary strategies are compatible with survival in extremely cold environments.

Keywords: ancient genomics | adaptation | population discontinuity | regulatory changes | horse

Significance: Yakutia is among the coldest regions in the Northern Hemisphere, showing ≈40 % of its territory above the Arctic Circle. Native horses are particularly adapted to this environment, with body sizes and thick winter coats minimizing heat loss. We sequenced complete genomes of two ancient and nine present-day Yakutian horses to elucidate their evolutionary origins. We find that the contemporary population descends from domestic livestock, likely brought by early horse-riders who settled in the region a few centuries ago. The metabolic, anatomical, and physiological adaptations of these horses therefore emerged on very short evolutionary time scales. We show the relative importance of regulatory changes in the adaptive process and identify genes independently selected in cold-adapted human populations and woolly mammoths.

Lister 2015

A. M. Lister & A. V. Sher, *Evolution and dispersal of mammoths across the Northern Hemisphere*. science **350** (2015), 805–809.

s350-0805-Supplement1.pdf, s350-0805-Supplement2.xlsx, s350-0805-Supplement3.xlsx

Mammoths provide a detailed example of species origins and dispersal, but understanding has been impeded by taxonomic confusion, especially in North America.The Columbian mammoth Mammuthus columbi was thought to have evolved in North America from a more primitive Eurasian immigrant.The earliest American mammoths (1.5 million years ago), however, resemble the advanced Eurasian M. trogontherii that crossed the Bering land bridge around that time, giving rise directly to M. columbi. Woolly mammoth M. primigenius later evolved in Beringia and spread into Europe and North America, leading to a diversity ofmorphologies as it encountered endemic M. trogontherii and M. columbi, respectively. In North America, this included intermediates ("M. jeffersonii"), suggesting introgression of M. primigenius with M. columbi.The lineage illustrates the dynamic interplay of

local adaptation, dispersal, and gene flow in the evolution of a widely distributed species complex.

PETROV 2015

Anton S. Petrov et al., *History of the ribosome and the origin of translation*. PNAS **112** (2015), 15396–15401.

Anton S. Petrov, Burak Gulen, Ashlyn M. Norris, Nicholas A. Kovacs, Chad R. Bernier, Kathryn A. Lanier, George E. Fox, Stephen C. Harvey, Roger M. Wartell, Nicholas V. Hud & Loren Dean Williams

We present a molecular-level model for the origin and evolution of the translation system, using a 3D comparative method. In thismodel, the ribosome evolved by accretion, recursively adding expansion segments, iteratively growing, subsuming, and freezing the rRNA. Functions of expansion segments in the ancestral ribosome are assigned by correspondence with their functions in the extant ribosome. The model explains the evolution of the large ribosomal subunit, the small ribosomal subunit, tRNA, and mRNA. Prokaryotic ribosomes evolved in six phases, sequentially acquiring capabilities for RNA folding, catalysis, subunit association, correlated evolution, decoding, energy-driven translocation, and surface proteinization. Two additional phases exclusive to eukaryotes led to tentacle-like rRNA expansions. In this model, ribosomal proteinization was a driving force for the broad adoption of proteins in other biological processes. The exit tunnel was clearly a central theme of all phases of ribosomal evolution and was continuously extended and rigidified. In the primitive noncoding ribosome, proto-mRNA and the small ribosomal subunit acted as cofactors, positioning the activated ends of tRNAs within the peptidyl transferase center. This association linked the evolution of the large and small ribosomal subunits, protomRNA, and tRNA.

Keywords: RNA evolution | translation | origin of life | A-minor interactions

Significance: The ribosome, in analogy with a tree, contains a record of its history, spanning 4 billion years of life on earth. The information contained within ribosomes connects us to the prehistory of biology. Details of ribosomal RNA variation, observed by comparing three-dimensional structures of ribosomes across the tree of life, form the basis of our molecularlevel model of the origins and evolution of the translational system. We infer many steps in the evolution of translation, mapping out acquisition of structure and function, revealing much about how modern biology originated from ancestral chemical systems.

Energie

BAGLA 2015

Pallava Bagla, *Thorium seen as nuclear's new frontier*. science **350** (2015), 726–727.

Unsung reactor fuel is more abundant than uranium and, proponents say, safer.

Thorium MSRs remain seductive in part because of their potential safety advantage: In case of an accident, the fluoride salts of thorium and uranium circulating in the core can simply be drained into a storage tank, stopping the fission chain reaction. The Chinese Academy of Sciences's Thorium Molten Salt Reactor Center of Excellence in Shanghai is developing a 10-MW pilot MSR to start running by 2022 and a 100-MW demonstration plant, to be commissioned around 2030, says Hongjie Xu, who is leading the effort.

Jungpaläolithikum

Schmidt 2015

Isabell Schmidt, *Beyond Solutrean Point Types, Technological Organization and Behavioral Implications.* Journal of Anthropological Research **71** (2015), 493–508.

This paper presents results from a study of Solutrean points from Upper Solutrean assemblages on the Iberian Peninsula. This supraregional, comparative approach—using a standardized and consistent set of attributes and analytical methods—focuses on the technological organization and strategies involved in the design, production, and use of these tools to shed light on possible reasons for synchronic variability beyond that of the fi nal tool types. The data suggest that regional patterning is deeply rooted in distinct tool manufacture and use behaviors, refl ecting adaptations of technological strategies to the different subsistence and mobility patterns of hunter-gatherer groups living in rather different environments.

Keywords: Solutrean points | Iberia | Last Glacial Maximum | Lithic technological | organization | Technological strategies | Risk and cost | Typology

Klima

Lyons 2015

Robert P. Lyons et al., *Continuous 1.3-million-year record of East African hydroclimate, and implications for patterns of evolution and biodiversity.* PNAS **112** (2015), 15568–15573.

Robert P. Lyons, Christopher A. Scholz, Andrew S. Cohen, John W. King, Erik T. Brown, Sarah J. Ivory, Thomas C. Johnson, Alan L. Deino, Peter N. Reinthal, Michael M. McGlue & Margaret W. Blome

The transport of moisture in the tropics is a critical process for the global energy budget and on geologic timescales, has markedly influenced continental landscapes, migratory pathways, and biological evolution. Here we present a continuous, first-of-its-kind 1.3-My record of continental hydroclimate and lake-level variability derived from drill core data from Lake Malawi, East Africa (9–15° S). Over the Quaternary, we observe dramatic shifts in effective moisture, resulting in large-scale changes in one of the world's largest lakes and most diverse freshwater ecosystems. Results show evidence for 24 lake level drops of more than 200 m during the Late Quaternary, including 15 lowstands when water levels were more than 400 m lower than modern. A dramatic shift is observed at the Mid-Pleistocene Transition (MPT), consistent with far-field climate forcing, which separates vastly different hydroclimate regimes before and after ≈800,000 years ago. Before 800 ka, lake levels were lower, indicating a climate drier than today, and water levels changed frequently. Following the MPT high-amplitude lake level variations dominate the record. From 800 to 100 ka, a deep, often overfilled lake occupied the basin, indicating a wetter climate, but these highstands were interrupted by prolonged intervals of extreme drought. Periods of high lake level are observed during times of high eccentricity. The extreme hydroclimate variability exerted a profound influence on the Lake Malawi endemic cichlid fish species flock; the geographically extensive habitat reconfiguration provided novel ecological opportunities, enabling new populations to differentiate rapidly to distinct species.

Keywords: Lake Malawi | tropical paleoclimatology | East African rift | cichlid fish | quaternary

Significance: Lake Malawi is one of the world's oldest and deepest lakes, with >1,000 species of endemic cichlid fish; its water bottom anoxia prevents bioturbation of deep-water sediments, which preserve exceptional paleoclimate signals. The Lake Malawi Drilling Project recovered the first continuous 1.3-My record of past climates of the African interior. These sediments show that the catchment experienced 24 dry periods over that time, when lake levels dropped more than 200 m. After ≈800,000 years ago, the lake was commonly deeper and overflowing, indicating wetter conditions, but lowstand intervals became more prolonged and extreme. These changes promoted the evolution of the endemic cichlid fishes, through shifting of habitats, and through isolation and restriction of populations.

Kultur

Ebeling 2015

Jennie Ebeling & M. Rogel, *The tabun and its misidentification in the archaeological record*. Levant **47** (2015), 328–349.

The tabun is a clay oven that was common in rural areas in the southern Levant in the 20th century AD; linguistic and literary sources, ethnographic information and archaeological remains offer insights into the manufacture and use of this female-gendered baking installation. Despite its earliest attestation in the writings of medieval Palestinian geographer al-Muqadassi, the term tabun has been adopted by archaeologists to describe any ancient oven in excavation reports. This has both obscured our understanding of ancient ovens and resulted in the dissemination of erroneous information about ancient baking and cooking in popular works about daily life in biblical times.

Keywords: tabun | bread oven | ethnography | ancient technology | women

Mu 2015

Yan Mu, Shinobu Kitayama, Shihui Han & Michele J. Gelfand, *How culture gets embrained: Cultural differences in event-related potentials of social norm violations*. PNAS **112** (2015), 15348–15353.

Humans are unique among all species in their ability to develop and enforce social norms, but there is wide variation in the strength of social norms across human societies. Despite this fundamental aspect of human nature, there has been surprisingly little research on how social norm violations are detected at the neurobiological level. Building on the emerging field of cultural neuroscience, we combine noninvasive electroencephalography (EEG) with a new social norm violation paradigm to examine the neural mechanisms underlying the detection of norm violations and how they vary across cultures. EEG recordings from Chinese and US participants (n = 50) showed consistent negative deflection of event-related potential around 400 ms (N400) over the central and parietal regions that served as a culture-general neural marker of detecting norm violations. The N400 at the frontal and temporal regions, however, was only observed among Chinese but not US participants, illustrating culture-specific neural substrates of the detection of norm violations. Further, the frontal N400 predicted a variety of behavioral and attitudinal measurements related to the strength of social norms that have been found at the national and state levels, including higher culture superiority and self-control but lower creativity. There were no cultural differences in the N400 induced by semantic violation, suggesting a unique cultural influence on social norm violation detection. In all, these findings provided the first evidence, to our knowledge, for the neurobiological foundations of social norm violation detection and its variation across cultures.

Keywords: culture | social norms | N400 | electroencephalography | EEG

Rueckl 2015

Jay G. Rueckl et al., *Universal brain signature of proficient reading, Evidence from four contrasting languages.* PNAS **112** (2015), 15510–15515.

Jay G. Rueckl, Pedro M. Paz-Alonso, Peter J. Molfese, Wen-Jui Kuo, Atira Bick, Stephen J. Frost, Roeland Hancock, Denise H. Wu, William Einar Mencl, Jon Andoni Duñabeitia, Jun-Ren Lee, Myriam Oliver, Jason D. Zevin, Fumiko Hoeft, Manuel Carreiras, Ovid J. L. Tzeng, Kenneth R. Pugh & Ram Frost

We propose and test a theoretical perspective in which a universal hallmark of successful literacy acquisition is the convergence of the speech and orthographic processing systems onto a common network of neural structures, regardless of how spoken words are represented orthographically in a writing system. During functionalMRI, skilled adult readers of four distinct and highly contrasting languages, Spanish, English, Hebrew, and Chinese, performed an identical semantic categorization task to spoken and written words. Results from three complementary analytic approaches demonstrate limited language variation, with speech–print convergence emerging as a common brain signature of reading proficiency across the wide spectrum of selected languages, whether their writing system is alphabetic or logographic, whether it is opaque or transparent, and regardless of the phonological and morphological structure it represents.

Keywords: cross-language invariance | word recognition | functional MRI

Significance: Using functional MRI, we examined reading and speech perception in four highly contrasting languages: Spanish, English, Hebrew, and Chinese. With three complementary analytic approaches, we demonstrate that in spite of striking dissimilarities among writing systems, successful literacy acquisition results in a convergence of the speech and orthographic processing systems onto a common network of neural structures. These findings have the major theoretical implication that the reading network has evolved to be universally constrained by the organization of the brain network underlying speech.

Sanders 2004

Seth L. Sanders, *What Was the Alphabet For? The rise of written vernaculars and the making of Israelite national literature.* Maarav **11** (2004), 25–56.

One distinct feature, then, of the early alphabet was precisely the opposite of what we would expect from the conventional story of the alphabet: it is not universalizing, but particularizing. It would have been difficult, even impossible to use this alphabet anywhere but home. Rather than being universal it would most likely have been unintelligible outside of the immediate region. The writers of Ugarit did not send their alphabetic texts abroad.

Vernacular writing was developed by groups on the margins of the cosmopolitan empires, and there was an obvious functional relationship between the groups' writing and their marginality. In the Late Bronze Age, scribes mediated between two very different worlds: a cosmopolitan one that had been handed down to them and a vernacular world they helped bring into being. In Late Bronze Age Ugarit, the same scribes produced both local alphabetic and international syllabic texts.63 The daily work of these scribes was to manage two separate and very different flows of information, using the same wet handfuls of clay. The first was a flow between Ugarit and the larger world: the king of Ugarit had to communicate with Egyptian, Hittite and Babylonian kings, but we have no evidence that he spoke any of these languages. To these kings, separated from him by hundreds of miles

of desert, he was alternatively a vassal, a weak ally, or a target. The second flow of information was within Ugarit: it is in this language and writing system that his subjects professed loyalty to him, claiming to cast themselves to the ground "fourteen times on my face."

In Ugaritic, the king of Ugarit's traditional sources of authority became visible, and meaningful. It is in this language and writing that the unique local rituals that divinized his ancestors and, eventually, him, were performed and recorded. Ugaritic articulated the native king's authority, in his traditional terms, and in a code his foreign overlords could not read.

THOTHATHIRI 2015

Malathi Thothathiri & Michelle Rattinger, *Ventral and dorsal streams for choosing word order*. PNAS **112** (2015), 15456–15461.

Proficient language use requires speakers to vary word order and choose between differentways of expressing the samemeaning. Prior statistical associations between individual verbs and different word orders are known to influence speakers' choices, but the underlying neural mechanisms are unknown. Here we show that distinct neural pathways are used for verbs with different statistical associations. We manipulated statistical experience by training participants in a language containing novel verbs and two alternative word orders (agent-before-patient, AP; patient-before-agent, PA). Some verbs appeared exclusively in AP, others exclusively in PA, and yet others in both orders. Subsequently, we used sparse sampling neuroimaging to examine the neural substrates as participants generated new sentences in the scanner. Behaviorally, participants showed an overall preference for AP order, but also increased PA order for verbs experienced in that order, reflecting statistical learning. Functional activation and connectivity analyses revealed distinct networks underlying the increased PA production. Verbs experienced in both orders during training preferentially recruited a ventral stream, indicating the use of conceptual processing for mapping meaning to word order. In contrast, verbs experienced solely in PA order recruited dorsal pathways, indicating the use of selective attention and sensorimotor integration for choosing words in the right order. These results show that the brain tracks the structural associations of individual verbs and that the same structural output may be achieved via ventral or dorsal streams, depending on the type of regularities in the input.

Keywords: language production | statistical learning | verb bias | sentence choice | fMRI

Significance: Languages allow multiple word orders for expressing the same meaning. Prior statistical experience with verbs in less-common sentence structures is known to facilitate subsequent use of those structures. To investigate how this is implemented in the brain, we trained participants in an artificial language and examined how they used that language to describe novel scenarios. Different verbs were associated with different word orders during training. Functional activation and connectivity patterns revealed that the choice of word order was supported by a ventral pathway for verbs that appeared in two competing orders, and dorsal pathways for verbs that appeared exclusively in the less-common order. Thus, the brain accomplishes the same language output via different routes, depending on past experience.

Metallzeiten

HOREJS 2015

B. Horejs, B. Milić, F. Ostmann, U. Thanheiser, B. Weninger & A. Galik, *The Aegean in the Early 7th Millennium BC, Maritime Net-*

works and Colonization. Journal of World Prehistory **28** (2015), 289–330.

The process of Near Eastern neolithization and its westward expansion from the core zone in the Levant and upper Mesopotamia has been broadly discussed in recent decades, and many models have been developed to describe the spread of early farming in terms of its timing, structure, geography and sociocultural impact. Until now, based on recent intensive investigations in northwestern and western Anatolia, the discussion has mainly centred on the importance of Anatolian inland routes for the westward spread of neolithization. This contribution focuses on the potential impact of east Mediterranean and Aegean maritime networks on the spread of the Neolithic lifestyle to the western edge of the Anatolian subcontinent in the earliest phases of sedentism. Employing the longue durée model and the concept of 'social memory', we will discuss the arrival of new groups via established maritime routes. The existence of maritime networks prior to the spread of farming is already indicated by the high mobility of Epipalaeolithic/Mesolithic groups exploring the Aegean and east Mediterranean seas, and reaching, for example, the Cyclades and Cyprus. Successful navigation by these early mobile groups across the open sea is attested by the distribution of Melian obsidian. The potential existence of an additional Pre-Pottery Neolithic (PPN) obsidian network that operated between Cappadocia/ Cilicia and Cyprus further hints at the importance of maritime coastal trade. Since both the coastal and the high seas networks were apparently already well established in this early period, we may further assume appropriate knowledge of geographic routes, navigational technology and other aspects of successful seafaring. This Mesolithic/PPN maritime knowhow package appears to have been used by later groups, in the early 7th millennium calBC, exploring the centre of the Anatolian Aegean coast, and in time establishing some of the first permanent settlements in that region. In the present paper, we link this background of newcomers to the western edge of Anatolia with new excavation results from CÕ ukuriçi Höyük, which we have analysed in terms of subsistence strategies, materiality, technology and symbolism. Additionally, further detailed studies of nutrition and obsidian procurement shed light on the distinct maritime affinity of the early settlers in our case study, something that, in our view, can hardly be attributed to inland farming societies. We propose a maritime colonization in the 7th millennium via routes from the eastern Mediterranean to the eastern Aegean, based on previously developed sea networks. The pronounced maritime affinity of these farming and herding societies allows us to identify traces of earlier PPN concepts still embedded in the social-cultural memories of the newcomers and incorporated in a new local and regional Neolithic identity.

Keywords: Neolithization | Western Anatolia | Aegean | Maritime networks and colonization | Çukuriçi Höyük

Knapp 2016

A. Bernard Knapp & Sturt W. Manning, *Crisis in Context, The End of the Late Bronze Age in the Eastern Mediterranean*. American Journal of Archaeology **120** (2016), 99–149.

Explanations for the Late Bronze Age crisis and collapse in the eastern Mediterranean are legion: migrations, predations by external forces, political struggles within dominant polities or system collapse among them, inequalities between centers and peripheries, climatic change and natural disasters, disease/plague. There has never been any overarching explanation to account for all the changes within and beyond the eastern Mediterranean, some of which occurred at different times from the mid to late 13th throughout the 12th centuries B.C.E. The ambiguity of the evidence—material, textual, climatic, chronological—and the differing contexts

involved across the central-eastern Mediterranean make it difficult to disentangle background noise from boundary conditions and to distinguish cause from effect. Can we identify the protagonists of the crisis and related events? How useful are recent explanations that focus on climate and/or chronology in providing a better understanding of the crisis? This article reviews the current state of the archaeological and historical evidence and considers the coherence of climatic explanations and overprecise chronologies in attempting to place the "crisis" in context. There is no final solution: the human-induced Late Bronze Age "collapse" presents multiple material, social, and cultural realities that demand continuing, and collaborative, archaeological, historical, and scientific attention and interpretation.

Risch 2015

Roberto Risch & Harald Meller, *Change and Continuity in Europe and the Mediterranean around 1600 BC*. Proceedings of the Prehistoric Society **81** (2015), 239–264.

Based on recent evidence from both archaeological and natural sciences, in this paper we would like to sketch a historical geography of Europe and the Mediterranean around the year 1600 BC and then discuss the changes observed during the 16th century BC in relation to a possible correspondence with the Thera eruption. Our point of departure will be the sequence of events that took place during the months and years just before, during, and immediately after the Thera eruption. The available archaeological evidence permits us to explore the response of the local and regional communities, the logistics that were mobilised, and the political decisions adopted in light of these events. From this local and regional scenario we will move on to discuss the changes occurring in Europe, the Mediterranean, and the Near East during the 16th century BC. At least four different socio-economic and political scenarios can be sketched, showing that the responses of Bronze Age societies were highly variable. At that point, we can ask how different political structures existing at the time reacted or were affected by the ecological and/or social dynamics. Basically, our itinerary concludes that the Thera eruption did not cause a severe climatic or environmental change, but touched the ideological realm particularly of those socio-political entities which were more dependent on complex ideological superstructures in order to legitimate extreme economic exploitation.

Keywords: Thera 'Minoan eruption' | Bronze Age societies | Aegean prehistory | European prehistory

Mittelpaläolithikum

Jöris 2011

Olaf Jöris, Martin Street, Thomas Terberger & Bernhard Weninger, *Radiocarbon Dating the Middle to Upper Palaeolithic Transition*, *The Demise of the Last Neanderthals and the First Appearance of Anatomically Modern Humans in Europe*. In: Silvana Condemi & Gerd-Christian Weniger (Hrsg.), *Continuity and Discontinuity in the Peopling of Europe*, *One Hundred Fifty Years of Neanderthal Study*. (2011), 239–298.

Only a precise chronological/stratigraphical framework can enable an understanding of the dynamics of change underlying the replacement of Neanderthals by Anatomically Modern Humans and the emergence of what are recognized as Upper Palaeolithic technologies and behaviour. This paper therefore examines the European radiocarbon-based chronometric record for the period between ca. 40.0

and 30.0 ka 14C BP with reference to the stratigraphic evidence. The following testable hypotheses are proposed:

14C ages for remains of the latest Neanderthals will regularly date to older than 38.0 ka 14C BP. While at present the oldest direct dates for remains of Anatomically Modern Humans are < ca. 35.0 ka 14C BP, AMH possibly appear in Europe as early as ca. 38.0 ka 14C BP.

14C will date Final Middle Palaeolithic "transitional" industries (leaf-point industries, Chatelperronian, Uluzzian) to between ca. 41.0 and 38.0 ka 14C BP, and possibly as young as 35.0/34.0 ka 14C BP.

Initial and Early Upper Palaeolithic "transitional" industries (Bachokirian, Bohunician, Protoaurignacian, Kostenki 14, level IVb) will date to between ca. 39.0 and 35.0 ka 14C BP.

The earliest Aurignacian (I) will not significantly pre-date ca. 35.0 ka 14C BP, whereas the earliest appearance of Aurignacian figurative art will not date earlier than 32.5 ka 14C BP.

Keywords: Radiometric data | Stratigraphic context | Chronological framework | Transitional industries | Aurignacien | Replacement

Wissing 2015

Christoph Wißing, Hélène Rougier, Isabelle Crevecoeur, Mietje Germonpré, Yuichi I. Naito, Patrick Semal & Hervé Bocherens, *Isotopic evidence for dietary ecology of late Neandertals in North-Western Europe*. Quaternary International (2015), preprint, 1–19. DOI:10.1016/j.quaint.2015.09.091.

The Late Pleistocene site "Troisieme caverne" of Goyet (Belgium) has yielded the broadest set of Neandertal remains in North-Western Europe and is associated with a rich and diverse large mammal assemblage. We reconstructed the dietary ecology at the site using stable isotope tracking (d13C and d15N) of bone collagen. The d13C and d15N values of all species are consistent with those observed in other "mammoth steppe" sites. The relative contribution of potential prey species to the diet of carnivores (including Neandertals) was evaluated using a Bayesian model. The distribution of individuals from herbivorous species and carnivorous ones was determined through cluster analysis in order to identify ecological niches, regardless of the individual species attribution. The Neandertals within the predator guild and the mammoth and reindeer as representatives of the herbivores occupied the most specific and most narrow ecological niches. The "Troisieme caverne" of Goyet can be regarded as a key site for the investigation of Late Pleistocene Neandertal ecology north of the Alps.

Keywords: Neandertal | Collagen | Stable isotopes | Foodweb | Late Pleistocene | Belgium

Neolithikum

Szécsényi-Nagy 2015

Anna Szécsényi-Nagy et al., *Tracing the genetic origin of Europe's first farmers reveals insights into their social organization*. Proc. Royal Society B **282** (2015), 20150339.

Anna Szécsényi-Nagy, Guido Brandt, Wolfgang Haak, Victoria Keerl, János Jakucs, Sabine Möller-Rieker, Kitti Köhler, Balázs Gusztáv Mende, Krisztián Oross, Tibor Marton, Anett Osztás, Viktória Kiss, Marc Fecher, György Pálfi, Erika Molnár, Katalin Sebők, András Czene, Tibor Paluch, Mario Šlaus, Mario

Novak, Nives Pećina-Šlaus, Brigitta Ősz, Vanda Voicsek, Krisztina Somogyi, Gábor Tóth, Bernd Kromer, Eszter Bánffy & Kurt W. Alt

Farming was established in Central Europe by the Linearbandkeramik culture (LBK), a well-investigated archaeological horizon, which emerged in the Carpathian Basin, in today's Hungary. However, the genetic background of the LBK genesis is yet unclear. Here we present 9 Y chromosomal and 84 mitochondrial DNA profiles from Mesolithic, Neolithic Starcevo and LBK sites (seventh/sixth millennia BC) from the Carpathian Basin and southeastern Europe. We detect genetic continuity of both maternal and paternal elements during the initial spread of agriculture, and confirm the substantial genetic impact of early southeastern European and Carpathian Basin farming cultures on Central European populations of the sixth–fourth millennia BC. Comprehensive Y chromosomal and mitochondrial DNA population genetic analyses demonstrate a clear affinity of the early farmers to the modern Near East and Caucasus, tracing the expansion from that region through southeastern Europe and the Carpathian Basin into Central Europe. However, our results also reveal contrasting patterns for male and female genetic diversity in the European Neolithic, suggesting a system of patrilineal descent and patrilocal residential rules among the early farmers.

Keywords: ancient DNA | mitochondrial DNA | Y chromosomal DNA | Neolithization | Carpathian Basin | Central Europe