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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.

### SOCIETY FOR SCIENCE – This is the oldest known string. It was made by a Neandertal

A cord fragment found clinging to a Neandertal's stone tool is evidence that our close evolutionary relatives were string makers, too, scientists say.

[http://click.societyforscience-](http://click.societyforscience-email.com/?qs=a28ce32a3abeff13e71bf972d5f9eb338e2efc22d6c557accf80fbc639a899c0283773cb88304b799a7710d836f124cec344225b67bbfa20)

[email.com/?qs=a28ce32a3abeff13e71bf972d5f9eb338e2efc22d6c557accf80fbc639a899c0283773cb88304b799a7710d836f124cec344225b67bbfa20](http://click.societyforscience-email.com/?qs=a28ce32a3abeff13e71bf972d5f9eb338e2efc22d6c557accf80fbc639a899c0283773cb88304b799a7710d836f124cec344225b67bbfa20)

### SOCIETY FOR SCIENCE – Hitchhiking oxpeckers warn endangered rhinos when people are nearby

Red-billed oxpeckers do more than just eat parasites from rhinos' backs. The birds can alert the hunted mammals to potential danger, a study finds.

[http://click.societyforscience-](http://click.societyforscience-email.com/?qs=a28ce32a3abeff13edb78a568c6075647c5cf853c7d4b09bf86411b45edee5f67cd2ee433c3bdc0272645a4e703eeac4f0ec8e729db5d68f)

[email.com/?qs=a28ce32a3abeff13edb78a568c6075647c5cf853c7d4b09bf86411b45edee5f67cd2ee433c3bdc0272645a4e703eeac4f0ec8e729db5d68f](http://click.societyforscience-email.com/?qs=a28ce32a3abeff13edb78a568c6075647c5cf853c7d4b09bf86411b45edee5f67cd2ee433c3bdc0272645a4e703eeac4f0ec8e729db5d68f)

### BREAKING SCIENCE – Neanderthals Were Capable of Making Cords

Archaeologists working at the Neanderthal site of Abri du Maras in France have discovered a 46,000-year-old cord fragment — the oldest known direct evidence of fiber technology. Neanderthals are often considered as less technologically advanced than modern humans. Archaeologists typically only find faunal remains or stone tools at Neanderthal sites.

[http://feedproxy.google.com/~r/BreakingScienceNews/~3/v5WY4ZUrGrs/neanderthal-cords-08317.html?utm\\_source=feedburner&utm\\_medium=email](http://feedproxy.google.com/~r/BreakingScienceNews/~3/v5WY4ZUrGrs/neanderthal-cords-08317.html?utm_source=feedburner&utm_medium=email)

### SCIENCE DAILY – Black rhinos eavesdrop on the alarm calls of hitchhiking oxpeckers to avoid humans

In Swahili, red-billed oxpeckers are called Askari wa kifaru, or 'the rhino's guard.' Now, an article suggests that this indigenous name rings true: red-billed oxpeckers may behave like sentinels, sounding an alarm to potential danger. By tracking wild black rhinos, researchers found that those carrying oxpeckers were far better at sensing and avoiding humans than those without the hitchhiking bird.

<https://www.sciencedaily.com/releases/2020/04/200409110524.htm>

### SCIENCE DAILY – 40,000 year old evidence that Neanderthal's wove string

Contrary to popular belief, Neanderthals were no less technologically advanced than *Homo sapiens*. Researchers have discovered the first evidence of cord making, dating back more than 40,000 years, on a flint fragment from the prehistoric site of Abri du Maras in the south of France.

<https://www.sciencedaily.com/releases/2020/04/200409110533.htm>

### SCIENCE DAILY – Aha! + Aaaah: Creative insight triggers a neural reward signal

A new neuroimaging study points to an answer of what may have driven the evolutionary development of creativity.

<https://www.sciencedaily.com/releases/2020/04/200409162315.htm>

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## ACADEMIA.EDU – Evolutionary and Demographic Changes Giving Rise to Modern Humans

Fred H. Smith and James C. M. Ahern (eds.), *The Origins of Modern Humans: Biology Reconsidered*. Wiley-Blackwell: Oxford, UK, ch11.

### RACHEL CASPARI & MILFORD H. WOLPOFF – The Process of Modern Human Origins: The Evolutionary and Demographic Changes Giving Rise to Modern Humans

The study of human phylogeny has always been contentious; for more than a century after the publication of *The Origin of Species*, reconstructions of human phylogeny often reflected current racial taxonomy (Wolpoff and Caspari, 1997a). Through the end of the nineteenth century and into the twentieth, many paleoanthropologists and paleontologists were evolutionary polygenists who essentially described human races (=subspecies) as having independently evolved from different primate species, some in ancient times and others more recently (Haeckel, 1896; Hooton, 1931; Hill, 1940; Gates, 1948). Later in the twentieth century evolutionary polygenism changed to address the independent evolution of human races (=subspecies) from a single prehuman hominid ancestor (Coon, 1962; Thoma, 1973; Rushton, 1995). Key elements shared by all variations of evolutionary polygenism include the independent evolution of human races (for so long that races acquired their humanity separately) and the tree models at their core. It was assumed that phylogeny explained human variation; the processes that accounted for the separate evolution of species also explained the evolution of “races.”

Even in its heyday evolutionary polygenism was not accepted by all paleoanthropologists (Hrdlička, 1927; Weidenreich, 1928), and after the end of the Second World War as biological races were increasingly rejected by the scientific community, prominent evolutionary schemes could no longer be based on them (at least, not without repercussions). This polarized the developing interpretations of the human fossil record and theories of human evolution. For some, the variation in the human fossil record continued to be interpreted phylogenetically, with taxa now elevated to the species level or above, a viewpoint still prominent among (but not unique to) advocates of the punctuated-equilibria theory (e.g., Groves and Mazak, 1975; Schwartz and Tattersall, 2002). For others, the taxonomy of human variation was reduced to a lower level and the null hypothesis became one of a single species lineage, with a reduced number of other species lineages recognized in the human fossil record, and very few, if more than one, in genus *Homo* (at the extreme see Wildman et al., 2003). The predominant single lineage model for *Homo* (Wolpoff et al., 1994) is explained by the hypothesis of Multiregional Evolution (Wolpoff et al., 1984).

[https://www.academia.edu/4723144/The\\_Process\\_of\\_Modern\\_Human\\_Origins\\_The\\_Evolutionary\\_and\\_Demographic\\_Changes\\_Giving\\_Rise\\_to\\_Modern\\_Humans?email\\_work\\_card=view-paper](https://www.academia.edu/4723144/The_Process_of_Modern_Human_Origins_The_Evolutionary_and_Demographic_Changes_Giving_Rise_to_Modern_Humans?email_work_card=view-paper)

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## PUBLICATIONS

### Current Biology

#### ARTICLES

#### GILBERT ROBERTS – Cooperation: How Vampire Bats Build Reciprocal Relationships

In theory, reciprocal relationships should develop gradually, to reduce the risk of helpers being exploited. In a classic case of reciprocity, vampire bats share blood with starving roost-mates. Now it transpires they share food only after first having established grooming relationships

[https://www.cell.com/current-biology/fulltext/S0960-9822\(20\)30110-X?dgcid=raven\\_jbs\\_etoc\\_email](https://www.cell.com/current-biology/fulltext/S0960-9822(20)30110-X?dgcid=raven_jbs_etoc_email)

#### PAPERS

#### GERALD G. CARTER et al – Development of New Food-Sharing Relationships In Vampire Bats

Some nonhuman animals form adaptive long-term cooperative relationships with nonkin that seem analogous in form and function to human friendship. However, it remains unclear how these bonds initially form, especially when they entail investments of time and energy. Theory suggests individuals can reduce the risk of exploitation by initially spreading out smaller cooperative investments across time or partners, then gradually escalating investments in more cooperative partnerships. Despite its intuitive appeal, this raising-the-stakes model has gained surprisingly scarce empirical support. Although human strangers do “raise the stakes” when making bids in cooperation games, there has been no clear evidence for raising the stakes during formation of social bonds in nature. Existing studies are limited to cooperative interactions with severe power asymmetries (e.g., the cleaner-client fish mutualism) or snapshots of a single behavior within established relationships (grooming in primates). Raising the stakes during relationship formation might involve escalating to more costly behaviors. For example, individuals could “test the waters” by first clustering for warmth (no cost), then conditionally grooming (low cost), and eventually providing coalitionary support (high cost). Detecting such a pattern requires introducing random strangers and measuring the emergence of natural helping behaviors that vary in costs. We performed this test by tracking the emergence of social grooming and regurgitated food donations among previously unfamiliar captive vampire bats (*Desmodus rotundus*) over 15 months. We found compelling evidence that vampire bats selectively escalate low-cost grooming before developing higher-cost food-sharing relationships.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(20\)30099-3?dgcid=raven\\_jbs\\_etoc\\_email](https://www.cell.com/current-biology/fulltext/S0960-9822(20)30099-3?dgcid=raven_jbs_etoc_email)

#### ROAN D. PLOTZ & WAYNE L. LINKLATER – Oxpeckers Help Rhinos Evade Humans

Evolutionary theory expects social, communicative species to eavesdrop most on other species’ alarm calls but also that solitary-living species benefit most from eavesdropping. Examples of solitary species responding to the alarm calls of other

species, however, are limited and unconvincing. The Swahili name for the red-billed oxpecker (*Buphagus erythrorhynchus*) is Askari wa kifarua, the rhinos' guard. Black rhino (*Diceros bicornis*) are a solitary-living, non-vocal species and are critically endangered through hunting. We searched Hluhluwe-iMfolozi Park, South Africa, for rhinoceros for 27 months with and without the aid of radio telemetry and conducted 86 experimental, unconcealed approaches to 11 rhino, without or with varying numbers of resident oxpecker. Oxpeckers enabled rhinos to evade detection by us in 40% to 50% of encounters. Alarm-calling by oxpeckers significantly improved the rate and distance that rhinos detected our approach from 23% to 100% and  $27 \pm 6$  m to  $61 \pm 4$  m, respectively. Every additional oxpecker improved detection distance by 9 m. Rhinos alerted by oxpeckers' alarm calls never re-oriented in our direction but moved to face downwind. Thus, oxpeckers' calls communicate only threat proximity, not direction, and rhinos assume the hunter is stalking from downwind. We confirm that oxpeckers guard rhinos and the importance of depredation, not sociality, in the evolution of eavesdropping. Conservationists should consider reintroducing oxpeckers to rhino populations, reinstating their anti-human sentinel.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(20\)30353-5?dgcid=raven\\_jbs\\_aip\\_email](https://www.cell.com/current-biology/fulltext/S0960-9822(20)30353-5?dgcid=raven_jbs_aip_email)

### **ANILA M. D'MELLO, JOHN D.E. GABRIELI & DEREK EVAN NEE – Evidence for Hierarchical Cognitive Control in the Human Cerebellum**

In non-habitual situations, cognitive control aligns actions with both short- and long-term goals. The capacity for cognitive control is tightly tied to the prefrontal cortex, whose expansion in humans relative to other species is thought to support our superior cognitive control. However, the posterolateral cerebellum has also expanded greatly relative to non-human primates and has an organizational structure that mirrors the prefrontal cortex. Nevertheless, cerebellar contributions to cognitive control are poorly understood. Here, we sought to explore whether a functional hierarchical processing framework, applied to the cerebellum, could elucidate cerebellar contributions to cognitive control. Using functional magnetic resonance imaging, we show that a gradient within the posterolateral cerebellum supports cognitive control with motor-adjacent cerebellar sub-regions supporting control of concrete, proximal actions and motor-distal, cerebellar sub-regions supporting abstract, future processing. This gradient was functionally hierarchical, with regions higher in the hierarchy influencing the relationship between regions lower in the hierarchy. This functional hierarchy provides the infrastructure by which context can inform current actions and prepare for future goals. Crucially, this mirrors the hierarchical organization of cognitive control within the prefrontal cortex. Based on these findings, we propose that the cerebellum contains within itself a parallel but separate hierarchical organization that, along with the prefrontal cortex, supports complex cognition.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(20\)30366-3?dgcid=raven\\_jbs\\_aip\\_email](https://www.cell.com/current-biology/fulltext/S0960-9822(20)30366-3?dgcid=raven_jbs_aip_email)

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## **Evolutionary Anthropology**

### **ARTICLES**

#### **FELIX RIEDE et al – Cultural taxonomies in the Paleolithic—Old questions, novel perspectives**

Time and time again, the systematics of Paleolithic archeology have been discussed, albeit most often in relation to specific periods or phenomena, or in difficult-to-access publications. Despite these recurring debates, however, the practice of classification and of building cultural taxonomies has changed little over the last many decades. Today, the cultural taxonomies of the Paleolithic are in crisis. Still, a robust definition of the analytical taxonomic units—cultures, industries, facies, groups—used for charting cultural and behavioral change in space and time is critical.

<https://onlinelibrary.wiley.com/doi/full/10.1002/evan.21819?campaign=woletoc>

### **PAPERS**

#### **MARYJKA B. BLASZCZYK – Primates got personality, too: Toward an integrative primatology of consistent individual differences in behavior**

In recent years, research on animal personality has exploded within the field of behavioral ecology. Consistent individual differences in behavior exist in a wide range of species, and these differences can have fitness consequences and influence several aspects of a species' ecology. In comparison to studies of other animals, however, there has been relatively little research on the behavioral ecology of primate personality. This is surprising given the large body of research within psychology and biomedicine showing that primate personality traits are heritable and linked to health and life history outcomes. In this article, I bring together theoretical perspectives on the ecology and evolution of animal personality with an integrative review of what we know about primate personality from studies conducted on captive, free-ranging, and wild primates. Incorporating frameworks that emphasize consistency in behavior into primate behavioral ecology research holds promise for improving our understanding of primate behavioral evolution.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21808?campaign=woletoc>

#### **BRIANA L. POBINER – The zooarchaeology and paleoecology of early hominin scavenging**

Questions about the timing, frequency, resource yield, and behavioral and biological implications of large animal carcass acquisition by early hominins have been a part of the “hunting-scavenging debate” for decades. This article presents a brief outline of this debate, reviews the zooarchaeological and modern ecological evidence for a possible scavenging niche among the earliest animal tissue-consuming hominins (pre-2.0 Ma), revisits some of the questions that this debate has generated, and outlines some ways to explore answers to those questions with evidence from the archaeological record.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21824?campaign=woletoc>

#### **GINA AUSTIN, REBECCA BONDÜ & BIRGIT ELSNER – Executive Function, Theory of Mind, and Conduct-Problem Symptoms In Middle Childhood**

Studies show relations between executive function (EF), Theory of Mind (ToM), and conduct-problem (CP) symptoms. However, many studies have involved cross-sectional data, small clinical samples, pre-school children, and/or did not consider potential mediation effects. The present study examined the longitudinal relations between EF, ToM abilities, and CP symptoms in a population-based sample of 1,657 children between 6 and 11 years (T1: M = 8.3 years, T2: M = 9.1 years; 51.9% girls). We assessed EF skills and ToM abilities via computerized tasks at first measurement (T1), CP symptoms were rated via parent questionnaires at T1 and approximately 1 year later (T2). Structural-equation models showed a negative relation between T1 EF and T2 CP symptoms even when controlling for attention-deficit hyperactivity disorder (ADHD) symptoms and other variables. This relation was fully mediated by T1 ToM abilities. The study shows how children's abilities to control their thoughts and behaviors and to understand others' mental states interact in the development of CP symptoms.

[https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00539/full?utm\\_source=F-AAE&utm\\_medium=EMLF&utm\\_campaign=MRK\\_1293822\\_69\\_Psycho\\_20200407\\_arts\\_A](https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00539/full?utm_source=F-AAE&utm_medium=EMLF&utm_campaign=MRK_1293822_69_Psycho_20200407_arts_A)

#### **CLAIRE BONIAL & KIMBERLY A. POLLARD – Choosing an event description: What a PropBank study reveals about the contrast between light verb constructions and counterpart synthetic verbs**

Light verb constructions (LVCs) in English and Romance languages are somewhat unique crosslinguistically because LVCs in these languages tend to have semantically similar synthetic verb counterparts (Zarco 1999): e.g. make an appearance and appear. This runs contrary to assumptions in linguistic theories that two competing forms are rarely maintained in a language unless they serve distinct purposes (e.g. Grice 1975). Why do English LVCs exist alongside counterpart synthetic verbs, especially given that synthetic verbs are arguably the more efficient form (Zipf 1949)? It has been proposed that LVCs serve an aspectual function (Prince 1972, Live 1973, Wierzbicka 1982, Tanabe 1999, Butt & Geuder 2001), as there are telic LVC counterparts (e.g. have a thought) of atelic verbs (e.g. think). This proposal has been difficult to evaluate without a large-scale resource providing a markup of both LVCs and counterpart verbs. Addressing this gap in resources, the present research describes the development of guidelines for LVC annotation in the English PropBank (Bonial & Palmer 2015). The focus of this article is the subsequent analysis of these annotations, aimed at uncovering corpus evidence of what contexts call for the use of an LVC over a synthetic verb. The corpus study shows that the general function of LVCs is not an aspectual one and provides distributional evidence that the ease and variety with which LVCs can be modified is the general motivating factor for the use of an LVC.

<https://www.cambridge.org/core/journals/journal-of-linguistics/article/choosing-an-event-description-what-a-propbank-study-reveals-about-the-contrast-between-light-verb-constructions-and-counterpart-synthetic-verbs/48D9D399264D2BE3C9AEB33A43653448>

#### **BEN AMBRIDGE, CAROLINE F. ROWLAND & ALISON GUMMERY – Teaching the unlearnable: a training study of complex yes/no questions**

A central question in language acquisition is how children master sentence types that they have seldom, if ever, heard. Here we report the findings of a pre-registered, randomised, single-blind intervention study designed to test the prediction that, for one such sentence type, complex questions (e.g., Is the crocodile who's hot eating?), children could combine schemas learned, on the basis of the input, for complex noun phrases (the [THING] who's [PROPERTY]) and simple questions (Is [THING] [ACTION]ing?) to yield a complex-question schema (Is [the [THING] who's [PROPERTY]] ACTIONing?). Children aged 4;2 to 6;8 (M = 5;6, SD = 7.7 months) were trained on simple questions (e.g., Is the bird cleaning?) and either (Experimental group, N = 61) complex noun phrases (e.g., the bird who's sad) or (Control group, N = 61) matched simple noun phrases (e.g., the sad bird). In general, the two groups did not differ on their ability to produce novel complex questions at test. However, the Experimental group did show (a) some evidence of generalising a particular complex NP schema (the [THING] who's [PROPERTY] as opposed to the [THING] that's [PROPERTY]) from training to test, (b) a lower rate of auxiliary-doubling errors (e.g., \*Is the crocodile who's hot is eating?), and (c) a greater ability to produce complex questions on the first test trial. We end by suggesting some different methods – specifically artificial language learning and syntactic priming – that could potentially be used to better test the present account.

<https://www.cambridge.org/core/journals/language-and-cognition/article/teaching-the-unlearnable-a-training-study-of-complex-yesno-questions/86D248CFD91FE304D78EDFCA5EA93AA0>

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## Mind & Language

### PAPERS

#### **DIANA MAZZARELLA & NAUSICAA POUSSCOULOUS – Pragmatics and epistemic vigilance: A developmental perspective**

Any form of overt communication, be it gestural or linguistic, involves pragmatic skills. This article investigates the social–cognitive foundations of pragmatic development from infancy to late childhood and argues that it is driven by, among other things, the emergence of the capacities to assess the communicator's competence (e.g. perceptual access, epistemic states) and honesty. We discuss the implications of this proposal and show how it sheds new light on the developmental trajectory of a series of pragmatic phenomena, with a specific focus on the development of irony comprehension.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12287?campaign=wolearlyview>

#### **FRANK JACKSON & DANIEL STOLJAR – Understanding self-ascription**

David Lewis argues that believing something is self-ascribing a property rather than holding true a proposition. But what is self-ascription? Is it some new mysterious primitive? Is Lewis saying that every belief you have is about you? Several recent authors have suggested that, in the light of these questions, Lewis's theory should be rejected, despite its enormous influence. But this neglects the fact that Lewis makes two relevant proposals about belief: one about belief de se, another about belief de re. It is the second that prompts these questions but the first that is central to his theory.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12237?campaign=woletoc>

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## Nature

### PAPERS

#### **FRIDO WELKER et al with JOSÉ MARÍA BERMÚDEZ DE CASTRO & ESKE WILLERSLEV – The dental proteome of *Homo antecessor***

The phylogenetic relationships between hominins of the Early Pleistocene epoch in Eurasia, such as *Homo antecessor*, and hominins that appear later in the fossil record during the Middle Pleistocene epoch, such as *Homo sapiens*, are highly debated. For the oldest remains, the molecular study of these relationships is hindered by the degradation of ancient DNA. However, recent research has demonstrated that the analysis of ancient proteins can address this challenge. Here we present the dental enamel proteomes of *H. antecessor* from Atapuerca (Spain) and *Homo erectus* from Dmanisi (Georgia), two key fossil assemblages that have a central role in models of Pleistocene hominin morphology, dispersal and divergence. We provide evidence that *H. antecessor* is a close sister lineage to subsequent Middle and Late Pleistocene hominins, including modern humans, Neanderthals and Denisovans. This placement implies that the modern-like face of *H. antecessor*—that is, similar to that of modern humans—may have a considerably deep ancestry in the genus *Homo*, and that the cranial morphology of Neanderthals represents a derived form. By recovering AMELY-specific peptide sequences, we also conclude that the *H. antecessor* molar fragment from Atapuerca that we analysed belonged to a male individual. Finally, these *H. antecessor* and *H. erectus* fossils preserve evidence of enamel proteome phosphorylation and proteolytic digestion that occurred in vivo during tooth formation. Our results provide important insights into the evolutionary relationships between *H. antecessor* and other hominin groups, and pave the way for future studies using enamel proteomes to investigate hominin biology across the existence of the genus *Homo*.

<https://www.nature.com/articles/s41586-020-2153-8>

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## New Scientist

### NEWS

#### **We may now know what our common ancestor with Neanderthals looked like**

Two studies of ancient humans have shed new light on the last common ancestor we share with Neanderthals. An extinct species that was once in the frame now looks unlikely to be the one. Another now seems more plausible, but it may only be related to the ancestor.

<https://www.newscientist.com/article/2239329-we-may-now-know-what-our-common-ancestor-with-neanderthals-looked-like/#ixzz6J9EnisU5>

#### **Male bottlenose dolphins synchronise their calls to attract females**

Synchronised swimming is a signature trait of bottlenose dolphins. Now, it turns out that male dolphins coordinate not only their movements but their vocalisations, too. This may mean they are working together to attract females.

<https://www.newscientist.com/article/2239312-male-bottlenose-dolphins-synchronise-their-calls-to-attract-females/#ixzz6J9F9D9jI>

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## PLoS One

### PAPERS

#### **ELLA ASSAF et al – Shaped stone balls were used for bone marrow extraction at Lower Paleolithic Qesem Cave, Israel**

The presence of shaped stone balls at early Paleolithic sites has attracted scholarly attention since the pioneering work of the Leakeys in Olduvai, Tanzania. Despite the persistent presence of these items in the archaeological record over a period of

two million years, their function is still debated. We present new results from Middle Pleistocene Qesem Cave on the use of these implements as percussion tools. Use-wear and abundant bone and fat residues found on ten shaped stone balls indicate crushing of fresh bones by thrusting percussion and provide direct evidence for the use of these items to access bone marrow of animal prey at this site. Two experiments conducted to investigate and verify functional aspects proved Qesem Cave shaped stone balls are efficient for bone processing and provide a comfortable grip and useful active areas for repeated use. Notably, the patina observed on the analyzed items precedes their use at the cave, indicating that they were collected by Qesem inhabitants, most probably from older Lower Paleolithic Acheulian sites. Thus, our results refer only to the final phases of the life of the items, and we cannot attest to their original function. As bone marrow played a central role in human nutrition in the Lower Paleolithic, and our experimental results show that the morphology and characteristics of shaped stone ball replicas are well-suited for the extraction of bone marrow, we suggest that these features might have been the reason for their collection and use at Qesem Cave. These results shed light on the function of shaped stone balls and are consistent with the significance of animal fat in the caloric intake of Middle Pleistocene humans as shown by the archeozoological evidence at Qesem Cave and possibly beyond.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0230972>

### **CORNELIA VAN SCHERPENBERG, RASHA ABDEL RAHMAN & HELLMUTH OBRIG – A novel multi-word paradigm for investigating semantic context effects in language production**

Semantic context modulates precision and speed of language production. Using different experimental designs including the Picture-Word-Interference (PWI) paradigm, it has consistently been shown that categorically related distractor words (e.g., cat) inhibit retrieval of the target picture name (dog). Here we introduce a novel variant of the PWI paradigm in which we present 8 words prior to a to be named target picture. Within this set, the number of words categorically related was varied between 3 and 5, and the picture to be named was either related or unrelated to the respective category. To disentangle interacting effects of semantic context we combined different naming paradigms manipulating the number of competitors and assessing the effect of repeated naming instances. Evaluating processing of the cohort by eye-tracking provided us with a metric of the (implicit) recognition of the semantic cohort. Results replicate the interference effect in that overall naming of pictures categorically related to the distractor set was slower compared to unrelated pictures. However, interference did not increase with increasing number of distractors. Tracking this effect across naming repetitions, we found that interference is prominent at the first naming instance of every picture only, whereby it is stable across distractor conditions, but dissipates across the experiment. Regarding eye-tracking our data show that participants fixated longer on semantically related items, indicating the identification of the lexico-semantic cohort. Our findings confirm the validity of the novel paradigm and indicate that besides interference during first exposure, repeated exposure to the semantic context may facilitate picture naming and counteract lexical interference.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0230439>

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## Proceedings of the Royal Society B

### PAPERS

### **BRONTE L. MOORE et al with STEPHANIE L. KING – Acoustic coordination by allied male dolphins in a cooperative context**

Synchronous displays are hallmarks of many animal societies, ranging from the pulsing flashes of fireflies, to military marching in humans. Such displays are known to facilitate mate attraction or signal relationship quality. Across many taxa, synchronous male displays appear to be driven by competition, while synchronous displays in humans are thought to be unique in that they serve a cooperative function. Indeed, it is well established that human synchrony promotes cooperative endeavours and increases success in joint action tasks. We examine another system in which synchrony is tightly linked to cooperative behaviour. Male bottlenose dolphins form long-lasting, multi-level, cooperative alliances in which they engage in coordinated efforts to coerce single oestrus females. Previous work has revealed the importance of motor synchrony in dolphin alliance behaviour. Here, we demonstrate that allied dolphins also engage in acoustic coordination whereby males will actively match the tempo and, in some cases, synchronize the production of their threat vocalization when coercing females. This finding demonstrates that male dolphins are capable of acoustic coordination in a cooperative context and, moreover, suggests that both motor and acoustic coordination are features of coalitionary behaviour that are not limited to humans.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2019.2944>

### **GABRIELE VALENTINI et al – Division of labour promotes the spread of information in colony emigrations by the ant *Temnothorax rugatulus***

The fitness of group-living animals often depends on how well members share information needed for collective decision-making. Theoretical studies have shown that collective choices can emerge in a homogeneous group of individuals following identical rules, but real animals show much evidence for heterogeneity in the degree and nature of their contribution to group decisions. In social insects, for example, the transmission and processing of information is influenced by a well-organized division of labour. Studies that accurately quantify how this behavioural heterogeneity affects the spread of information among group members are still lacking. In this paper, we look at nest choices during colony emigrations of the ant *Temnothorax rugatulus* and quantify the degree of behavioural heterogeneity of workers. Using clustering methods and

network analysis, we identify and characterize four behavioural castes of workers—primary, secondary, passive and wandering—covering distinct roles in the spread of information during an emigration. This detailed characterization of the contribution of each worker can improve models of collective decision-making in this species and promises a deeper understanding of behavioural variation at the colony level.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2019.2950>

#### **U. M. MARCINKOWSKA & I. J. HOLZLEITNER – Stability of women's facial shape throughout the menstrual cycle**

Facial characteristics can serve as a cue for judgements of multiple human traits, from maternal tendencies, overall fertility to sexual openness. In this study, we tested previously found fluctuations in facial shape throughout the menstrual cycle. With methods more robust than those formerly used (larger sample size and detailed hormonal assessments determining the timing of the ovulation), we did not find significant changes in either of the three facial measurements conducted: symmetry, averageness and sexual dimorphism (all  $F \leq 0.78$ , all partial  $\eta^2 \leq 0.01$ , all  $p \geq 0.542$ ). After narrowing the sample to cycles that had a higher probability of being ovulatory (based on daily measurements of luteinizing hormone and oestradiol), the results remained non-significant (all  $F \leq 1.20$ , all partial  $\eta^2 \leq 0.03$ , all  $p \geq 0.315$ ). Our results (i) suggest that the previously found increased facial attractiveness of women in the most fertile phase of the menstrual cycle is not driven by changes in facial shape, but might instead stem from other changes in facial appearance, such as a more attractive skin tone; and (ii) underline the importance of replication of studies with new methods.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2019.2910>

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## Science

### REVIEWS

#### **MARY ELLEN HANNIBAL – Animals have much to teach us about communication, mate preference, and social hierarchy**

Review of 'Becoming Wild: How Animal Cultures Raise Families, Create Beauty, and Achieve Peace' by Carl Safina.

<https://blogs.sciencemag.org/books/2020/04/09/becoming-wild/>

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## Trends in Cognitive Sciences

### PAPERS

#### **ARIE W. KRUGLANSKI, KATARZYNA JASKO & KARL FRISTON – All Thinking is 'Wishful' Thinking**

People often seek new information and eagerly update their beliefs. Other times they avoid information or resist revising their beliefs. What explains those different reactions? Answers to this question often frame information processing as a competition between cognition and motivation. Here, we dissolve this dichotomy by bringing together two theoretical frameworks: epistemic motivation and active inference. Despite evolving from different intellectual traditions, both frameworks attest to the indispensability of motivational considerations to the epistemic process. The imperatives that guide model construction under the epistemic motivation framework can be mapped onto key constructs in active inference. Drawing these connections offers a way of articulating social psychological constructs in terms of Bayesian computations and provides a generative testing ground for future work.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(20\)30079-6?dgcid=raven\\_jbs\\_aip\\_email](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(20)30079-6?dgcid=raven_jbs_aip_email)

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