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## NOTICES

### PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, do please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.

If there is a journal you feel I should be tracking on a regular basis, do let me know.

And if you have any other ideas for extending the “EAORC experience”, please contact me.

### SCIENCE NEWS – Artificial intelligence is evolving all by itself

Artificial intelligence (AI) is evolving—literally. Researchers have created software that borrows concepts from Darwinian evolution, including “survival of the fittest,” to build AI programs that improve generation after generation without human input. The program replicated decades of AI research in a matter of days, and its designers think that one day, it could discover new approaches to AI.

[https://www.sciencemag.org/news/2020/04/artificial-intelligence-evolving-all-itself?utm\\_campaign=news\\_daily\\_2020-04-13&et rid=17774313&et cid=3284539](https://www.sciencemag.org/news/2020/04/artificial-intelligence-evolving-all-itself?utm_campaign=news_daily_2020-04-13&et rid=17774313&et cid=3284539)

### BREAKING SCIENCE – Neolithic East African Pastoralist Societies Consumed Milk

New research published in the Proceedings of the National Academy of Sciences provides the first evidence for diet and subsistence practices of Neolithic East African pastoralists. The development of pastoralism is known to have transformed human diets and societies in grasslands worldwide.

[http://feedproxy.google.com/~r/BreakingScienceNews/~3/iAL3o9VgThQ/neolithic-east-african-pastoralist-societies-milk-08336.html?utm\\_source=feedburner&utm\\_medium=email](http://feedproxy.google.com/~r/BreakingScienceNews/~3/iAL3o9VgThQ/neolithic-east-african-pastoralist-societies-milk-08336.html?utm_source=feedburner&utm_medium=email)

### SCIENCE DAILY – Flaw in Rubber Hand Illusion raise tough questions for psychology

A world-famous psychological experiment used to help explain the brain's understanding of the body, as well as scores of clinical disorders, has been dismissed as not fit-for-purpose in a new article.

{Peter Lush says, “Few contemporary scientists seem to be aware of the extent to which imaginative suggestion can drive experience, and so haven't been able to control for suggestion effects in the Rubber Hand Illusion”. But I thought the whole point of the illusion WAS suggestion effects. If you control for them, you are removing the illusion, and all you have left is a rubber hand.}

<https://www.sciencedaily.com/releases/2020/04/200410162432.htm>

### SCIENCE DAILY – How expectations influence learning

During learning, the brain is a prediction engine that continually makes theories about our environment and accurately registers whether an assumption is true or not. A team of neuroscientists has shown that expectation during these predictions affects the activity of various brain networks.

<https://www.sciencedaily.com/releases/2020/04/200415110441.htm>

### SCIENCE DAILY – Papua New Guinea highland research redates Neolithic period

A new report on the emergence of agriculture in highland Papua New Guinea shows advancements often associated with a later Neolithic period occurred about 1,000 years' earlier than previously thought.

<https://www.sciencedaily.com/releases/2020/04/200417103140.htm>

### NATURE BRIEFING – Nature to join open-access Plan S

Scientists will soon be able to publish open-access papers in Nature. The journal's publisher, Springer Nature, says it is committed to joining the bold open-access initiative known as Plan S, pending discussion of further technical details. The publisher will offer a route to publishing open access in Nature and most Nature-branded journals from January 2021 — though we don't yet know what it will cost.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=5681e552bf&e=1db4b9a19b>

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## ACADEMIA.EDU – The origin of symbolic behavior of Middle Palaeolithic humans

*Quaternary International* 326-327 (2014) 398-405

### JAN MICHAL BURDUKIEWICZ – The origin of symbolic behavior of Middle Palaeolithic humans: Recent controversies

One of the most controversial problems of the Middle Palaeolithic research is the origin of symbolic behavior and who was responsible: only populations of anatomically modern humans (*Homo sapiens* in Africa) or also populations of Neandertals in Western Eurasia? According to the current evidence, there are two opposite concepts. The first one assumes that use of complex stone and bone technology, burying their dead, and making of art objects as well as personal ornaments originated with anatomically modern humans. The second one supports a view that the Neandertals developed their culture in a similar way, convergent or in various contacts with the societies of early *Homo sapiens*. Their technological equipment enabled them to enter and colonize new areas in northern latitudes, which was impossible without developed knowledge about fire usage, shelter building, and adequate clothing. Neandertals made efficient tools, including composite tools made of various raw materials. In addition, the social relations of Neandertals exemplified an altruistic approach to others. According to the current knowledge, the origin of symbolic behavior cannot be linked only with anatomically modern humans or any isolated Middle Paleolithic population. It appeared much earlier, in the Lower Palaeolithic. It is necessary to remember that archaeological data for remote time are still rare and more evidence is needed to test concepts.

[https://www.academia.edu/26985289/The\\_origin\\_of\\_symbolic\\_behavior\\_of\\_Middle\\_Palaeolithic\\_humans\\_Recent\\_controversies?email\\_work\\_card=view-paper](https://www.academia.edu/26985289/The_origin_of_symbolic_behavior_of_Middle_Palaeolithic_humans_Recent_controversies?email_work_card=view-paper)

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## SAPIENS – Will Asia Rewrite Human History?

Politics, geography, and tradition have long focused archaeological attention on the evolution of *Homo sapiens* in Europe and Africa. Now, new research is challenging old ideas by showing that early human migrations unfolded across Asia far earlier than previously known.

<https://sapiens.us11.list-manage.com/track/click?u=80f6cf678900daf984bf763b7&id=ceb6094d9a&e=dc0eff6180>

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## PUBLICATIONS

### Frontiers in Psychology

#### PAPERS

### EDMUND T. ROLLS – Neural Computations Underlying Phenomenal Consciousness: A Higher Order Syntactic Thought Theory

Problems are raised with the global workspace hypothesis of consciousness, for example about exactly how global the workspace needs to be for consciousness to suddenly be present. Problems are also raised with Carruthers's (2019) version that excludes conceptual (categorical or discrete) representations, and in which phenomenal consciousness can be reduced to physical processes, with instead a different levels of explanation approach to the relation between the brain and the mind advocated. A different theory of phenomenal consciousness is described, in which there is a particular computational system involved in which Higher Order Syntactic Thoughts are used to perform credit assignment on first order thoughts of multiple step plans to correct them by manipulating symbols in a syntactic type of working memory. This provides a good evolutionary reason for the evolution of this kind of computational module, with which, it is proposed, phenomenal consciousness is associated. Some advantages of this HOST approach to phenomenal consciousness are then described with reference not only to the global workspace approach, but also to Higher Order Thought (HOT) theories. It is hypothesized that the HOST system which requires the ability to manipulate first order symbols in working memory might utilize parts of the prefrontal cortex implicated in working memory, and especially the left inferior frontal gyrus, which is involved in language and probably syntactical processing. Overall, the approach advocated is to identify the computations that are linked to consciousness, and to analyze the neural bases of those computations.

[https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00655/full?utm\\_source=F-AAE&utm\\_medium=EMLF&utm\\_campaign=MRK\\_1302118\\_69\\_Psycho\\_20200416\\_arts\\_A](https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00655/full?utm_source=F-AAE&utm_medium=EMLF&utm_campaign=MRK_1302118_69_Psycho_20200416_arts_A)

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## Language and Cognition

#### PAPERS

### MICHELE I. FEIST & SARAH E. DUFFY – On the path of time: temporal motion in typological perspective

The Moving Ego and Moving Time metaphors have provided a fertile testing ground for the psychological reality of space-time metaphors. Despite this, little research has targeted the linguistic patterns used in these two mappings. To fill that gap, the current study uses corpus data to examine the use of motion verbs in two typologically different languages, English and Spanish. We first investigated the relative frequency of the two metaphors. Whereas we observed no difference in frequency in the Spanish data, our findings indicated that in English, Moving Time expressions are more prevalent than are Moving Ego expressions. Second, we focused on the patterns of use of the verbs themselves, asking whether well-known typological patterns in the expression of spatial motion would carry over to temporal motion. Specifically, we examined the frequencies of temporal uses of path and manner verbs in English and in Spanish. Contra the patterns observed in space, we observed a preference for path verbs in both languages, with this preference more strongly evident in English than in Spanish. In

addition, our findings revealed greater use of motion verbs in temporal expressions in Spanish compared to English. These findings begin to outline constraints on the aspects of spatial conceptualization that are likely to be reused in the conceptualization of time.

<https://www.cambridge.org/core/journals/language-and-cognition/article/on-the-path-of-time-temporal-motion-in-typological-perspective/88F308AD38A22B61F1DCCF042AA9D662>

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## Nature

### PAPERS

#### **RAINER GRÜN et al with CHRIS STRINGER – Dating the skull from Broken Hill, Zambia, and its position in human evolution**

The cranium from Broken Hill (Kabwe) was recovered from cave deposits in 1921, during metal ore mining in what is now Zambia. It is one of the best-preserved skulls of a fossil hominin, and was initially designated as the type specimen of *Homo rhodesiensis*, but recently it has often been included in the taxon *Homo heidelbergensis*. However, the original site has since been completely quarried away, and—although the cranium is often estimated to be around 500 thousand years old—its unsystematic recovery impedes its accurate dating and placement in human evolution. Here we carried out analyses directly on the skull and found a best age estimate of  $299 \pm 25$  thousand years (mean  $\pm 2\sigma$ ). The result suggests that later Middle Pleistocene Africa contained multiple contemporaneous hominin lineages (that is, *Homo sapiens*, *H. heidelbergensis*/*H. rhodesiensis* and *Homo naledi*), similar to Eurasia, where *Homo neanderthalensis*, the Denisovans, *Homo floresiensis*, *Homo luzonensis* and perhaps also *Homo heidelbergensis* and *Homo erectus* were found contemporaneously. The age estimate also raises further questions about the mode of evolution of *H. sapiens* in Africa and whether *H. heidelbergensis*/*H. rhodesiensis* was a direct ancestor of our species.

<https://www.nature.com/articles/s41586-020-2165-4>

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## Nature Communications

### PAPERS

#### **JOHANNES LOHSE & ISRAEL WAICHMAN – The effects of contemporaneous peer punishment on cooperation with the future**

We use a laboratory version of the intergenerational goods game (IGG) to investigate whether peer punishment facilitates the successful provision of multigenerational public goods. In our experiment, groups (generations) decide sequentially about the provision of a multigenerational public good through the voluntary contributions of their members. Successful provision requires that contributions meet a threshold and exclusively benefits members of future generations. Provision costs are borne only by the current generation. We compare a baseline condition without a punishment institution to a treatment condition where peer punishment can be inflicted exclusively on members of the same generation but not on members of past or future generations. We find that without punishment the likelihood of reaching the contribution threshold is low and that making punishment available within a generation is partially successful in sustaining cooperation in a succession of multiple generations.

<https://www.nature.com/articles/s41467-020-15661-7>

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## Nature Human Behaviour

### PAPERS

#### **SCOTT CLAESSENS et al with QUENTIN D. ATKINSON – The dual evolutionary foundations of political ideology**

Research over the last fifty years has suggested that political attitudes and values around the globe are shaped by two ideological dimensions, often referred to as economic and social conservatism. However, it remains unclear why this ideological structure exists. Here we highlight the striking concordance between these dual dimensions of ideology and independent convergent evidence for two key shifts in the evolution of human group living. First, humans began to cooperate more and across wider interdependent networks. Second, humans became more group-minded, conforming to social norms in culturally marked groups and punishing norm-violators. We propose that fitness trade-offs and behavioural plasticity have maintained functional variation in willingness to cooperate and conform within modern human groups, naturally giving rise to the two dimensions of political ideology. Supported by evidence from across the behavioural sciences, this evolutionary framework provides insight into the biological and cultural basis of political ideology.

<https://www.nature.com/articles/s41562-020-0850-9>

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#### **RYAN M. STOLIER, ERIC HEHMAN & JONATHAN B. FREEMAN – Trait knowledge forms a common structure across social cognition**

Researchers have noted the resemblance across core models of social cognition, in which trait inferences centre on others' intentions and abilities (for example, warmth, competence). Current views posit that this common 'trait space' originates from the adaptive utility of the dimensions, predicting a relatively fixed and universal architecture. In contrast, we hypothesize that perceivers learn conceptual knowledge of how traits correlate, which shapes trait inferences similarly across domains (for example, faces, person knowledge, stereotypes), from which a common trait space emerges. Here we show substantial overlap between the structures of perceivers' conceptual and social perceptual trait spaces, across perceptual

domains (studies 1–4) and that conceptual associations directly shape trait space (study 5). Furthermore, we find evidence that conceptual trait space is learned from social perception and actual personality structure (studies 6 and 7). Our findings suggest conceptual trait associations serve as a cornerstone in social perception, providing broad implications for the study of social behaviour.

<https://www.nature.com/articles/s41562-019-0800-6>

### **KELSEY LUCCA, RACHEL HORTON & JESSICA A. SOMMERVILLE – Infants rationally decide when and how to deploy effort**

The ability to decide whether, when and how to try is central to human learning. We investigated whether infants can make rational inferences about when and how to try on a novel problem-solving task. After learning from an adult that the task was either easy, difficult or impossible to solve, infants varied in whether, when and how they tried based on the type of social evidence that they received and on their own ongoing experience with the task. Specifically, infants formed expectations about the task, their own ability to solve the task and the experimenter's ability to solve the task, in light of accumulating evidence across time that impacted their time spent trying, trying force, affect, and help-seeking behaviour on the task. Thus, infants flexibly integrate social input and first-hand experience in a dynamic fashion to engage in adaptive persistence.

<https://www.nature.com/articles/s41562-019-0814-0>

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## Nature Scientific Reports

### PAPERS

### **GIOVANNI FEDERICO & MARIA A. BRANDIMONTE – Looking to recognise: the pre-eminence of semantic over sensorimotor processing in human tool use**

Alongside language and bipedal locomotion, tool use is a characterizing activity of human beings. Current theories in the field embrace two contrasting approaches: “manipulation-based” theories, which are anchored in the embodied-cognition view, explain tool use as deriving from past sensorimotor experiences, whereas “reasoning-based” theories suggest that people reason about object properties to solve everyday-life problems. Here, we present results from two eye-tracking experiments in which we manipulated the visuo-perceptual context (thematically consistent vs. inconsistent object-tool pairs) and the goal of the task (free observation or looking to recognise). We found that participants exhibited reversed tools' visual-exploration patterns, focusing on the tool's manipulation area under thematically consistent conditions and on its functional area under thematically inconsistent conditions. Crucially, looking at the tools with the aim of recognising them produced longer fixations on the tools' functional areas irrespective of thematic consistency. In addition, tools (but not objects) were recognised faster in the thematically consistent conditions. These results strongly support reasoning-based theories of tool use, as they indicate that people primarily process semantic rather than sensorimotor information to interact with the environment in an agent's consistent-with-goal way. Such a pre-eminence of semantic processing challenges the mainstream embodied-cognition view of human tool use.

<https://www.nature.com/articles/s41598-020-63045-0>

### **B. L. HARDY et al – Direct evidence of Neanderthal fibre technology and its cognitive and behavioral implications**

Neanderthals are often considered as less technologically advanced than modern humans. However, we typically only find faunal remains or stone tools at Paleolithic sites. Perishable materials, comprising the vast majority of material culture items, are typically missing. Individual twisted fibres on stone tools from the Abri du Maras led to the hypothesis of Neanderthal string production in the past, but conclusive evidence was lacking. Here we show direct evidence of fibre technology in the form of a 3-ply cord fragment made from inner bark fibres on a stone tool recovered in situ from the same site. Twisted fibres provide the basis for clothing, rope, bags, nets, mats, boats, etc. which, once discovered, would have become an indispensable part of daily life. Understanding and use of twisted fibres implies the use of complex multi-component technology as well as a mathematical understanding of pairs, sets, and numbers. Added to recent evidence of birch bark tar, art, and shell beads, the idea that Neanderthals were cognitively inferior to modern humans is becoming increasingly untenable.

<https://www.nature.com/articles/s41598-020-61839-w>

### **AUORE VAL et al – Human exploitation of nocturnal felines at Diepkloof Rock Shelter provides further evidence for symbolic behaviours during the Middle Stone Age**

Within the animal kingdom, carnivores occupied a unique place in prehistoric societies. At times predators or competitors for resources and shelters, anthropogenic traces of their exploitation, often for non-nutritional purposes, permeate the archaeological record. Scarce but spectacular depictions in Palaeolithic art confirm peoples' fascination with carnivores. In contrast with the European record, research on hominin/carnivore interactions in Africa has primarily revolved around the hunting or scavenging debate amongst early hominins. As such, the available information on the role of carnivores in Anatomically Modern Humans' economic and cultural systems is limited. Here, we illustrate a particular relationship between humans and carnivores during the MIS5-4 Still Bay and Howiesons Poort techno-complexes at Diepkloof Rock Shelter, South Africa. The recovery of numerous felid remains, including cut-marked phalanges, tarsals and metapodials, constitutes direct evidence for carnivore skinning and, presumably, pelt use in the southern African Middle Stone Age. Carnivore exploitation at

the site seems to have focused specifically on nocturnal, solitary and dangerous felines. The lines of evidence presented here suggest the capture and fur use of those felines in the context of highly codified and symbolically loaded cultural traditions. <https://www.nature.com/articles/s41598-020-63250-x>

### **DAVORKA RADOVČIĆ et al – Surface analysis of an eagle talon from Krapina**

The Krapina white-tailed eagle talons represent a kind of jewelry worn by Krapina Neandertals some 130,000 years ago. New inspection of one Krapina talon (386.1) revealed a fiber, sealed by a thin silicate coating, adhering to the surface within a wide cut mark, as well as concentrated traces of occasional spots of red and yellow pigment and some black stains. We analyzed the fiber and small portions of pigmented areas by non-invasive, infrared synchrotron beam. Different areas were targeted, revealing the protein nature of the fiber, identified as of animal origin. Targeted areas revealed intra- and inter-strand aggregation indicating the fiber to be collagen losing its original triple  $\alpha$ -helix conformation, further confirming the diagenetic decay of the original collagen structure and the antiquity of the fiber. It is possible that the fiber is a remnant of the leather or sinew string binding the talons together. Spectroscopic analysis of the pigments in two isolated areas confirmed two types of ochre and that the dark spots are charcoal remnants. Applying novel non-invasive technologies provides new possibilities to further test the hypothesis of using prehistoric objects for symbolic purposes.

<https://www.nature.com/articles/s41598-020-62938-4>

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## **PLoS Biology**

### **PAPERS**

#### **ANGÉLIQUE VOLFART et al – Neurophysiological evidence for crossmodal (face-name) person-identity representation in the human left ventral temporal cortex**

Putting a name to a face is a highly common activity in our daily life that greatly enriches social interactions. Although this specific person–identity association becomes automatic with learning, it remains difficult and can easily be disrupted in normal circumstances or neurological conditions. To shed light on the neural basis of this important and yet poorly understood association between different input modalities in the human brain, we designed a crossmodal frequency-tagging paradigm coupled to brain activity recording via scalp and intracerebral electroencephalography. In Experiment 1, 12 participants were presented with variable pictures of faces and written names of a single famous identity at a 4-Hz frequency rate while performing an orthogonal task. Every 7 items, another famous identity appeared, either as a face or a name. Robust electrophysiological responses were found exactly at the frequency of identity change (i.e.,  $4 \text{ Hz} / 7 = 0.571 \text{ Hz}$ ), suggesting a crossmodal neural response to person identity. In Experiment 2 with twenty participants, two control conditions with periodic changes of identity for faces or names only were added to estimate the contribution of unimodal neural activity to the putative crossmodal face-name responses. About 30% of the response occurring at the frequency of crossmodal identity change over the left occipito-temporal cortex could not be accounted for by the linear sum of unimodal responses. Finally, intracerebral recordings in the left ventral anterior temporal lobe (ATL) in 7 epileptic patients tested with this paradigm revealed a small number of “pure” crossmodal responses, i.e., with no response to changes of identity for faces or names only. Altogether, these observations provide evidence for integration of verbal and nonverbal person identity-specific information in the human brain, highlighting the contribution of the left ventral ATL in the automatic retrieval of face-name identity associations.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000659>

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## **PLoS One**

### **PAPERS**

#### **ROGIER LANDMAN et al – Close-range vocal interaction in the common marmoset (*Callithrix jacchus*)**

Vocal communication in animals often involves taking turns vocalizing. In humans, turn-taking is a fundamental rule in conversation. Among non-human primates, the common marmoset is known to engage in antiphonal calling using phee calls and trill calls. Calls of the trill type are the most common, yet difficult to study, because they are not very loud and uttered in conditions when animals are in close proximity to one another. Here we recorded trill calls in captive pair-housed marmosets using wearable microphones, while the animals were together with their partner or separated, but within trill call range. Trills were exchanged mainly with the partner and not with other animals in the room. Animals placed outside the home cage increased their trill call rate and uttered more trills in response to their partner compared to strangers. The fundamental frequency,  $F_0$ , of trills increased when animals were placed outside the cage. Our results indicate that trill calls can be monitored using wearable audio equipment and that minor changes in social context affect trill call interactions and spectral properties of trill calls.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0227392>

#### **ANDRÉ S. PEREIRA et al – The multidimensionality of female mandrill sociality—A dynamic multiplex network approach**

The structure and dynamics of primate social groups are shaped by the social relationships of its members. These relationships are based on different types of interactions and vary in relation to the identity of the interactants and over time. Social network analysis tools represent a powerful and comprehensive method to characterise social interactions and

recent methodological advances now allow the study of the multidimensionality of sociality via multilayer networks that incorporate multiple types of interactions. Here, we use a multidimensional network approach to investigate the multidimensionality of sociality of females in a captive group of mandrills. We constructed two multiplex networks based on agonistic, proximity and grooming interactions of 6–7 mature females to analyse the multidimensionality of relationships within two independent observation periods; and three multiplex networks (one for each interaction type) to examine how relationships changed between periods. Within each period, different individuals were the most central in each layer and at the multiplex level, and different layers (i.e., interaction types) contributed non-redundant information to the multilayer structure. Across periods, relationships based on the same interaction type also contained non-redundant information. These results indicate that female mandrills engage in multidimensional and dynamic relationships, suggesting that in order to represent the full complexity of relationships, networks need to be constructed from more than a single type of interaction and across time. Our results provide evidence for the potential value of the multilayer network approach to characterise the multidimensionality of primate sociality.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0230942>

#### **TANYA O'GARRA & MATTHEW R. SISCO – The effect of anchors and social information on behaviour**

We use a 'multi-player dictator game' (MDG), with 'social information' about the monetary transfer made by a previous dictator to a recipient, to examine whether average contributions as well as the behavioural strategy adopted are affected by the first amount presented (the 'anchor') using a sequential strategy elicitation method. We find that average contributions are positively affected by the anchor. The anchor is also found to influence the behavioural strategy that individuals adopt, such that low anchors significantly increase the likelihood that players will adopt unconditional self-interested strategies, whereas high anchors increase the likelihood of adopting giving strategies. The distribution of strategies—and hence, the distribution of behavioural 'types'—is therefore affected by the initial conditions of play, lending support to the notion that behavioural strategies are context dependent.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0231203>

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## PNAS

### PAPERS

#### **MELISSA EMERY THOMPSON et al with RICHARD W. WRANGHAM – Wild chimpanzees exhibit humanlike aging of glucocorticoid regulation**

Cortisol, a key product of the stress response, has critical influences on degenerative aging in humans. In turn, cortisol production is affected by senescence of the hypothalamic–pituitary–adrenal (HPA) axis, leading to progressive dysregulation and increased cortisol exposure. These processes have been studied extensively in industrialized settings, but few comparative data are available from humans and closely related species living in natural environments, where stressors are very different. Here, we examine age-related changes in urinary cortisol in a 20-y longitudinal study of wild chimpanzees ( $n = 59$  adults) in the Kanyawara community of Kibale National Park, Uganda. We tested for three key features of HPA aging identified in many human studies: increased average levels, a blunted diurnal rhythm, and enhanced response to stressors. Using linear mixed models, we found that aging was associated with a blunting of the diurnal rhythm and a significant linear increase in cortisol, even after controlling for changes in dominance rank. These effects did not differ by sex. Aging did not increase sensitivity to energetic stress or social status. Female chimpanzees experienced their highest levels of cortisol during cycling (versus lactation), and this effect increased with age. Male chimpanzees experienced their highest levels when exposed to sexually attractive females, but this effect was diminished by age. Our results indicate that chimpanzees share some key features of HPA aging with humans. These findings suggest that impairments of HPA regulation are intrinsic to the aging process in hominids and are side effects neither of extended human life span nor of atypical environments.

<https://www.pnas.org/content/117/15/8424.abstract?etoc>

#### **LEONI GEORGIU et al with JEAN-JACQUES HUBLIN – Evidence for habitual climbing in a Pleistocene hominin in South Africa**

Bipedalism is a defining trait of the hominin lineage, associated with a transition from a more arboreal to a more terrestrial environment. While there is debate about when modern human-like bipedalism first appeared in hominins, all known South African hominins show morphological adaptations to bipedalism, suggesting that this was their predominant mode of locomotion. Here we present evidence that hominins preserved in the Sterkfontein Caves practiced two different locomotor repertoires. The trabecular structure of a proximal femur (StW 522) attributed to *Australopithecus africanus* exhibits a modern human-like bipedal locomotor pattern, while that of a geologically younger specimen (StW 311) attributed to either *Homo* sp. or *Paranthropus robustus* exhibits a pattern more similar to nonhuman apes, potentially suggesting regular bouts of both climbing and terrestrial bipedalism. Our results demonstrate distinct morphological differences, linked to behavioral differences between *Australopithecus* and later hominins in South Africa and contribute to the increasing evidence of locomotor diversity within the hominin clade.

<https://www.pnas.org/content/117/15/8416.abstract?etoc>

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## Science Advances

### PAPERS

#### **TIM T. MORRIS et al – Population phenomena inflate genetic associations of complex social traits**

Heritability, genetic correlation, and genetic associations estimated from samples of unrelated individuals are often perceived as confirmation that genotype causes the phenotype(s). However, these estimates can arise from indirect mechanisms due to population phenomena including population stratification, dynastic effects, and assortative mating. We introduce these, describe how they can bias or inflate genotype-phenotype associations, and demonstrate methods that can be used to assess their presence. Using data on educational achievement and parental socioeconomic position as an exemplar, we demonstrate that both heritability and genetic correlation may be biased estimates of the causal contribution of genotype. These results highlight the limitations of genotype-phenotype estimates obtained from samples of unrelated individuals. Use of these methods in combination with family-based designs may offer researchers greater opportunities to explore the mechanisms driving genotype-phenotype associations and identify factors underlying bias in estimates.

[https://advances.sciencemag.org/content/6/16/eaay0328?utm\\_campaign=toc\\_advances\\_2020-04-17&et rid=17774313&et cid=3290184](https://advances.sciencemag.org/content/6/16/eaay0328?utm_campaign=toc_advances_2020-04-17&et rid=17774313&et cid=3290184)

#### **YITIAN SHAO, VINCENT HAYWARD & YON VISELL – Compression of dynamic tactile information in the human hand**

A key problem in the study of the senses is to describe how sense organs extract perceptual information from the physics of the environment. We previously observed that dynamic touch elicits mechanical waves that propagate throughout the hand. Here, we show that these waves produce an efficient encoding of tactile information. The computation of an optimal encoding of thousands of naturally occurring tactile stimuli yielded a compact lexicon of primitive wave patterns that sparsely represented the entire dataset, enabling touch interactions to be classified with an accuracy exceeding 95%. The primitive tactile patterns reflected the interplay of hand anatomy with wave physics. Notably, similar patterns emerged when we applied efficient encoding criteria to spiking data from populations of simulated tactile afferents. This finding suggests that the biomechanics of the hand enables efficient perceptual processing by effecting a preneuronal compression of tactile information.

[https://advances.sciencemag.org/content/6/16/eaaz1158?utm\\_campaign=toc\\_advances\\_2020-04-17&et rid=17774313&et cid=3290184](https://advances.sciencemag.org/content/6/16/eaaz1158?utm_campaign=toc_advances_2020-04-17&et rid=17774313&et cid=3290184)

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## Trends in Cognitive Sciences

### PAPERS

#### **CECILIA HEYES et al with CHRISTOPHER D. FRITH – Knowing Ourselves Together: The Cultural Origins of Metacognition**

Metacognition – the ability to represent, monitor and control ongoing cognitive processes – helps us perform many tasks, both when acting alone and when working with others. While metacognition is adaptive, and found in other animals, we should not assume that all human forms of metacognition are gene-based adaptations. Instead, some forms may have a social origin, including the discrimination, interpretation, and broadcasting of metacognitive representations. There is evidence that each of these abilities depends on cultural learning and therefore that cultural selection might shape human metacognition. The cultural origins hypothesis is a plausible and testable alternative that directs us towards a substantial new programme of research.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(20\)30059-0?dgcid=raven\\_jbs\\_etoc\\_email](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(20)30059-0?dgcid=raven_jbs_etoc_email)

#### **ULRIKE HAHN – Argument Quality in Real World Argumentation**

The idea of resolving dispute through the exchange of arguments and reasons has been central to society for millennia. We exchange arguments as a way of getting at the truth in contexts as diverse as science, the court room, and our everyday lives. In democracies, political decisions should be negotiated through argument, not deception, or even worse, brute force. If argument is to lead to the truth or to good decisions, then some arguments must be better than others and ‘argument strength’ must have some meaningful connection with truth. Can argument strength be measured in a way that tracks an objective relationship with truth and not just mere persuasiveness? This article describes recent developments in providing such measures.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(20\)30020-6?dgcid=raven\\_jbs\\_etoc\\_email](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(20)30020-6?dgcid=raven_jbs_etoc_email)

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