

References

Aktuell

ABBOTT 2011

Alison Abbott, *City living marks the brain*. [nature](#) **474** (2011), 429.

“Even the most powerful of these genes conveys only a 20% increased risk”, he says. Yet schizophrenia is twice as common in those who are city-born and raised as in those from the countryside, and the bigger the city, the higher the risk.

This ‘social stress’ activated many brain areas, two of them specifically correlated with the volunteers’ history of urban living. The amygdala, which processes emotion, was activated only in people currently living in a city. And the cingulate cortex, which helps to regulate the amygdala and processes negative emotions, responded more strongly in those brought up in cities than in those who grew up in towns or rural areas.

ANDERSON 2016

Christopher J. Anderson et al., *Response to Comment on “Estimating the reproducibility of psychological science”*. [science](#) **351** (2016), 1037.

Christopher J. Anderson, Štěpán Bahník, Michael Barnett-Cowan, Frank A. Bosco, Jesse Chandler, Christopher R. Chartier, Felix Cheung, Cody D. Christopherson, Andreas Cordes, Edward J. Cremata, Nicolas Della Penna, Vivien Estel, Anna Fedor, Stanka A. Fitneva, Michael C. Frank, James A. Grange, Joshua K. Hartshorne, Fred Hasselman, Felix Henninger, Marije van der Hulst, Kai J. Jonas, Calvin K. Lai, Carmel A. Levitan, Jeremy K. Miller, Katherine S. Moore, Johannes M. Meixner, Marcus R. Munafo, Koen I. Neijenhuijs, Gustav Nilsson, Brian A. Nosek, Franziska Plessow, Jason M. Prenoveau, Ashley A. Ricker, Kathleen Schmidt, Jeffrey R. Spies, Stefan Stieger, Nina Strohminger, Gavin B. Sullivan, Robbie C. M. van Aert, Marcel A. L. M. van Assen, Wolf Vanpaemel, Michelangelo Vianello, Martin Voracek & Kellylynn Zuni

Gilbert et al. conclude that evidence from the Open Science Collaboration’s Reproducibility Project: Psychology indicates high reproducibility, given the study methodology. Their very optimistic assessment is limited by statistical misconceptions and by causal inferences from selectively interpreted, correlational data. Using the Reproducibility Project: Psychology data, both optimistic and pessimistic conclusions about reproducibility are possible, and neither are yet warranted.

BOHANNON 2016

John Bohannon, *Survey fraud test sparks battle*. [science](#) **351** (2016), 1014.

Pew Research Center challenges statistical test.

Surveying communities in the developing world often requires face-to-face interviews, done house-by-house in dangerous environments. To avoid risk or save time, Robbins says, interviewers sometimes resort to “curbstoning”: sitting on the curb and inventing survey responses, often by duplicating answers. To detect such fabrication, their test looks for highly similar responses from multiple respondents. How similar is too similar? After running a simulation of data fabrication scenarios, they settled on 85% as the cutoff. In a 100-question survey of 100 people,

for example, fewer than five people would be expected to have identical answers on 85 of the questions if the data are genuine.

Late last year, after the pair submitted a paper on their method and findings to the peer-reviewed *Statistical Journal of the IAOS*, one of the field's leading publications, they received an email from Kennedy and other top officials at Pew. "We strongly suggest that you retract the paper," the email stated. Kuriakose and Robbins did not withdraw their paper. It was accepted in December 2015 and is in press.

GILBERT 2016

Daniel T. Gilbert, Gary King, Stephen Pettigrew & Timothy D. Wilson, *Comment on "Estimating the reproducibility of psychological science"*. [science 351 \(2016\), 1037](#).

A paper from the Open Science Collaboration (Research Articles, 28 August 2015, aac4716) attempting to replicate 100 published studies suggests that the reproducibility of psychological science is surprisingly low. We show that this article contains three statistical errors and provides no support for such a conclusion. Indeed, the data are consistent with the opposite conclusion, namely, that the reproducibility of psychological science is quite high.

In other words, if MLP had used OSC's method, they would have reported an unsettling replication rate of 34 % rather than the heartening 85 % they actually reported. In fact, we estimate that if all the replication studies had been high enough in fidelity to earn the endorsement of the original authors, then the rate of successful replication would have been 58.6 % (95 % CI: 47.0 %, 69.5 %) when controlling for relevant covariates. Remarkably, the CIs of these estimates actually overlap the 65.5 % replication rate that one would expect if every one of the original studies had reported a true effect.

GLUTH 2016

Sebastian Gluth & Laura Fontanesi, *Wiring the altruistic brain*. [science 351 \(2016\), 1028–1029](#).

Communication between brain regions uncovers hidden motives for generous behavior.

Hein et al. provide yet another striking finding. After categorizing participants as either selfish or prosocial on the basis of their behavior toward the control partner, they find that only selfish participants increase their donations toward the empathy partner, whereas only prosocial participants act (even) more generously toward the reciprocity partner. Provided that this result can be established as robust and generalizable to nonlaboratory contexts, it bears high relevance for social policy and for treatments of antisocial behavior: Whether we want to increase altruism in an already cooperative group or in individuals with deficits in prosocial skills, we should focus on emphasizing reciprocity or empathy, respectively.

HEIN 2016

Grit Hein, Yosuke Morishima, Susanne Leiberg, Sunhae Sul & Ernst Fehr, *The brain's functional network architecture reveals human motives*. [science 351 \(2016\), 1074–1078](#).

[s351-1074-Supplement.pdf](#)

Goal-directed human behaviors are driven by motives. Motives are, however, purely mental constructs that are not directly observable. Here, we show that the brain's functional network architecture captures information that predicts different motives behind the same altruistic act with high accuracy. In contrast, mere

activity in these regions contains no information about motives. Empathy-based altruism is primarily characterized by a positive connectivity from the anterior cingulate cortex (ACC) to the anterior insula (AI), whereas reciprocity-based altruism additionally invokes strong positive connectivity from the AI to the ACC and even stronger positive connectivity from the AI to the ventral striatum. Moreover, predominantly selfish individuals show distinct functional architectures compared to altruists, and they only increase altruistic behavior in response to empathy inductions, but not reciprocity inductions.

KANAZAWA 2013

Satoshi Kanazawa & Linus Fontaine, *Intelligent People Defect More in a One-Shot Prisoner's Dilemma Game*. [Journal of Neuroscience, Psychology, and Economics](#) **6** (2013), 201–213.

Why so many people make the theoretically irrational decision to cooperate in a one-shot Prisoner's Dilemma game remains a puzzle in game theory. Recent developments in evolutionary psychology suggest that the anomaly may be attributable to evolutionary constraints on the human brain and their interaction with general intelligence. We conduct a laboratory experiment to test three hypotheses: (a) projection of a video image of another experimental subject increases cooperation because the human brain implicitly assumes that their choice is not anonymous; (b) more intelligent individuals are more likely to defect, because they are more likely to comprehend the evolutionarily novel features of the experiment that make defection rational; and (c) the effect of the video projection on cooperation is greater among less intelligent individuals. The experiment clearly supports two of the three hypotheses.

Keywords: evolutionary psychology | general intelligence | Savanna Principle | Savanna-IQ Interaction | Hypothesis | strong reciprocity

KANAZAWA 2015

Satoshi Kanazawa & Norman P. Li, *Happiness in modern society, Why intelligence and ethnic composition matter*. [Journal of Research in Personality](#) **59** (2015), 111–120.

Recent developments in evolutionary psychology suggest that living among others of the same ethnicity might make individuals happier and further that such an effect of the ethnic composition on life satisfaction may be stronger among less intelligent individuals. Data from the National Longitudinal Study of Adolescent Health showed that White Americans had significantly greater life satisfaction than all other ethnic groups in the US and this was largely due to the fact that they were the majority ethnic group; minority Americans who lived in counties where they were the numerical majority had just as much life satisfaction as White Americans did. Further, the association between ethnic composition and life satisfaction was significantly stronger among less intelligent individuals. The results suggest two important factors underlying life satisfaction and highlight the utility of integrating happiness research and evolutionary psychology.

Keywords: Positive psychology | Evolutionary psychology | Life satisfaction | Savanna Principle | Mismatch hypothesis | Evolutionary legacy hypothesis

KENNEDY 2011

Daniel P. Kennedy & Ralph Adolphs, *Stress and the city*. [nature](#) **474** (2011), 452–453.

Many of us were raised or currently live in an urban environment. A neuroimaging study now reveals how this affects brain function when an individual is faced with a stressful situation.

LEDERBOGEN 2011

Florian Lederbogen et al., *City living and urban upbringing affect neural social stress processing in humans*. [nature 474 \(2011\), 498–500](#).
[n474-0498-Supplement.pdf](#)

Florian Lederbogen, Peter Kirsch, Leila Haddad, Fabian Streit, Heike Tost, Philipp Schuch, Stefan Wüst, Jens C. Pruessner, Marcella Rietschel, Michael Deuschle & Andreas Meyer-Lindenberg

More than half of the world's population now lives in cities, making the creation of a healthy urban environment a major policy priority¹. Cities have both health risks and benefits¹, but mental health is negatively affected: mood and anxiety disorders are more prevalent in city dwellers² and the incidence of schizophrenia is strongly increased in people born and raised in cities^{3–6}. Although these findings have been widely attributed to the urban social environment^{2,3,7,8}, the neural processes that could mediate such associations are unknown. Here we show, using functional magnetic resonance imaging in three independent experiments, that urban upbringing and city living have dissociable impacts on social evaluative stress processing in humans. Current city living was associated with increased amygdala activity, whereas urban upbringing affected the perigenual anterior cingulate cortex, a key region for regulation of amygdala activity, negative affect⁹ and stress¹⁰. These findings were regionally and behaviourally specific, as no other brain structures were affected and no urbanicity effect was seen during control experiments invoking cognitive processing without stress. Our results identify distinct neural mechanisms for an established environmental risk factor, link the urban environment for the first time to social stress processing, suggest that brain regions differ in vulnerability to this risk factor across the lifespan, and indicate that experimental interrogation of epidemiological associations is a promising strategy in social neuroscience.

LI 2016

Norman P. Li & Satoshi Kanazawa, *Country roads, take me home ... to my friends, How intelligence, population density, and friendship affect modern happiness*. [British Journal of Psychology \(2016\), preprint, 1–23](#). DOI:10.1111/bjop.12181.

We propose the savanna theory of happiness, which suggests that it is not only the current consequences of a given situation but also its ancestral consequences that affect individuals' life satisfaction and explains why such influences of ancestral consequences might interact with intelligence. We choose two varied factors that characterize basic differences between ancestral and modern life – population density and frequency of socialization with friends – as empirical test cases. As predicted by the theory, population density is negatively, and frequency of socialization with friends is positively, associated with life satisfaction. More importantly, the main associations of life satisfaction with population density and socialization with friends significantly interact with intelligence, and, in the latter case, the main association is reversed among the extremely intelligent. More intelligent individuals experience lower life satisfaction with more frequent socialization with friends. This study highlights the utility of incorporating evolutionary perspectives in the study of subjective well-being.

LIU 2016

Guiyou Liu & Qinghua Jiang, *Alzheimer's disease CD33rs3865444 variant does not contribute to cognitive performance*. [PNAS 113 \(2016\), E1589–E1590](#).

In summary, Schwarz et al. report the protective role of SNPs in CD33 and other genes against postreproductive cognitive decline. Using the four largescale GWAS datasets, we did not find any significant association between 10 of 13 SNPs and childhood intelligence, cognitive performance, and educational attainment. We believe that our findings provide important supplementary information about the role of CD33 and other genes in cognitive decline.

MARCY 2016

Ariel Marcy, *Making a game of science*. [science 351 \(2016\), 1106](#).

When Ariel Marcy was 7 years old, her physician father gave her an electronic game to help her understand what he did all day. Playfully exploring the human body as a child, she says, set her on the path to where she is today: working to inspire the next generation with her own science games and beefing up her credentials by pursuing a biology Ph.D. at the University of Queensland in Brisbane, Australia. One of her creations, “Go Extinct!,” a board game in which players explore evolutionary trees, is already in a second printing. To fashion this dual career in science and game design, Marcy had to think beyond the standard routes in science training and take the initiative to make her own way.

NORMILE 2016

Dennis Normile, *Epidemic Of Fear*. [science 351 \(2016\), 1022–1023](#).

A bumper crop of thyroid abnormalities in Fukushima children, including cancer, has perplexed scientists and alarmed locals.

To see what comparable screening would find in a population not exposed to radiation, Takamura’s team used the Fukushima survey protocol to examine 4365 children aged 3 to 18 from three widely separated prefectures. They found similar numbers of nodules and cysts and one cancer, for a prevalence of 230 cancers per million people, as they reported in Scientific Reports in March 2015. Other Japanese studies reported thyroid cancer rates of 300, 350, and even 1300 per million. “The prevalence of thyroid cancer detected by advanced ultrasound techniques in other areas of Japan does not differ meaningfully from that in Fukushima Prefecture,” Takamura wrote in Epidemiology.

Williams says the evidence suggests that thyroid growths among children are far more common than previously thought and must be considered normal. The Fukushima survey, he says, promises a “better understanding of the origins and development” of such growths and may lead to better treatment protocols.

SPRINGER 2016

Stevan A. Springer, Flavio Schwarz, Tasha K. Altheide, Nissi M. Varki, Ajit Varki & Pascal Gagneux, *Maintenance of postreproductive cognitive capacity by inclusive fitness, Reply to Liu and Jiang*. [PNAS 113 \(2016\), E1591–E1592](#).

The APOE4 allele (which Liu and Jiang do not address) may protect the cognitive development of young individuals under diarrhea stress or starvation, but increases the risk of Alzheimer’s decades later. Such examples will allow us to examine the balance of early and late selective forces, and shed light on the ability of inclusive fitness to shape altruistic phenotypes and reshape lifehistory trade-offs, and the evolution of senescence, realizing that social, cultural, and linguistic features of humans influence the ability of elders to direct their care, but require cognitive capacity.

Anthropologie

DE VYNCK 2016

Jan C. de Vynck et al., *Return rates from intertidal foraging from Blombos Cave to Pinnacle Point, Understanding early human economies*. *Journal of Human Evolution* **92** (2016), 101–115.

JHumEvo092-0101-Supplement.docx

Jan C. de Vynck, Robert Anderson, Chloe Atwater, Richard M. Cowling, Erich C. Fisher, Curtis W. Marean, Robert S. Walker & Kim Hill

The south coast of South Africa provides the earliest evidence for Middle Stone Age (MSA) coastal resource exploitation by early *Homo sapiens*. In coastal archaeology worldwide, there has been a debate over the general productivity of intertidal foraging, leading to studies that directly measure productivity in some regions, but there have been no such studies in South Africa. Here we present energetic return rate estimates for intertidal foraging along the southern coast of South Africa from Blombos Cave to Pinnacle Point. Foraging experiments were conducted with Khoi-San descendants of the region, and hourly caloric return rates for experienced foragers were measured on 41 days near low tide and through three seasons over two study years. On-site return rates varied as a function of sex, tidal level, marine habitat type and weather conditions. The overall energetic return rate from the entire sample (1492 kcal/h) equals or exceeds intertidal returns reported from other hunter-gatherer studies, as well as measured return rates for activities as diverse as hunting mammals and plant collecting. Returns are projected to be exceptionally high (≈ 3400 kcal/h for men, ≈ 1900 kcal/h for women) under the best combination of conditions. However, because of the monthly tidal cycle, high return foraging is only possible for about 10 days per month and for only 2–3 h on those days. These experiments suggest that while intertidal resources are attractive, women and children could not have subsisted independently, nor met all their protein-lipid needs from marine resources alone, and would have required substantial additional energy and nutrients from plant gathering and/or from males contributing game.

Keywords: Shellfish | Intertidal foraging | South Africa | Human evolution

Regardless of high returns near spring tide dates, our experiments suggest that marine intertidal foraging on neap tide days would provide very low energetic returns. Hence, the foraging economy in this area must have included important other sources of energy and protein lipid nutrients, even when human population densities were low.

Anthropologie Jungpaläolithikum

POSTH 2016

Cosimo Posth et al., *Pleistocene Mitochondrial Genomes Suggest a Single Major Dispersal of Non-Africans and a Late Glacial Population Turnover in Europe*. *Current Biology* **26** (2016), 827–833.

How modern humans dispersed into Eurasia and Australasia, including the number of separate expansions and their timings, is highly debated [1, 2]. Two categories of models are proposed for the dispersal of non-Africans: (1) single dispersal, i.e., a single major diffusion of modern humans across Eurasia and Australasia [3–5]; and (2) multiple dispersal, i.e., additional earlier population expansions that may have contributed to the genetic diversity of some present-day humans outside of Africa [6–9]. Many variants of these models focus largely on Asia and Australasia, neglecting human dispersal into Europe, thus explaining only a subset

of the entire colonization process outside of Africa [3–5, 8, 9]. The genetic diversity of the first modern humans who spread into Europe during the Late Pleistocene and the impact of subsequent climatic events on their demography are largely unknown. Here we analyze 55 complete human mitochondrial genomes (mtDNAs) of hunter-gatherers spanning 35,000 years of European prehistory. We unexpectedly find mtDNA lineage M in individuals prior to the Last Glacial Maximum (LGM). This lineage is absent in contemporary Europeans, although it is found at high frequency in modern Asians, Australasians, and Native Americans. Dating the most recent common ancestor of each of the modern non-African mtDNA clades reveals their single, late, and rapid dispersal less than 55,000 years ago. Demographic modeling not only indicates an LGM genetic bottleneck, but also provides surprising evidence of a major population turnover in Europe around 14,500 years ago during the Late Glacial, a period of climatic instability at the end of the Pleistocene.

Cosimo Posth, Gabriel Renaud, Alissa Mittnik, Dorothée G. Drucker, H el ene Rougier, Christophe Cupillard, Fr ed erique Valentin, Corinne Thevenet, Anja Furtw angler, Christoph Wi ing, Michael Francken, Maria Malina, Michael Bolus, Martina Lari, Elena Gigli, Giulia Capecchi, Isabelle Crevecoeur, C edric Beauval, Damien Flas, Mietje Germonpr e, Johannes van der Plicht, Richard Cottiaux, Bernard G ely, Annamaria Ronchitelli, Kurt Wehrberger, Dan Grigorescu, Jiř  Svoboda, Patrick Semal, David Caramelli, Herv eBocherens, Katerina Harvati, Nicholas J. Conard, Wolfgang Haak, Adam Powell, & Johannes Krause

Highlights

- Newly generated pre-Neolithic European mtDNA genomes triple the number available
- Clade M found for the first time in Europe, prior to the Last Glacial Maximum bottleneck
- Rapid single dispersal of all non-Africans less than 55,000 years ago
- Previously unknown major population shift in Europe at the end of the Pleistocene

Datierung

H OFLMAYER 2016

Felix H oflmayer, Jens Kamlah, H el ene Sader, Michael W. Dee, Walter Kutschera, Eva Maria Wild & Simone Riehl, *New Evidence for Middle Bronze Age Chronology and Synchronisms in the Levant, Radiocarbon Dates from Tell el-Burak, Tell el-Dab’a, and Tel Ifshar Compared*. [Bulletin of the American Schools of Oriental Research](#) **375** (2016), 53–76.

We report a set of radiocarbon data for the Middle Bronze Age monumental building at Tell el-Burak in Lebanon, dating it to the 19th century b.c., and summarize the relevant archaeological information concerning the stratigraphy and dating of the building. The radiocarbon data from Tell el-Burak is consistent with the high Middle Bronze Age radiocarbon dates recently reported for Tell el-Dab’a in the eastern Nile Delta and with radiocarbon dates for Middle Bronze Age Tel Ifshar in the coastal plain of Israel. A comparison of these radiocarbon dates questions the current (low) Middle Bronze Age absolute chronology of the southern Levant, which is largely based on the stratigraphic sequence of Tell el-Dab’a. Due to open questions in the archaeological dating of Tell el-Dab’a, we argue against using a single site as a main reference for dating the Middle Bronze Age in the Levant and argue for adopting a comprehensive and independent approach based on archaeological, historical, and radiocarbon evidence from all relevant sites.

Keywords: Tell el-Burak | Middle Bronze Age chronology | radiocarbon dating | Tell el-Dab'a | Tel Ifshar | southern Levant

MATSUMURA 2010

Kimiyoshi Matsumura & Takayuki Omori, *The Iron Age Chronology in Anatolia Reconsidered, The Results of the Excavations at Kaman-Kalehöyük*. In: PAOLO MATTHIAE, FRANCES PINNOCK, LORENZO NIGRO & NICOLÒ MARCHETTI (Hrsg.), *Proc. 6th Int. Congress Archaeology of the Ancient Near East 5 May – 10 May 2009, “Sapienza”, Università di Roma, Vol. I. (Wiesbaden 2010), 443–455.*

The Iron Age absolute Chronology in Anatolia relies entirely on the dating of the burned layer at Yassý höyük, Gordion. Recently a new dating of this layer was proposed and according to this the layer should be dated ca. 100 years older than before. But from the traditional relative chronological point of view there is a disagreement about this new dating. To cast new light on this problem, we are attempting to construct a new Iron Age Chronology, that is independent from the dating at Gordion, at Kaman-Kalehöyük by combination of stratigraphic analysis and the AMS (Accelerator Mass Spectrometry) ¹⁴C dating method.

SCHWALBE 1982

L. A. Schwalbe & R. N. Rogers, *Physics and Chemistry of the Shroud Of Turin, A Summary of the 1978 Investigation*. *Analytica Chimica Acta* **135** (1982), 3–49.

This report reviews and correlates results obtained from tests conducted on the Shroud of Turin during the October 1978 investigation. Several image formation hypotheses are addressed. Although no single theory adequately accounts for all of the observations, it is concluded that the image is the result of some cellulose oxidation-dehydration reaction rather than an applied pigment. The application or transfer mechanism of the image onto the cloth is still not known. Because many proposed mechanisms of image formation strongly depend upon historical considerations, a determination of the age of the Shroud by radiocarbon dating is necessary for further hypothesis testing. Available data from the “blood” areas are considered and the results show these to be blood stains.

Kultur

SHENNAN 1999

Stephen Shennan, *Cost, benefit and value in the organization of early European copper production*. *Antiquity* **73** (1999), 352–363.

How can archaeologists evaluate the ‘cost of production’ in prehistory? Stephen Shennan explores ethnographic examples, Ricardo’s Law of Comparative Advantage and archaeological evidence from the eastern Alps in a stimulating discussion of Bronze Age production and exchange.

Keywords: Alps | copper | mining | exchange | central Europe | Bronze Age | Ricardo’s law

As we saw above, one of the consequences of large-scale intensive exchange systems which operate on Ricardian principles, such as the Grassfields system or what is being suggested here for the Central European Early Bronze Age, is that they lead to economic growth. That is to say, total regional production is higher

than it would have been if individual communities had remained self-sufficient; thus, again as we noted above, a system producing overall benefits also produces individual benefits, albeit not equal ones. A consequence of such growth tends to be population increase (for the mechanisms of this, see Wood 1998), which indeed seems to be one of the most striking characteristics of the Central European Early Bronze Age (Shennan in press).

Methoden Mittelpaläolithikum

GILMORE 2016

Cassandra C. Gilmore & Timothy D. Weaver, *Comparative perspective on antemortem tooth loss in Neandertals*. [Journal of Human Evolution](#) **92** (2016), 80–90.

[JHumEvo092-0080-Supplement.pdf](#)

Neandertal specimens with severe antemortem (before death) tooth loss (AMTL) are sometimes interpreted as evidence for human-like behaviors in Neandertals, such as conspecific care or cooking, although it is uncertain whether AMTL frequencies in Neandertals are similar to those in modern humans and exceed those in non-human primates. This study characterizes AMTL (all tooth types) in Neandertals relative to recent human hunter-gatherers and several non-human primate taxa using binomial-normal regression models fit in a Bayesian framework to a sample of 25 Neandertals, 310 recent human huntergatherers, 61 chimpanzees, 38 orangutans, and 75 baboons. The probability that a tooth is lost antemortem is modeled to depend on tooth class, taxon, and estimated age at death.

Neandertals have odds of AMTL above orangutans and baboons, similar to or somewhat lower than chimpanzees, and below recent humans, if we assume a human-like rate of senescence; or intermediate between chimpanzees and recent humans, if we assume a faster rate of senescence. These findings suggest that Neandertals can only be considered to have frequencies of AMTL above non-human primates if they had more rapid life histories than modern humans. Either Neandertals are not human-like in their life history or their frequency of AMTL.

These interpretations are complicated, however, by the substantial inter-population variation in AMTL among recent humans, with some populations having odds of AMTL as low as in non-human primates. These results, together with theoretical considerations, suggest that only high frequencies of AMTL are diagnostic of behavior. Consequently, the behavioral implications of low frequencies of AMTL, such as those found in Neandertals, are ambiguous. Low frequencies in Neandertals could be because they had a low risk of AMTL rather than because they had high mortality from AMTL relative to an average modern human of similar age.

Keywords: Behavioral evolution | Conspecific care | Cooking | Longevity

The results presented here show that recent humans have higher odds of AMTL on average than chimpanzees, orangutans, baboons, and Neandertals. Neandertals have levels of AMTL most similar to those of chimpanzees, although the estimates depend, in part, upon the estimated ages of the Neandertal individuals. Neandertals could have higher levels of AMTL than non-human primates if they are assumed to have faster life histories than modern humans, but even so, the average Neandertal estimates fall at the lower end of human variation. However, the substantial interpopulational variation observed among recent human populations suggests that if AMTL-related mortality is behaviorally mediated, as has been proposed, only high frequencies of AMTL would be diagnostic of behavior. Consequently, the behavioral implications of low frequencies, such as those found

for Neandertals, are ambiguous. Estimates of Neandertal AMTL experience are not different enough from non-human primates that they require behavioral explanations, but neither do these results exclude modern human behaviors from the Neandertal repertoire.