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References

Aktuell

Aschwanden 2021

Christie Aschwanden, *Why Herd Immunity For Covid Is Probably Impossible*. nature **591** (2021), 520–522.

Even with vaccination efforts in full force, the theoretical threshold for vanquishing COVID-19 looks to be out of reach.

Damialis 2021

Athanasios Damialis, Stefanie Gilles, Mikhail Sofiev, Viktoria Sofieva, Franziska Kolek, Daniela Bayr, Maria P. Plaza, Vivien, *Higher airborne pollen concentrations correlated with increased SARS-CoV-2 infection rates, as evidenced from 31 countries across the globe*. PNAS **118** (2021), e2019034118. DOI:10.1073/pnas.2019034118.

pnas118-e2019034118-Supplement.pdf

Pollen exposure weakens the immunity against certain seasonal respiratory viruses by diminishing the antiviral interferon response. Here we investigate whether the same applies to the pandemic severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is sensitive to antiviral interferons, if infection waves coincide with high airborne pollen concentrations. Our original hypothesis was that more airborne pollen would lead to increases in infection rates. To examine this, we performed a crosssectional and longitudinal data analysis on SARS-CoV-2 infection, airborne pollen, and meteorological factors. Our dataset is the most comprehensive, largest possible worldwide from 130 stations, across 31 countries and five continents. To explicitly investigate the effects of social contact, we additionally considered population density of each study area, as well as lockdown effects, in all possible combinations: without any lockdown, with mixed lockdown-no lockdown regime, and under complete lockdown. We found that airborne pollen, sometimes in synergy with humidity and temperature, explained, on average, 44 % of the infection rate variability. Infection rates increased after higher pollen concentrations most frequently during the four previous days. Without lockdown, an increase of pollen abundance by 100 pollen/m3 resulted in a 4 % average increase of infection rates. Lockdown halved infection rates under similar pollen concentrations. As there can be no preventive measures against airborne pollen exposure, we suggest wide dissemination of pollen-virus coexposure dire effect information to encourage high-risk individuals to wear particle filter masks during high springtime pollen concentrations.

Keywords: COVID-19 | pollen | viral infection | aerobiology

Athanasios Damialis, Stefanie Gilles, Mikhail Sofiev, Viktoria Sofieva, Franziska Kolek, Daniela Bayr, Maria P. Plaza, Vivien Leier-Wirtz, Sigrid Kaschuba, Lewis H. Ziska, Leonard Bielory, László Makra, Maria del Mar Trigo, COV-19/POLLEN study group & Claudia Traidl-Hoffmann

Significance: Coexposure to airborne pollen enhances susceptibility to respiratory viral infections, regardless of the allergy status. We hypothesized this could be also true for SARS-CoV-2 infections. To investigate this, we tested for relationships between SARS-CoV-2 infection rates and pollen concentrations, along with humidity, temperature, population density, and lockdown effects. Our unique dataset

derives from 130 sites in 31 countries and across five continents. We found that pollen, sometimes in synergy with humidity and temperature, explained, on average, 44 % of the infection rate variability. Lockdown halved infection rates under similar pollen concentrations. As we cannot completely avoid pollen exposure, we suggest wide dissemination of pollen-virus coexposure information to encourage high-risk individuals to wear particle filter masks during high springtime pollen concentrations.

Davies 2021

Nicholas G. Davies et al., *Increased mortality in community-tested cases of SARS-CoV-2 lineage B.1.1.7.* nature (2021), preprint, 1–21. DOI:10.1038/s41586-021-03426-1.

n2021.03-Davies-Supplement.pdf

SARS-CoV-2 lineage B.1.1.7, a variant first detected in the UK in September 20201, has spread to multiple countries worldwide. Several studies have established that B.1.1.7 is more transmissible than preexisting variants, but have not identified whether it leads to any change in disease severity2. Here we analyse a dataset linking 2,245,263 positive SARS-CoV-2 community tests and 17,452 COVID-19 deaths in England from 1 September 2020 to 14 February 2021. For 1,146,534 (51 %) of these tests, the presence or absence of B.1.1.7 can be identified because of mutations in this lineage preventing PCR amplification of the spike gene target (S gene target failure, SGTF1). Based on 4,945 deaths with known SGTF status, we estimate that the hazard of death associated with SGTF is 55 % (95 % CI 39–72 %) higher after adjustment for age, sex, ethnicity, deprivation, care home residence, local authority of residence and test date. This corresponds to the absolute risk of death for a 55–69-year-old male increasing from 0.6 % to 0.9 % (95 % CI 0.8–1.0 %) within 28 days after a positive test in the community. Correcting for misclassification of SGTF and missingness in SGTF status, we estimate a 61 % (42–82 %) higher hazard of death associated with B.1.1.7. Our analysis suggests that B.1.1.7 is not only more transmissible than preexisting SARS-CoV-2 variants, but may also cause more severe illness.

Nicholas G. Davies, Christopher I. Jarvis, CMMID COVID-19 Working Group, W. John Edmunds, Nicholas P. Jewell, Karla Diaz-Ordaz & Ruth H. Keogh

Gaebler 2021

Christian Gaebler et al., *Evolution of antibody immunity to SARS-CoV-2.* nature **591** (2021), 639–644. DOI:10.1038/s41586-021-03207-w.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has infected 78 million individuals and is responsible for over 1.7 million deaths to date. Infection is associated with the development of variable levels of antibodies with neutralizing activity, which can protect against infection in animal models1,2. Antibody levels decrease with time, but, to our knowledge, the nature and quality of the memory B cells that would be required to produce antibodies upon reinfection has not been examined. Here we report on the humoral memory response in a cohort of 87 individuals assessed at 1.3 and 6.2 months after infection with SARS-CoV-2. We find that titres of IgM and IgG antibodies against the receptor-binding domain (RBD) of the spike protein of SARS-CoV-2 decrease significantly over this time period, with IgA being less affected. Concurrently, neutralizing activity in plasma decreases by fivefold in pseudotype virus assays. By contrast, the number of RBD-specific memory B cells remains unchanged at 6.2 months after infection. Memory B cells display clonal turnover after 6.2 months, and the antibodies that they express have greater somatic hypermutation, resistance to RBD mutations and increased potency, indicative of continued evolution of the humoral

response. Immunofluorescence and PCR analyses of intestinal biopsies obtained from asymptomatic individuals at 4 months after the onset of coronavirus disease 2019 (COVID-19) revealed the persistence of SARS-CoV-2 nucleic acids and immunoreactivity in the small bowel of 7 out of 14 individuals. We conclude that the memory B cell response to SARS-CoV-2 evolves between 1.3 and 6.2 months after infection in a manner that is consistent with antigen persistence.

Christian Gaebler, Zijun Wang, Julio C. C. Lorenzi, Frauke Muecksch, Shlomo Finkin, Minami Tokuyama, Alice Cho, Mila Jankovic, Dennis Schaefer-Babajew, Thiago Y. Oliveira, Melissa Cipolla, Charlotte Viant, Christopher O. Barnes, Yaron Bram, Gaëlle Breton, Thomas Hägglöf, Pilar Mendoza, Arlene Hurley, Martina Turroja, Kristie Gordon, Katrina G. Millard, Victor Ramos, Fabian Schmidt, Yiska Weisblum, Divya Jha, Michael Tankelevich, Gustavo Martinez-Delgado, Jim Yee, Roshni Patel, Juan Dizon, Cecille Unson-O'Brien, Irina Shimeliovich, Davide F. Robbiani, Zhen Zhao, Anna Gazumyan, Robert E. Schwartz, Theodora Hatziioannou, Pamela J. Bjorkman, Saurabh Mehandru, Paul D. Bieniasz, Marina Caskey & Michel C. Nussenzweig

McCormick 2021

Kevin D. McCormick, Jana L. Jacobs & John W. Mellors, *The emerging plasticity of SARS-CoV-2*. science **371** (2021), 1306–1308. DOI:10.1126/science.abg4493.

The evolution of SARS-CoV-2 poses challenges for vaccines and immunotherapies.

Mallapaty 2021

Smriti Mallapaty, *Has Covid Peaked? Maybe, but it's too soon to be sure*. nature **591** (2021), 512–513.

Global COVID-19 cases fell significantly since they peaked in early January, but are on the rise again.

Monod 2021

Mélodie Monod et al., *Age groups that sustain resurging COVID-19 epidemics in the United States*. science **371** (2021), 1336. DOI:10.1126/science.abe8372.

s371-1336-Supplement.pdf

After initial declines, in mid-2020 a resurgence in transmission of novel coronavirus disease (COVID-19) occurred in the United States and Europe. As efforts to control COVID-19 disease are reintensified, understanding the age demographics driving transmission and how these affect the loosening of interventions is crucial. We analyze aggregated, age-specific mobility trends from more than 10 million individuals in the United States and link these mechanistically to age-specific COVID-19 mortality data. We estimate that as of October 2020, individuals aged 20 to 49 are the only age groups sustaining resurgent SARS-CoV-2 transmission with reproduction numbers well above one and that at least 65 of 100 COVID-19 infections originate from individuals aged 20 to 49 in the United States. Targeting interventions—including transmission-blocking vaccines—to adults aged 20 to 49 is an important consideration in halting resurgent epidemics and preventing COVID-19–attributable deaths.

Mélodie Monod, Alexandra Blenkinsop, Xiaoyue Xi, Daniel Hebert, Sivan Bershan, Simon Tietze, Marc Baguelin, Valerie C. Bradley, Yu Chen, Helen Coupland, Sarah Filippi, Jonathan Ish-Horowicz, Martin McManus, Thomas Mellan, Axel Gandy, Michael Hutchinson, H. Juliette T. Unwin, Sabine L. van Elsland, Michaela A. C. Vollmer, Sebastian Weber, Harrison Zhu, Anne Bezancon, Neil M.

Ferguson, Swapnil Mishra, Seth Flaxman, Samir Bhatt & Oliver Ratmann on behalf of the Imperial College COV-Response Team

Rommel 2021

Alexander Rommel et al., *COVID-19-Krankheitslast in Deutschland im Jahr 2020, Durch Tod und Krankheit verlorene Lebensjahre im Verlauf der Pandemie.* Deutsches Ärzteblatt **118** (2021), ix, 145–151. DOI:10.3238/arztebl.m2021.0147.

Hintergrund: Die SARS-CoV-2-Pandemie hat im Jahr 2020 das Gesundheitswesen vor große Herausforderungen gestellt. Die COVID-19-Krankheitslast lässt sich durch den Verlust an Lebensjahren durch Krankheit oder Tod ausdrücken. Dabei gehen beispielsweise durch Versterben im Alter von 40 Jahren deutlich mehr Lebensjahre verloren als bei Tod mit 80 Jahren.

Methode: Auf Basis laborbestätigter SARS-CoV-2-Meldefälle im Jahr 2020 (Datenstand 18. Januar 2021) werden durch Tod verlorene Lebensjahre ("years of life lost", YLL) und durch gesundheitliche Einschränkungen verlorene Lebensjahre ("years lived with disability", YLD) zur Krankheitslast insgesamt ("disability- adjusted life years", DALY) aufsummiert. Die Methodik ist angelehnt an die "Global Burden of Disease"-Studie. Bestehende Vorerkrankungen werden bei der Berechnung der YLL nicht berücksichtigt. Die angelegte Restlebenserwartung berücksichtigt aber ein mittleres altersspezifisches Niveau an Morbidität.

Ergebnisse: Im Jahr 2020 gingen in Deutschland 305 641 Lebensjahre durch COVID-19 verloren. Bei Männern entfielen 34,8 % der DALY auf Personen unter 70 Jahre, bei Frauen 21,0 %. 99,3 % dieser Krankheitslast machten verlorene Lebensjahre durch Versterben aus (YLL). Die durch COVID-19 im Tagesmittel entstandene Krankheitslast durch Versterben lag unter der für wichtige nichtübertragbare Erkrankungen. Eine verstorbene Person verlor im Mittel etwa 9,6 Lebensjahre, Personen unter 70 Jahre verloren 25,2 Lebensjahre. Männer hatten durch Tod einen größeren Verlust an Lebenszeit als Frauen (11,0 versus 8,1 Jahre).

Schlussfolgerung: Die Auswirkungen von COVID-19 auf die Bevölkerungsgesundheit lassen sich mit den Indikatoren der Krankheitslast verdeutlichen. Die Methode liefert damit zusätzliche Erkenntnisse, die für künftige Ausbrüche frühzeitig genutzt werden sollten.

Alexander Rommel, Elena von der Lippe, Dietrich Plaß, Thomas Ziese, Michaela Diercke, Matthias an der Heiden, Sebastian Haller, Annelene Wengler, für die BURDEN 2020 Study Group

Singh 2021

Surya Singh, Mujaheed Shaikh, Katharina Hauck & Marisa Miraldo, *Impacts of introducing and lifting nonpharmaceutical interventions on COVID-19 daily growth rate and compliance in the United States.* PNAS **118** (2021), e2021359118. DOI:10.1073/pnas.2021359118.

pnas118-e2021359118-Supplement1.pdf, pnas118-e2021359118-Supplement2.qt

We evaluate the impacts of implementing and lifting nonpharmaceutical interventions (NPIs) in US counties on the daily growth rate of COVID-19 cases and compliance, measured through the percentage of devices staying home, and evaluate whether introducing and lifting NPIs protecting selective populations is an effective strategy. We use difference-in-differences methods, leveraging on daily county-level data and exploit the staggered introduction and lifting of policies across counties over time. We also assess heterogenous impacts due to counties' population characteristics, namely ethnicity and household income. Results show that introducing NPIs led to a reduction in cases through the percentage of devices

staying home. When counties lifted NPIs, they benefited from reduced mobility outside of the home during the lockdown, but only for a short period. In the long term, counties experienced diminished health and mobility gains accrued from previously implemented policies. Notably, we find heterogenous impacts due to population characteristics implying that measures can mitigate the disproportionate burden of COVID-19 on marginalized populations and find that selectively targeting populations may not be effective.

Keywords: COVID-19 | nonpharmaceutical interventions | lockdown measures | public policy | compliance

Significance: The coronavirus pandemic has become the most recent and urgent public health issue to threaten health systems and test government responses globally. The United States is leading with the highest number of infections despite the implementation of nonpharmaceutical interventions (NPIs). These measures may vary in their effectiveness across populations as the ability to physically distance is a privilege and is highly intersected with ethnicity and socioeconomic status. Furthermore, the United States has now lifted many NPIs; however, there is no evidence on whether and to what degree lifting NPIs can diminish the health gains of previously implemented policies. This study provides timely evidence for policymakers to inform next steps to mitigate the pandemic.

Vogel 2021

Gretchen Vogel & Kai Kupferschmidt, *New problems erode confidence in AstraZeneca's vaccine*. science **371** (2021), 1294–1295. DOI:10.1126/science.371.6536.1294.

Rare clotting disorders interrupt vaccination in Europe as U.S. expert panel rebukes company over efficacy data.

Amerika

Malakoff 2021

David Malakoff, *Great Lakes people among first coppersmiths*. science **371** (2021), 1299.

New dates show Native Americans worked pure ore nearly 10,000 years ago.

Anthropologie

Braun 2021

David R. Braun et al., *Ecosystem engineering in the Quaternary of the West Coast of South Africa*. Evolutionary Anthropology **30** (2021), 50–62.

Despite advances in our understanding of the geographic and temporal scope of the Paleolithic record, we know remarkably little about the evolutionary and ecological consequences of changes in human behavior. Recent inquiries suggest that human evolution reflects a long history of interconnections between the behavior of humans and their surrounding ecosystems (e.g., niche construction). Developing expectations to identify such phenomena is remarkably difficult because it requires understanding the multi-generational impacts of changes in behavior. These long-term dynamics require insights into the emergent phenomena that alter selective pressures over longer time periods which are not possible to observe, and are also not intuitive based on observations derived from ethnographic time scales. Generative models show promise for probing these potentially unexpected consequences of

human-environment interaction. Changes in the uses of landscapes may have long term implications for the environments that hominins occupied. We explore other potential proxies of behavior and examine how modeling may provide expectations for a variety of phenomena.

Keywords: archaeology | evolution | generative modeling | niche construction | paleoecology | South Africa

David R. Braun, John Tyler Faith, Matthew J. Douglass, Benjamin Davies, Mitchel J. Power, Vera Aldeias, Nicholas J. Conard, Russell Cutts, Larisa R. G. DeSantis, Lydie M. Dupont, Irene Esteban, Andrew W. Kandel, Naomi E. Levin, Julie Luyt, John Parkington, Robyn Pickering, Lynne Quick, Judith Sealy & Deano Stynder

Iovita 2021

Radu Iovita, David R. Braun, Matthew J. Douglass, Simon J. Holdaway, Sam C. Lin, Deborah I. Olszewski & Zeljko Rezek, *Operationalizing niche construction theory with stone tools*. Evolutionary Anthropology **30** (2021), 28–39.

One of the greatest difficulties with evolutionary approaches in the study of stone tools (lithics) has been finding a mechanism for tying culture and biology in a way that preserves human agency and operates at scales that are visible in the archaeological record. The concept of niche construction, whereby organisms actively construct their environments and change the conditions for selection, could provide a solution to this problem. In this review, we evaluate the utility of niche construction theory (NCT) for stone tool archaeology. We apply NCT to lithics both as part of the "extended phenotype" and as residuals or precipitates of other niche-constructing activities, suggesting ways in which archaeologists can employ niche construction feedbacks to generate testable hypotheses about stone tool use. Finally, we conclude that, as far as its applicability to lithic archaeology, NCT compares favorably to other prominent evolutionary approaches, such as human behavioral ecology and dualinheritance theory.

Keywords: cultural evolution | lithics | niche construction

Milot 2021

Emmanuel Milot, *How natural selection shapes our later years*. Nature Ecology & Evolution **5** (2021), 271–272.

Natural selection does not disappear with age, according to a new evolutionary demographic model. This conclusion is at odds with the widespread belief that ending reproduction relaxes purifying selection on alleles that increase our ageing body's vulnerability to diseases such as cancer, Alzheimer's or diabetes.

Thompson 2021

Jessica C. Thompson, David K. Wright & Sarah J. Ivory, *The emergence and intensification of early hunter-gatherer niche construction*. Evolutionary Anthropology **30** (2021), 17–27.

Hunter-gatherers, especially Pleistocene examples, are not well-represented in archeological studies of niche construction. However, as the role of humans in shaping environments over long time scales becomes increasingly apparent, it is critical to develop archeological proxies and testable hypotheses about early hunter-gatherer impacts. Modern foragers engage in niche constructive behaviors aimed at maintaining or increasing the productivity of their environments, and these may have had significant ecological consequences over later human evolution. In some cases, they may also represent behaviors unique to modern Homo sapiens.

Archeological and paleoenvironmental data show that African hunter-gatherers were niche constructors in diverse environments, which have legacies in how ecosystems function today. These can be conceptualized as behaviorally mediated trophic cascades, and tested using archeological and paleoenvironmental proxies. Thus, large-scale niche construction behavior is possible to identify at deeper time scales, and may be key to understanding the emergence of modern humans.

Keywords: burning | environmental impacts | foragers | middle stone age | modern human | Pleistocene

Veatch 2021

Elizabeth G. Veatch, Erik J. Ringen, Megan B. Kilgore & Jatmiko, *Using niche construction theory to generate testable foraging hypotheses at Liang Bua*. Evolutionary Anthropology **30** (2021), 8–16.

Niche construction theory (NCT) has emerged as a promising theoretical tool for interpreting zooarchaeological material. However, its juxtaposition against more established frameworks like optimal foraging theory (OFT) has raised important criticism around the testability of NCT for interpreting hominin foraging behavior. Here, we present an optimization foraging model with NCT features designed to consider the destructive realities of the archaeological record after providing a brief review of OFT and NCT. Our model was designed to consider a foragers decision to exploit an environment given predation risk, mortality, and payoff ratios between different ecologies, like more-open or more-forested environments. We then discuss how the model can be used with zooarchaeological data for inferring environmental exploitation by a primitive hominin, Homo floresiensis, from the island of Flores in Southeast Asia. Our example demonstrates that NCT can be used in combination with OFT principles to generate testable foraging hypotheses suitable for zooarchaeological research.

Keywords: archaeological theory | extended evolutionary synthesis | foraging theory | Homo floresiensis | optimal foraging theory | zooarchaeology

Bibel

Millek 2018

Jesse Michael Millek, *Just how much was destroyed? The end of the Late Bronze Age in the Southern Levant*. Ugarit-Forschungen **49** (2018), 239–273.

Destruction is an integral part of the end of the Late Bronze Age in the southern Levant. Once-powerful sites like Hazor and Lachish were burnt and abandoned. A multitude of other sites have been included in maps and tables describing the extent of the destruction, but just how much was destroyed? This article examines 62 destruction events to answer this very question. While some sites did suffer destruction, other destruction events exist only as scholarly citations, and many others are minor in their extent. This has strong implications on many of the theories for the end of the Late Bronze Age which utilize these destruction events to explain the transitions from the Late Bronze Age to the Iron I.

Here I must also say what I am not arguing. I am not attempting to take violence or turmoil out of the transition from the Late Bronze Age to the Iron Age. There were vast changes which took place over the course of a hundred years or more as old political institutions came to an end, Egyptian rule over the southern Levant was withdrawn and new entities such as the Philistines and the Israelites appeared taking advantage of the situation. Three sites do yield evidence of destruction by warfare and one more with violence by desecration. There are likely

to be more than these which we cannot know based on the archaeological material. However, much of the warfare that took place is likely archaeologically invisible as it would have taken place in the fields and valleys. The transition would have been tumultuous, and for some groups the period was a downturn while for others it was an opportunity. There were winners and losers and different populations were able to adapt to the stress they faced and stayed at their site while others chose abandonment. Some merged with different populations in the southern coastal plain while others sought new places of habitation in the highlands. However, the questions are not, were these times tumultuous or did warfare occur and did warfare cause destruction? The answer to both questions is yes. Rather, the question is, did destruction by warfare, earthquakes, or destruction in general at one time or over time bring about the transition and the social, political, and cultural changes seen at the end of Late Bronze Age and in the early Iron Age? To this I would say, no.

Biologie

Na 2021

Shin-Young Na, Mathangi Janakiraman, Alexei Leliavski & Gurumoorthy Krishnamoorthy, *High-salt diet suppresses autoimmune demyelination by regulating the blood–brain barrier permeability*. PNAS **118** (2021), e2025944118.

pnas118-e2025944118-Supplement.pdf

Sodium chloride, "salt," is an essential component of daily food and vitally contributes to the body's homeostasis. However, excessive salt intake has often been held responsible for numerous health risks associated with the cardiovascular system and kidney. Recent reports linked a high-salt diet (HSD) to the exacerbation of artificially induced central nervous system (CNS) autoimmune pathology through changes in microbiota and enhanced TH17 cell differentiation [M. Kleinewietfeld et al., Nature 496, 518–522 (2013); C. Wu et al., Nature 496, 513–517 (2013); N. Wilck et al., Nature 551, 585–589 (2017)]. However, there is no evidence that dietary salt promotes or worsens a spontaneous autoimmune disease. Here we show that HSD suppresses autoimmune disease development in a mouse model of spontaneous CNS autoimmunity. We found that HSD consumption increased the circulating serum levels of the glucocorticoid hormone corticosterone. Corticosterone enhanced the expression of tight junction molecules on the brain endothelial cells and promoted the tightening of the blood–brain barrier (BBB) thereby controlling the entry of inflammatory T cells into the CNS. Our results demonstrate the multifaceted and potentially beneficial effects of moderately increased salt consumption in CNS autoimmunity.

Keywords: multiple sclerosis | dietary salt | experimental autoimmune encephalomyelitis

Significance: Dietary salt intake has been considered an important risk factor for autoimmune diseases like multiple sclerosis (MS). Here we studied the effects of a high-salt diet (HSD) using a spontaneous autoimmune disease mouse model resembling MS. We found that high-salt consumption protects mice from developing the neurological disease by promoting the tightening of the blood–brain barrier and preventing the migration of autoreactive T cells into the CNS. Our results emphasize the multifarious effects of high-salt consumption in autoimmune disease susceptibility.

Datierung

Devièse 2021

Thibaut Devièse et al., *Reevaluating the timing of Neanderthal disappearance in Northwest Europe*. PNAS **118** (2021), e2022466118.

pnas118-e2022466118-Supplement.pdf

Elucidating when Neanderthal populations disappeared from Eurasia is a key question in paleoanthropology, and Belgium is one of the key regions for studying the Middle to Upper Paleolithic transition. Previous radiocarbon dating placed the Spy Neanderthals among the latest surviving Neanderthals in Northwest Europe with reported dates as young as 23,880 ± 240 B.P. (OxA-8912). Questions were raised, however, regarding the reliability of these dates. Soil contamination and carbon-based conservation products are known to cause problems during the radiocarbon dating of bulk collagen samples. Employing a compound-specific approach that is today the most efficient in removing contamination and ancient genomic analysis, we demonstrate here that previous dates produced on Neanderthal specimens from Spy were inaccurately young by up to 10,000 y due to the presence of unremoved contamination. Our compound-specific radiocarbon dates on the Neanderthals from Spy and those from Engis and Fonds-de-Forêt demonstrate that they disappeared from Northwest Europe at 44,200 to 40,600 cal B.P. (at 95.4 % probability), much earlier than previously suggested. Our data contribute significantly to refining models for Neanderthal disappearance in Europe and, more broadly, show that chronometric models regarding the appearance or disappearance of animal or hominin groups should be based only on radiocarbon dates obtained using robust pretreatment methods.

Keywords: Neanderthal disappearance | Belgium | compound-specific radiocarbon dating | ancient genomic analysis

Thibaut Devièse, Grégory Abrams, Mateja Hajdinjak, Stéphane Pirson, Isabelle De Groote, Kévin Di Modica, Michel Toussaint, Valentin Fischer, Dan Comeskey, Luke Spindler, Matthias Meyer, Patrick Semal & Tom Higham

Significance: Understanding when Neanderthals disappeared is a hotly debated topic. When radiocarbon dating placed the Spy Neanderthals amongst the latest surviving in Northwest Europe, questions were raised regarding the reliability of the dates. Using a procedure more efficient in removing contamination and ancient genomic analysis, we show that previous dates produced on Neanderthal specimens from Spy are too young by up to 10,000 y. Our direct radiocarbon dates on the Neanderthals from Spy and those from Engis and Fonds-de-Forêt show a reduction of the uncertainty for the time window corresponding to Neanderthal disappearance in Northwest Europe. This population disappeared at 44,200 to 40,600 cal B.P. (at 95.4 % probability). This is also earlier than previous suggestions based on dates on bulk collagen.

Finegan 1964

Jack Finegan, *Handbook of Biblical Chronology*, *Principles of the time reckoning in the ancient world and problems of chronology in the Bible*. (Princeton 1964).

Kultur

Rahmstorf 2019

Lorenz Rahmstorf & Edward Stratford (Hrsg.), *Weights and Marketplaces*, *From the Bronze Age to the Early Modern*

Period. Weight & Value 1 (Göttingen 2019).

Rahmstorf 2021
: Lorenz Rahmstorf, Gojko Barjamovic & Nicola Ialongo (Hrsg.), *Merchants, Measures and Money*, *Understanding Technologies of Early Trade in a Comparative Perspective*. Weight & Value 2 (Göttingen 2021).

Velde 2021
: François R. Velde, *A functional approach to money in the ancient world*. In: Lorenz Rahmstorf, Gojko Barjamovic & Nicola Ialongo (Hrsg.), *Merchants, Measures and Money*, *Understanding Technologies of Early Trade in a Comparative Perspective*. Weight & Value 2 (Göttingen 2021), 199–206.

To think about the presence or absence of money across a wide range of historical contexts, I propose a functional approach based on monetary economics and informed by medieval and early modern history. Money is an object that solves a problem of exchange. Depending on the context, the problem may or may not arise, it may be solved by other methods than the physical transfer of tokens, the characteristics of the tokens may vary. Because they solve a problem, monetary objects have more value than their intrinsic content: how little or how much depends on the manner in which they are supplied. When these objects become the standard to express claims or promises, the unit of account ceases to be innocuous.

Keywords: Money | monetary exchange | fiat money | commodity money | monetary history

Mathematik

Pavard 2021
: Samuel Pavard & Christophe F. D. Coste, *Evolutionary demographic models reveal the strength of purifying selection on susceptibility alleles to late-onset diseases*. Nature Ecology & Evolution **5** (2021), 392–400.

NatEcoEvo05-0392-Supplement.pdf

Assessing the role played by purifying selection on a susceptibility allele to late-onset disease (SALOD) is crucial to understanding the puzzling allelic spectrum of a disease, because most alleles are recent and rare. This fact is surprising because it suggests that alleles are under purifying selection while those that are involved in post-menopause mortality are often considered neutral in the genetic literature. The aim of this article is to use an evolutionary demography model to assess the magnitude of selection on SALODs while accounting for epidemiological and sociocultural factors. We develop an age-structured population model allowing for the calculation of SALOD selection coefficients (1) for a large and realistic parameter space for disease onset, (2) in a two-sex model in which men can reproduce in old age and (3) for situations in which child survival depends on maternal, paternal and grandmaternal care. The results show that SALODs are under purifying selection for most known age-at-onset distributions of late-onset genetic diseases. Estimates regarding various genes involved in susceptibility to cancer or Huntington's disease demonstrate that negative selection largely overcomes the effects of drift in most human populations. This is also probably true for neurodegenerative

or polycystic kidney diseases, although sociocultural factors modulate the effect of selection in these cases. We conclude that neutrality is probably the exception among alleles that have a deleterious effect in old age and that accounting for sociocultural factors is required to understand the full extent of the force of selection shaping senescence in humans.

Mesolithikum

Epimachov 2021

Andrej V. Epimachov, *Anfänge der Keramiktraditionen im Grenzraum zwischen Osteuropa und Westsibirien (Wald- und Waldsteppengebiete Transuraliens, Russland).* Eurasia Antiqua **23** (2021), 101–110.

Gehen wir vom angenommenen mathematischen Modell über zwei Zentren der Entstehung und Verbreitung von Technologien der Keramikherstellung aus, können wir feststellen, dass jede der beiden Vektorrichtungen für Transuralien in Frage kommen könnte. Nebenbei bemerkt schließen wir nicht aus, dass die Grenze zwischen dem sogenannten asiatischen und dem afrikanischen Verbreitungskorridor angesichts der neuen Daten verschoben werden könnte, sollten sich diese Daten bestätigen lassen. Bei so einer Konstellation würde sich die Mannigfaltigkeit der Kulturtypen des transuralischen Neolithikums (von welchen einige als übereinstimmend belegt sind) als Widerspiegelung eines komplexen Prozesses der Verbreitung einer wichtigen technologischen Erneuerung erweisen.

Keywords: Russian Federation | Ural | Transuralian Region | Mesolithic Age | Neolithic Age | Kokino | Kozlov | Ceramics | Radiocarbon dating

Keywords: Russische Foderation | Ural | Transuralgebiet | Mesolithikum | Neolithikum | Kokino | Kozlov | Keramik | Radiokohlenstof datierung

Politik

Lutz 2021

Wolfgang Lutz et al., *Years of good life is a well-being indicator designed to serve research on sustainability.* PNAS **118** (2021), e1907351118.

pnas118-e1907351118-Supplement.pdf

Sustainable development (SD) as popularized by the Brundtland Commission and politically enshrined in the Sustainable Development Goals has been the explicit focus of sustainability science. While there is broad agreement that the trend of human well-being (W) over time should serve as a sustainability criterion, the literature so far has mostly addressed this in terms of its determinants rather than focusing on W itself. There is broad agreement that an indicator for W should have multiple constituents, clearly going beyond gross domestic product. Here, we propose a tailor-made indicator to serve precisely this purpose following a set of specified desiderata, including its applicability to flexibly defined subnational populations by gender, place of residence, ethnicity, and other relevant characteristics. The indicator, years of good life (YoGL), reflects the evident fact that in order to be able to enjoy any quality of life, one has to be alive and thus is primarily based on life expectancy. However, since mere survival is not considered good enough, life years are counted conditional on meeting minimum standards in two dimensions: the objective dimension of capable longevity (consisting of being out of absolute poverty and enjoying minimal levels of physical and cognitive health) and the subjective dimension of overall life satisfaction. We illustrate the calculation of this

indicator for countries and subpopulations at different stages of development and with different degrees of data availability.

Keywords: sustainability science | human well-being indicator | basic needs | survival | good life

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Significance: Attempts at comprehensive quantitative assessments of sustainable development can focus on either determinants or constituents of long-term human well-being. While much research on determinants has relied on economic concepts of capital and inclusive wealth, here we focus on the constituents of well-being using a demographic approach. We construct a tailor-made metric based on life expectancy and indicators of objective and subjective well-being. The future trend in this metric has the potential to serve as a sustainability criterion and marks a crucial step in the endeavor to comprehensively assess sustainable development. At this stage, it is only applied to observed past and current conditions. To address sustainability, it will be combined with scenarios addressing future changes including feedback from environmental change.

Religion

Shtulman 2014

Andrew Shtulman & Marjaana Lindeman, *God Can Hear But Does He Have Ears? Dissociations Between Psychological and Physiological Dimensions of Anthropomorphism*. Proceedings of the Annual Meeting of the Cognitive Science Society **36** (2014), 2931–2936.

Anthropomorphism is a default strategy for making the unfamiliar familiar, but is it a uniform strategy? Do all dimensions of anthropomorphism "hang together"? We explored this question by involving adults (n = 99) in a speeded property-attribution task in which they decided, as quickly as possible, whether properties of two types—psychological and physiological—could be attributed to God. Participants not only attributed more psychological properties to God than physiological properties, but they were also faster, more consistent, and more confident in making those attributions. Participants showed the reverse pattern when denying properties to God. That is, they were slower, less consistent, and less confident in denying psychological properties to God than in denying physiological ones. These findings suggest that God is conceptualized, by default, as having a mind but not a body—a distinction that has important implications for the nature and origin of God concepts in particular and supernatural concepts in general.

Keywords: religious cognition | God concepts | folk theories

Singh 2021

Manvir Singh, *Magic, Explanations, and Evil, The Origins and Design of Witches and Sorcerers*. Current Anthropology **62** (2021), 2–29.

CurrAnth62-002-Supplement.pdf

In nearly every documented society, people believe that some misfortunes are caused by malicious group mates using magic or supernatural powers. Here I report cross-cultural patterns in these beliefs and propose a theory to explain them. Using the newly created Mystical Harm Survey, I show that several conceptions of malicious mystical practitioners, including sorcerers (who use learned spells), possessors of the evil eye (who transmit injury through their stares and words), and witches (who possess superpowers, pose existential threats, and engage in morally abhorrent acts), recur around the world. I argue that these beliefs develop

from three cultural selective processes: a selection for intuitive magic, a selection for plausible explanations of impactful misfortune, and a selection for demonizing myths that justify mistreatment. Separately, these selective schemes produce traditions as diverse as shamanism, conspiracy theories, and campaigns against heretics—but around the world, they jointly give rise to the odious and feared witch. I use the tripartite theory to explain the forms of beliefs in mystical harm and outline 10 predictions for how shifting conditions should affect those conceptions. Societally corrosive beliefs can persist when they are intuitively appealing or they serve some believers' agendas.