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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.

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### SCIENCE NEWS – Humans in India may have survived supereruption 74,000 years ago

When Mount Toba erupted on the Indonesian island of Sumatra some 74,000 years ago, ash fell like snow on the Indian subcontinent, including on human toolmakers who had shaped stone flakes into sharp cutting instruments. Debate over the identity of these craftspeople—and whether a cataclysmic “volcanic winter” wiped them out—has raged for decades, because it has implications for when our species first left Africa. A new study of these people’s tools suggests they not only survived the eruption, but thrived for another 50,000 years. Others, however, say there isn’t enough evidence that the tools were made by Homo sapiens at all.

[https://www.sciencemag.org/news/2020/02/humans-india-may-have-survived-supereruption-74000-years-ago?utm\\_campaign=news\\_daily\\_2020-02-25](https://www.sciencemag.org/news/2020/02/humans-india-may-have-survived-supereruption-74000-years-ago?utm_campaign=news_daily_2020-02-25)

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### SCIENCE NEWS – This long-overlooked part of our foot may be key to walking upright

Humans are one of only a few creatures on the planet that can walk and run upright. Now, scientists have identified a key piece of anatomy that makes this possible: the long-overlooked transversal arch, which runs across the middle of the foot, just behind—and perpendicular to—our toes.

[https://www.sciencemag.org/news/2020/02/long-overlooked-part-our-foot-may-be-key-walking-upright?utm\\_campaign=news\\_daily\\_2020-02-26&et rid=17774313&et cid=3222448](https://www.sciencemag.org/news/2020/02/long-overlooked-part-our-foot-may-be-key-walking-upright?utm_campaign=news_daily_2020-02-26&et rid=17774313&et cid=3222448)

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### **SOCIETY FOR SCIENCE – The earliest known hominid interbreeding occurred 700,000 years ago**

The migration of Neandertal-Denisovan ancestors to Eurasia some 700,000 years ago heralded hookups with a resident hominid population.

<http://click.societyforscience-email.com/?qs=c70cd0fc8efb8654c75fd215a1f44aec1ae1e7609dc3b2e0b462503a50c538c29338e909a9564a67d55ea83dec7206f2d41358a169c810a1>

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### **SOCIETY FOR SCIENCE – Evolving an arch across the foot's width helped hominids walk upright**

The arch across the foot evolved at least 3.4 million years ago, possibly before the lengthwise arch. Both arches help humans to walk and run.

<http://click.societyforscience-email.com/?qs=407597a6c89aa7dcb9813d61163db240c87c9155e8eada64d94ceccea4ba7d5d58e6c1d099b79edbaaf0b50af10553c7dbddb9f73ee6eb0>

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### **SOCIETY FOR SCIENCE – South Asian toolmaking withstood the biggest volcanic blast in 2 million years**

Toolmakers continued to strike sharp-edged flakes as usual after a volcano's colossal eruption around 74,000 years ago on what's now Sumatra Island.

<http://click.societyforscience-email.com/?qs=407597a6c89aa7dce3a7efe64e0b2e44385160644b352940eea7c234955d6c9e12b0a937b0c8c12f9b32d609cf94a98271cf96d3804db54a>

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### **SCIAM NEWS – Bumblebees Solve a 17th-Century Psychological Puzzle**

By answering the question posed in Molyneux's problem, the invertebrates may have demonstrated an ability to internally represent objects.

<https://www.scientificamerican.com/article/bumblebees-solve-a-17th-century-psychological-puzzle/>

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### **SCIENCE DAILY – Human populations survived the Toba volcanic super-eruption 74,000 years ago**

Researchers present evidence that Middle Palaeolithic tool-users were present in India before and after the Toba super-eruption 74,000 years ago. The findings support arguments that Homo sapiens was present in South Asia prior to major waves of human expansion 60,000 years ago, and that populations endured climatic and environmental changes.

<https://www.sciencedaily.com/releases/2020/02/200225114416.htm>

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### **SCIENCE DAILY – Mathematician identifies new tricks for the old arch in our foot**

Walking and running subjects our feet to forces in excess of body weight. The longitudinal arch of the feet was thought to be the reason the feet do not deform under such load. However, researchers have illustrated that the transverse arch may be more important for this stiffness.

<https://www.sciencedaily.com/releases/2020/02/200226110848.htm>

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### **SCIENCE DAILY – Complex pattern of ancient immigration from Africa, Asia and Europe**

Anthropologists have found out that prehistoric migration from Africa, Asia and Europe to the Mediterranean islands took place long before the era of the Mediterranean seafaring civilizations. For their analysis they used the DNA of prehistoric individuals from Sicily, Sardinia and the Balearic Islands.

<https://www.sciencedaily.com/releases/2020/02/200226095426.htm>

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### **SCIENCE DAILY – Babies from bilingual homes switch attention faster**

Babies born into bilingual homes change the focus of their attention more quickly and more frequently than babies in homes where only one language is spoken, according to new research.

<https://www.sciencedaily.com/releases/2020/02/200225221348.htm>

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### **SCIENCE DAILY – Using a cappella to explain speech and music specialization**

Speech and music are two fundamentally human activities that are decoded in different brain hemispheres. A new study used a unique approach to reveal why this specialization exists.

<https://www.sciencedaily.com/releases/2020/02/200227144317.htm>

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### **SCIENCE DAILY – Hunter-gatherer networks accelerated human evolution**

Humans began developing a complex culture as early as the Stone Age. This development was brought about by social interactions between various groups of hunters and gatherers, a new study has now confirmed. The researchers mapped the social networks of present-day hunter-gatherers in the Philippines and simulated the discovery of a medicinal plant product.

## ACADEMIA.EDU – Material Engagement Theory and Metaplasticity in Late Pleistocene

*Quaternary International* 405:A, 8-20 (16 June 2016)

### **PATRICK ROBERTS – ‘We have never been behaviourally modern’: The implications of Material Engagement Theory and Metaplasticity for understanding the Late Pleistocene record of human behaviour**

The emergence of the human mind is a topic that has been of considerable interest to the disciplines of archaeology, cognitive archaeology and neuroscience in recent years. Most research in this regard has tended to focus on what material culture associated with early *Homo sapiens* might reflect in terms of the timing and nature of early cognitive capacities and ‘behavioural modernity’. In recent years, however, both the concept of ‘behavioural modernity’ and its passive treatment of material culture have become highly criticised. Yet, until now, there has remained some confusion as to where to turn in its absence. Recently, Lambros Malafouris outlined the theoretical frameworks of Material Engagement Theory and Metaplasticity as a means to understand the active role of material culture in the constitution of the human mind. However, despite Malafouris' application of these theoretical frameworks to a series of case studies previously associated with human cognitive ‘modernity’ (including tool manufacture, early body ornamentation, and ritual art), the Late Pleistocene archaeological community has done little to engage with this work. In this paper I outline and then apply MET and Metaplasticity to two further case studies often considered pertinent to the development of human cognition in the Late Pleistocene namely, long-distance resource sourcing and/or exchange and the development of composite technologies. In doing so, I hope to demonstrate that there is somewhere to turn in the wake of the statement ‘we have never been behaviourally modern’.

<https://www.sciencedirect.com/science/article/abs/pii/S1040618215001950?via%3Dihub>

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## ACADEMIA.EDU – Analysis of an engraved ochre fragment from the Middle Stone Age

*Journal of Archaeological Science* 39 (2012) 942-952

### **FRANCESCO D'ERRICO, RENATA GARCÍA MORENO & RIAAN F. RIFKIN – Technological, elemental and colorimetric analysis of an engraved ochre fragment from the Middle Stone Age levels of Klasies River Cave 1, South Africa**

It is generally accepted that abstract and iconographic representations are reflections of symbolic material culture. Here we describe a fragmented ochreous pebble bearing a sequence of sub-parallel linear incisions. These were produced by a lithic point and may represent one of the oldest instances of a deliberate engraving. The object was recovered from Middle Stone Age II levels of Klasies River Cave 1, South Africa, and is dated to between 100,000 and 85,000 years ago. Microscopic analysis reveals that the surface of the object was ground until smooth before being engraved with a sequence of sub-parallel lines made by single and multiple strokes. X-ray fluorescence and colorimetric analysis of the object and a sample of twelve additional ochre pieces from the same level reveals that the brown colour and Manganese-rich composition renders the engraved piece distinct. This suggests that a particular type of raw material may have been selected for engraving purposes. Although the purpose of marking this object remains uncertain, its detailed analysis adds relevant information to previously published occurrences of Middle Stone Age engraved objects and contributes to clarify their distribution through time and space.

[https://www.academia.edu/11793293/Technological\\_elemental\\_and\\_colorimetric\\_analysis\\_of\\_an\\_engraved\\_ochre\\_fragment\\_from\\_the\\_Middle\\_Stone\\_Age\\_levels\\_of\\_Klasies\\_River\\_Cave\\_1\\_South\\_Africa](https://www.academia.edu/11793293/Technological_elemental_and_colorimetric_analysis_of_an_engraved_ochre_fragment_from_the_Middle_Stone_Age_levels_of_Klasies_River_Cave_1_South_Africa)

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## ACADEMIA.EDU – Red ochre, body painting, and language

*Rudolf Botha and Chris Knight (eds.) (2009). The Cradle of Language. Oxford University Press: Oxford, UK, ch7.*

### **IAN WATTS – Red ochre, body painting, and language: Interpreting the Blombos ochre**

Whereas language leaves no material trace, collective ritual—with its formal characteristics of amplified, stereotypical, redundant display—might be expected to leave a loud archeological signature. Does the archeological record of ochre use provide such a signature, and can it indirectly contribute to our understanding of the evolution of language? I begin by highlighting the formal differences between language and ritual as modes of communication. Why, despite having opposed characteristics, is ritual widely regarded (Durkheim 1961; Rappaport 1999; Knight 1999) as establishing the social conditions for language? I then turn to the principal theories and inductive hypotheses that can be brought to bear on the interpretation of early (pre-45ky) ochre use. In addition to being the first major theorist to posit a link between language and ritual, Durkheim drew attention to the role of body-painting in grounding the collective representations central to ritual action. Subsequent theoretical perspectives can be distributed along a spectrum. At one extreme is the innatist view that biology provides sufficient constraint to account for universal features of color labeling (Berlin and Kay 1969). Although this “Basic Colour Term” (BCT) theory is biological, it is not evolutionary and generates no predictions as to when pigments should be expected to emerge. It has, however, been used to predict the order in which different pigments should appear (Hovers et al. 2003). At the other extreme is the “Female Cosmetic Coalitions” (FCC) model (Knight et al. 1995; Power and Aiello 1997; Power this volume). This sets out from premises in human behavioral ecology, prioritizing the role of reproductive strategies in driving early pigment use and generating archeologically testable predictions. Between these two poles is the qualified innatism of Deacon (1997: 119), who treats the evolution of BCTs as subject to constraints from both neurophysiology and “pragmatic constraints of human uses.” Deacon’s model specifies a ritual and a temporal context, but is indistinguishable

from BCT theory with respect to the sequence in which terms should arise. Finally, challenging the presumption that ochre was a pigment, several utilitarian hypotheses have been proposed (Klein 1995; Wadley et al. 2004; Wadley 2005a). I evaluate these perspectives and their implications in the light of a survey of early potential pigments and my research on the Blombos Cave ochre assemblage.

[https://www.academia.edu/1560509/Red\\_ochre\\_body\\_painting\\_and\\_language\\_interpreting\\_the\\_Blombos\\_ochre?auto=download](https://www.academia.edu/1560509/Red_ochre_body_painting_and_language_interpreting_the_Blombos_ochre?auto=download)

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## ACADEMIA.EDU – Art in the Making

(2014). *Leiden University: Leiden, Netherlands.*

### L. MENDOZA STRAFFON – Art in the Making: The evolutionary origins of visual art as a communication signal

The corpus of art from the Pleistocene has grown substantially in recent decades, and with it, the earliest evidence of visual art has become much older than previously anticipated, going back over 100,000 years. This new information has rendered some traditional ideas about the recent origins of visual art obsolete. Existing archaeological and evolutionary models that aim to explain the emergence of visual art should now be reassessed in light of current data. That is the aim of this book. First, it reviews the earliest examples of different forms of visual art in two important archaeological periods of human artistic innovation, the height of the African Middle Stone Age, and the European Early Upper Palaeolithic. It then takes a critical view at three influential origins-of-art models, namely, the sexual selection model, the social cohesion model, and the cognitive evolution model. Finally, it offers an alternative proposal that redefines visual art as a communication signal and, using the archaeological evidence, relates its emergence and development to the evolution of human cooperation strategies. This book will appeal to anyone interested in the debate of the origins of art and the evolution of modern human cognition, behaviour, and culture.

[https://www.academia.edu/16483799/Art\\_in\\_the\\_Making\\_The\\_evolutionary\\_origins\\_of\\_visual\\_art\\_as\\_a\\_communication\\_signal\\_Fulltext\\_email\\_work\\_card=view-paper](https://www.academia.edu/16483799/Art_in_the_Making_The_evolutionary_origins_of_visual_art_as_a_communication_signal_Fulltext_email_work_card=view-paper)

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## SAPIENS – How Did Belief Evolve?

An anthropologist traces the development of Homo sapiens' most creative and destructive force, from the making of stone tools to the rise of religions.

<https://sapiens.us11.list-manage.com/track/click?u=80f6cf678900daf984bf763b7&id=8557b3ffe1&e=dc0eff6180>

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## SAPIENS – How Eating Rat Stew Serves Hobbit Science

Researchers are feasting on giant Indonesian rodents to uncover clues about hobbit-like hominins.

<https://sapiens.us11.list-manage.com/track/click?u=80f6cf678900daf984bf763b7&id=d35c796c12&e=dc0eff6180>

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## PUBLICATIONS

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### Animal Behaviour

#### PAPERS

#### GABRIELE SCHINO, PAOLA CARDUCCI & VALENTINA TRUPPA – Attention to social stimuli is modulated by sex and exposure time in tufted capuchin monkeys

The dot probe task is an experimental procedure commonly used to study how animals (including humans) pay attention to different stimuli. In this study, we evaluated how different durations of image exposure modulate the response to this task and how male and female tufted capuchin monkeys (*Sapajus* spp.) respond to a dot probe presented immediately after different social stimuli. Subjects were shown pairs of images of unfamiliar conspecifics: a male versus a female or two individuals grooming versus two individuals not engaged in grooming (nongrooming). With shorter image exposures (250 ms) both sexes showed shorter response times to the dot probe after presentation of (i.e. biased their attention towards) images of unfamiliar males compared to females, and did not show any bias towards images of grooming compared to nongrooming. With longer image exposures (1000 ms) females biased their attention towards images of unfamiliar females, while males did not show any difference; in contrast, males biased their attention towards images of grooming compared to nongrooming, while females did not show any difference. We interpret these results as showing that responses to the dot probe task with different image exposures reflect different attentional phenomena, and that the two sexes differ in how social stimuli affect their attention.

[https://www.sciencedirect.com/science/article/abs/pii/S0003347220300051?dgcid=raven\\_sd\\_via\\_email](https://www.sciencedirect.com/science/article/abs/pii/S0003347220300051?dgcid=raven_sd_via_email)

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### BioEssays

#### PAPERS

#### ADRIANO R. LAMEIRA & JOSEP CALL – Understanding Language Evolution: Beyond Pan-Centrism

Language does not fossilize but this does not mean that the language's evolutionary timeline is lost forever. Great apes provide a window back in time on our last prelinguistic ancestor's communication and cognition. Phylogeny and cladistics implicitly conjure Pan (chimpanzees, bonobos) as a superior (often the only) model for language evolution compared with earlier diverging lineages, Gorilla and Pongo (orangutans). Here, in reviewing the literature, it is shown that Pan do not

surpass other great apes along genetic, cognitive, ecologic, or vocal traits that are putatively paramount for language onset and evolution. Instead, revived herein is the idea that only by abandoning single-species models and learning about the variation among great apes, there might be a chance to retrieve lost fragments of the evolutionary timeline of language.

<https://onlinelibrary.wiley.com/doi/pdf/10.1002/bies.201900102>

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## Biology Letters

### PAPERS

#### **LIVIO FAVARO et al – Do penguins' vocal sequences conform to linguistic laws?**

Information compression is a general principle of human language: the most frequent words are shorter in length (Zipf's Law of Brevity) and the duration of constituents decreases as the size of the linguistic construct increases (Menzerath–Altmann Law). Vocal sequences of non-human primates have been shown to conform to both these laws, suggesting information compression might be a more general principle. Here, we investigated whether display songs of the African penguin, which mediate recognition, intersexual mate choice and territorial defence, conform with these laws. Display songs are long, loud sequences combining three types of syllables. We found that the shortest type of syllable was the most frequent (with the shortest syllable being repeated stereotypically, potentially favouring signal redundancy in crowded environments). We also found that the average duration of the song's constituents was negatively correlated with the size of the song (a consequence of increasing the relative number of the shortest syllable type, rather than reducing the duration across all syllable types, thus preserving the communication of size-related information in the duration of the longest syllable type). Our results provide the first evidence for conformity to Zipf's and Menzerath–Altmann Laws in the vocal sequences of a non-primate species, indicating that these laws can coexist with selection pressures specific to the species' ecology.

<https://royalsocietypublishing.org/doi/full/10.1098/rsbl.2019.0589>

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## Current Anthropology

### PAPERS

#### **PASCAL BOYER – Why Divination? Evolved Psychology and Strategic Interaction in the Production of Truth**

Divination is found in most human societies, but there is little systematic research to explain (1) why it is persuasive or (2) why divination is required for important collective decisions in many small-scale societies. Common features of human communication and cooperation may help address both questions. A highly recurrent feature of divination is “ostensive detachment,” a demonstration that the diviners are not the authors of the statements they utter. As a consequence, people spontaneously interpret divination as less likely than other statements to be influenced by anyone's intentions or interests. This is enough to give divination an epistemic advantage compared with other sources of information, answering question 1. This advantage is all the more important in situations where a diagnosis will create differential costs and benefits, for example, determining who is responsible for someone's misfortune in a small-scale community. Divinatory statements provide a version of the situation that most participants are motivated to agree with, as it provides a focal point for efficient coordination at a minimal cost for almost all participants, which would answer question 2.

<https://www.journals.uchicago.edu/doi/abs/10.1086/706879>

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## Evolutionary Human Sciences

### PAPERS

#### **ALBERTO J. C. MICHELETTI, GRAEME D. RUXTON & ANDY GARDNER – The demography of human warfare can drive sex differences in altruism**

Recent years have seen great interest in the suggestion that between-group aggression and within-group altruism have coevolved. However, these efforts have neglected the possibility that warfare – via its impact on demography – might influence human social behaviours more widely, not just those directly connected to success in war. Moreover, the potential for sex differences in the demography of warfare to translate into sex differences in social behaviour more generally has remained unexplored. Here, we develop a kin-selection model of altruism performed by men and women for the benefit of their groupmates in a population experiencing intergroup conflict. We find that warfare can promote altruistic, helping behaviours as the additional reproductive opportunities winners obtain in defeated groups decrease harmful competition between kin. Furthermore, we find that sex can be a crucial modulator of altruism, with there being a tendency for the sex that competes more intensely with relatives to behave more altruistically and for the sex that competes more intensely with non-relatives in defeated groups to receive more altruism. In addition, there is also a tendency for the less-dispersing sex to both give and receive more altruism. We discuss implications for our understanding of observed sex differences in cooperation in human societies.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/demography-of-human-warfare-can-drive-sex-differences-in-altruism/4E775E752897C3C655C96825AE2088EB>

**INÉS ANTÓN-MÉNDEZ – The Role of Verbs In Sentence Production**

To investigate the role of verbs in sentence production, the experiment reported here employed a simple sentence elicitation technique based on separate elicitor images for the different sentence constituents: subject, verb, and verbal modifier. This permitted presenting them in different temporal configurations to see whether the time taken to start uttering the subject of a sentence was contingent on having access to information about the action that would determine verb selection. The results show that sentence onset latencies varied in relation to the presentation of the verb elicitor, suggesting that sentence processing depends crucially on having access to the information pertaining to the verb. What is more, increases in the lexical frequency of the actual verbs used significantly reduced onset latencies for the subject noun as expected if the verb lemmas have to be retrieved before the sentence can be processed. Among other things, this argues against strict linearity and in favor of hierarchical incrementality in sentence production. Additionally, the results hint at the possibility that other obligatory sentence constituents [namely, direct objects (DOs) in transitive sentences] may also have to be available before the sentence can be processed.

[https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00189/full?utm\\_source=F-AAE&utm\\_medium=EMLF&utm\\_campaign=MRK\\_1254058\\_69\\_Psycho\\_20200225\\_arts\\_A](https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00189/full?utm_source=F-AAE&utm_medium=EMLF&utm_campaign=MRK_1254058_69_Psycho_20200225_arts_A)

**DOR SHILTON et al with EVA JABLONKA – Human Social Evolution: Self-Domestication or Self-Control?**

The self-domestication hypothesis suggests that, like mammalian domesticates, humans have gone through a process of selection against aggression – a process that in the case of humans was self-induced. Here, we extend previous proposals and suggest that what underlies human social evolution is selection for socially mediated emotional control and plasticity. In the first part of the paper we highlight general features of human social evolution, which, we argue, is more similar to that of other social mammals than to that of mammalian domesticates and is therefore incompatible with the notion of human self-domestication. In the second part, we discuss the unique aspects of human evolution and propose that emotional control and social motivation in humans evolved during two major, partially overlapping stages. The first stage, which followed the emergence of mimetic communication, the beginnings of musical engagement, and mimesis-related cognition, required socially mediated emotional plasticity and was accompanied by new social emotions. The second stage followed the emergence of language, when individuals began to instruct the imagination of their interlocutors, and to rely even more extensively on emotional plasticity and culturally learned emotional control. This account further illustrates the significant differences between humans and domesticates, thus challenging the notion of human self-domestication.

[https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00134/full?utm\\_source=F-AAE&utm\\_medium=EMLF&utm\\_campaign=MRK\\_1254058\\_69\\_Psycho\\_20200225\\_arts\\_A](https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00134/full?utm_source=F-AAE&utm_medium=EMLF&utm_campaign=MRK_1254058_69_Psycho_20200225_arts_A)

**SEAN O'CONNOR – The Natural Selection of Private and Inner Speech**

This article analyzes the emergence of private and inner speech from the perspective of natural selection, arguing that social speech acts as a selection pressure for the emergence of private speech, that private speech acts as a selection pressure that leads to the emergence of inner speech, and that this view of private and inner speech may help to explain the natural selection of a variety of other traits of the human mind in an asymmetric intraspecific evolutionary arms race.

[https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00163/full?utm\\_source=F-AAE&utm\\_medium=EMLF&utm\\_campaign=MRK\\_1254058\\_69\\_Psycho\\_20200225\\_arts\\_A](https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00163/full?utm_source=F-AAE&utm_medium=EMLF&utm_campaign=MRK_1254058_69_Psycho_20200225_arts_A)

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Nature

ARTICLES

**GLEN A. LICHTWARK & LUKE A. KELLY – Ahead of the curve in the evolution of human feet**

The longitudinal arch has long been considered a crucial structure that provides stiffness to the human foot. Now the transverse arch is stepping into the spotlight, with a proposed central role in the evolution of human foot stiffness.

<https://www.nature.com/articles/s41586-020-2053-y>

PAPERS

**MADHUSUDHAN VENKADESAN et al – Stiffness of the human foot and evolution of the transverse arch**

The stiff human foot enables an efficient push-off when walking or running, and was critical for the evolution of bipedalism. The uniquely arched morphology of the human midfoot is thought to stiffen it, whereas other primates have flat feet that bend severely in the midfoot. However, the relationship between midfoot geometry and stiffness remains debated in foot biomechanics, podiatry and palaeontology. These debates centre on the medial longitudinal arch and have not considered whether stiffness is affected by the second, transverse tarsal arch of the human foot<sup>16</sup>. Here we show that the transverse tarsal arch, acting through the inter-metatarsal tissues, is responsible for more than 40% of the longitudinal stiffness of the foot. The underlying principle resembles a floppy currency note that stiffens considerably when it curls transversally. We derive a dimensionless curvature parameter that governs the stiffness contribution of the transverse tarsal arch, demonstrate its predictive power using mechanical models of the foot and find its skeletal correlate in hominin feet. In the foot, the material properties of the inter-metatarsal tissues and the mobility of the metatarsals may additionally influence

the longitudinal stiffness of the foot and thus the curvature–stiffness relationship of the transverse tarsal arch. By analysing fossils, we track the evolution of the curvature parameter among extinct hominins and show that a human-like transverse arch was a key step in the evolution of human bipedalism that predates the genus *Homo* by at least 1.5 million years. This renewed understanding of the foot may improve the clinical treatment of flatfoot disorders, the design of robotic feet and the study of foot function in locomotion.

<https://www.nature.com/articles/s41586-020-2053-y>

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## Nature Communications

### PAPERS

#### **CHRIS CLARKSON et al with MICHAEL PETRAGLIA – Human occupation of northern India spans the Toba super-eruption ~74,000 years ago**

India is located at a critical geographic crossroads for understanding the dispersal of *Homo sapiens* out of Africa and into Asia and Oceania. Here we report evidence for long-term human occupation, spanning the last ~80 thousand years, at the site of Dhaba in the Middle Son River Valley of Central India. An unchanging stone tool industry is found at Dhaba spanning the Toba eruption of ~74 ka (i.e., the Youngest Toba Tuff, YTT) bracketed between ages of  $79.6 \pm 3.2$  and  $65.2 \pm 3.1$  ka, with the introduction of microlithic technology ~48 ka. The lithic industry from Dhaba strongly resembles stone tool assemblages from the African Middle Stone Age (MSA) and Arabia, and the earliest artefacts from Australia, suggesting that it is likely the product of *Homo sapiens* as they dispersed eastward out of Africa.

<https://www.nature.com/articles/s41467-020-14668-4>

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## Nature Scientific Reports

### PAPERS

#### **PAVEL V. VOINOV et al with JOSEP CALL – Chimpanzee Coordination and Potential Communication in a Two-touchscreen Turn-taking Game**

Recent years have seen a growing interest in the question of whether and how groups of nonhuman primates coordinate their behaviors for mutual benefit. On the one hand, it has been shown that chimpanzees in the wild and in captivity can solve various coordination problems. On the other hand, evidence of communication in the context of coordination problems is scarce. Here, we investigated how pairs of chimpanzees (*Pan troglodytes*) solved a problem of dynamically coordinating their actions for achieving a joint goal. We presented five pairs of chimpanzees with a turn-taking coordination game, where the task was to send a virtual target from one computer display to another using two touch-screens. During the joint practice of the game some subjects exhibited spontaneous gesturing. To address the question whether these gestures were produced to sustain coordination, we introduced a joint test condition in which we simulated a coordination break-down scenario: subjects appeared either unwilling or unable to return the target to their partner. The frequency of gesturing was significantly higher in these test trials than in the regular trials. Our results suggest that at least in some contexts chimpanzees can exhibit communicative behaviors to sustain coordination in joint action.

<https://www.nature.com/articles/s41598-020-60307-9>

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## New Scientist

### NEWS

#### **70,000-year-old remains suggest Neanderthals buried their dead**

Neanderthals really did bury their dead. Archaeologists in Iraq have discovered a new Neanderthal skeleton that appears to have been deliberately buried around 60,000 to 70,000 years ago.

<https://institutions.newscientist.com/article/2233918-70000-year-old-remains-suggest-neanderthals-buried-their-dead/>

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## PNAS

### PAPERS

#### **DAVID A. LEOPOLD & RICHARD J. KRAUZLIS – How the brain pays attention to others' attention**

Humans and other primates have evolved skills to interpret and respond to highly complex social information. This ability is reflected in multiple cortical regions of the macaque brain devoted to the visual analysis of individuals, actions, and scenes. Beyond visual analysis, social perception engages brain areas that govern an observer's strategic examination of stimuli, for example directing attention to scene elements with the most relevant social information. Consider a monkey sneaking a cautious glance at a gathering of other monkeys. There exists information about many social variables: who is there, how they are feeling, why they are gathered, and what might happen next, to name a few. One's capacity to retrieve information is limited, and an observer must prioritize information that is of immediate relevance. How does the brain implement the selective attention to pertinent social information? An important clue comes from a recent electrophysiological study by Ramezani and Thier, who discovered that neurons in a specialized region of the macaque cerebral cortex become much more sensitive to the gaze direction of an observed face when the subject actively seeks that information.

<https://www.pnas.org/content/117/8/3901?etoc=>

ARTICLES

**ANIELLO DE SANTO & JONATHAN RAWSKI – What can formal language theory do for animal cognition studies?**

There is a long tradition of studies using formal grammars to probe differences between human language and animal song, in terms of expressive power (generative capacity). In this sense, previous literature argues that the correct upper bound to the complexity of animal song is the regular class, and that suprarregular expressive power is unnecessary to capture patterns in animal communication systems. Morita & Koda attempt to resurrect supra-regular analyses of animal pattern recognition. First, they state that claims about the regularity of animal song are not supported by empirical evidence, as supra-regular analyses of animal patterns are possible; second, they analyse gibbon data via probabilistic context-free grammars (PCFG; a notoriously suprarregular formalism), and invoke compactness of the analysis as a fundamental advantage of this approach.

<https://royalsocietypublishing.org/doi/full/10.1098/rsos.191772>

PAPERS

**T. MORITA & H. KODA – Superregular grammars do not provide additional explanatory power but allow for a compact analysis of animal song**

A pervasive belief with regard to the differences between human language and animal vocal sequences (song) is that they belong to different classes of computational complexity, with animal song belonging to regular languages, whereas human language is superregular. This argument, however, lacks empirical evidence since superregular analyses of animal song are understudied. The goal of this paper is to perform a superregular analysis of animal song, using data from gibbons as a case study, and demonstrate that a superregular analysis can be effectively used with non-human data. A key finding is that a superregular analysis does not increase explanatory power but rather provides for compact analysis: fewer grammatical rules are necessary once superregularity is allowed. This pattern is analogous to a previous computational analysis of human language, and accordingly, the null hypothesis, that human language and animal song are governed by the same type of grammatical systems, cannot be rejected.

<https://royalsocietypublishing.org/doi/abs/10.1098/rsos.190139>

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Science

ARTICLES

**DANIELA SAMMLER – Splitting speech and music**

Speech and music are human universals, and people around the world often blend them together into vocal songs. This entwinement of the speech and music cognitive domains is a challenge for the auditory cognitive system. How do listeners extract words and melodies from a single sound wave? The split is surmised to start in the signal: Speech and musical sounds are thought to differ in details of their acoustic structure and thus activate different receptive preferences of the left and right auditory cortices of the brain. On page 1043 of this issue, Albouy et al. provide evidence for the biophysical basis of the long-debated, yet still unresolved, hemispheric asymmetry of speech and music perception in humans. They show that the left and right auditory regions of the brain contribute differently to the decoding of words and melodies in songs.

<https://science.sciencemag.org/content/367/6481/974>

PAPERS

**PHILIPPE ALBOUY et al – Distinct sensitivity to spectrotemporal modulation supports brain asymmetry for speech and melody**

Does brain asymmetry for speech and music emerge from acoustical cues or from domain-specific neural networks? We selectively filtered temporal or spectral modulations in sung speech stimuli for which verbal and melodic content was crossed and balanced. Perception of speech decreased only with degradation of temporal information, whereas perception of melodies decreased only with spectral degradation. Functional magnetic resonance imaging data showed that the neural decoding of speech and melodies depends on activity patterns in left and right auditory regions, respectively. This asymmetry is supported by specific sensitivity to spectrotemporal modulation rates within each region. Finally, the effects of degradation on perception were paralleled by their effects on neural classification. Our results suggest a match between acoustical properties of communicative signals and neural specializations adapted to that purpose.

<https://science.sciencemag.org/content/367/6481/1043>

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Science Advances

PAPERS

**T. PICO, J. X. MITROVICA & A. C. MIX – Sea level fingerprinting of the Bering Strait flooding history detects the source of the Younger Dryas climate event**

During the last glacial maximum, expansive continental ice sheets lowered globally averaged sea level ~130 m, exposing a land bridge at the Bering Strait. During the subsequent deglaciation, sea level rose rapidly and ultimately flooded the Bering Strait, linking the Arctic and Pacific oceans. Observational records of the Bering Strait flooding have suggested two apparently contradictory scenarios for the timing of the reconnection. We reconcile these enigmatic datasets using gravitationally self-consistent sea-level simulations that vary the timing and geometry of ice retreat between the Laurentide and cordilleran ice

sheets to the southwest of the Bering Strait to fit observations of a two-phased flooding history. Assuming the datasets are robust, we demonstrate that their reconciliation requires a substantial melting of the cordilleran and western Laurentide ice sheet from 13,000 to 11,500 years ago. This timing provides a freshwater source for the widely debated Younger Dryas cold episode (12,900 to 11,700 years ago).

[https://advances.sciencemag.org/content/6/9/eaay2935?utm\\_campaign=toc\\_advances\\_2020-02-28&et rid=17774313&et cid=3225403](https://advances.sciencemag.org/content/6/9/eaay2935?utm_campaign=toc_advances_2020-02-28&et rid=17774313&et cid=3225403)

#### **ANDREA B. MIGLIANO et al – Hunter-gatherer multilevel sociality accelerates cumulative cultural evolution**

Although multilevel sociality is a universal feature of human social organization, its functional relevance remains unclear. Here, we investigated the effect of multilevel sociality on cumulative cultural evolution by using wireless sensing technology to map inter- and intraband social networks among Agta hunter-gatherers. By simulating the accumulation of cultural innovations over the real Agta multicamp networks, we demonstrate that multilevel sociality accelerates cultural differentiation and cumulative cultural evolution. Our results suggest that hunter-gatherer social structures [based on (i) clustering of families within camps and camps within regions, (ii) cultural transmission within kinship networks, and (iii) high intercamp mobility] may have allowed past and present hunter-gatherers to maintain cumulative cultural adaptation despite low population density, a feature that may have been critical in facilitating the global expansion of homo sapiens.

[https://advances.sciencemag.org/content/6/9/eaax5913?utm\\_campaign=toc\\_advances\\_2020-02-28&et rid=17774313&et cid=3225403](https://advances.sciencemag.org/content/6/9/eaax5913?utm_campaign=toc_advances_2020-02-28&et rid=17774313&et cid=3225403)

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