

## EAORC BULLETIN 1,047 – 9 July 2023

## CONTENTS

<b>NOTICES</b> .....	<b>2</b>
PUBLICATION ALERTS.....	2
EDITORIAL INTERJECTIONS.....	2
ACADEMIA.EDU – Recovering Forgotten European Memories .....	2
ROSLYN FRANK – Recovering Forgotten European Memories: An Essay in Cultural Linguistics .....	2
<b>NEWS</b> .....	<b>3</b>
NATURE BRIEFING – Academic systems cultivate bullying .....	3
SAPIENS – Neanderthals Traversed Vast Distances.....	3
SAPIENS – Were Neanderthals More Than Cousins to Homo Sapiens? .....	3
SAPIENS – Did Neanderthals Make Art? .....	3
SCIENCE.ORG NEWS – Did our ancient relatives practice cannibalism? .....	3
SCIENCE.ORG NEWS – The most outstanding leader of the Iberian Copper Age was a woman .....	3
THE CONVERSATION – How climate change is causing communication breakdown in the animal world .....	3
<b>PUBLICATIONS</b> .....	<b>3</b>
eLife.....	3
<b>NEWS</b> .....	3
Smart as a bee .....	3
<b>PAPERS</b> .....	3
ANDREAS BERGHÄNEL et al – Adolescent length growth spurts in bonobos and other primates: Mind the scale .....	3
AMÉLIE BEAUDET & EDWIN DE JAGER – Broca’s area, variation and taxic diversity in early Homo from Koobi Fora (Kenya).....	4
Frontiers in Artificial Intelligence.....	4
<b>PAPERS</b> .....	4
DAMION DOOLEY & TARINI NARAVANE – Ontological how and why: action and objective of planned processes in the food domain.....	4
Frontiers in Behavioral Economics.....	4
<b>PAPERS</b> .....	4
JANA HOFMEIER & LOUIS STRANG – Image concerns and the dynamics of prosocial behavior .....	4
Frontiers in Communication.....	4
<b>PAPERS</b> .....	4
CHRIS GENOVESI – Grice’s Café: coffee, cream, and metaphor comprehension .....	4
Frontiers in Ecology and Evolution .....	5
<b>PAPERS</b> .....	5
JULIA MÖRCHEN et al with CAREL P. VAN SCHAİK – Migrant orangutan males use social learning to adapt to new habitat after dispersal .....	5
Frontiers in Environmental Archaeology .....	5
<b>PAPERS</b> .....	5
CLARA BOULANGER et al – Inland fishing by Homo sapiens during early settlement of Wallacea .....	5
Heliyon.....	5
<b>PAPERS</b> .....	5
AGNÈS FALCO et al – Younger adults are more prosocial than older adults in economic decision making results from the give and take game .....	5
National Geographic .....	6
<b>ARTICLES</b> .....	6
PAULA RAMÓN – A ‘women-only’ village? The truth is much more complex—and fascinating .....	6
Nature Communications .....	6
<b>PAPERS</b> .....	6
NACE MIKUS et al – Blocking D2/D3 dopamine receptors in male participants increases volatility of beliefs when learning to trust others.....	6
Nature Communications Biology .....	6
<b>PAPERS</b> .....	6
CÉLINE AMIEZ et al with MICHAEL PETRIDES & CHET C. SHERWOOD – The relevance of the unique anatomy of the human prefrontal operculum to the emergence of speech .....	6
Nature Ecology & Evolution.....	6
<b>OBITUARIES</b> .....	6
TRAVIS RAYNE PICKERING et al – Charles Kimberlin (Bob) Brain (1931–2023) .....	6

Nature Scientific Reports.....	7
<b>PAPERS</b> .....	7
MARTA CINTAS-PEÑA et al – Amelogenin peptide analyses reveal female leadership in Copper Age Iberia (c. 2900–2650 BC) .....	7
C. DEBRACQUE et al with K. E. SLOCOMBE & Z. CLAY – Humans recognize affective cues in primate vocalizations: acoustic and phylogenetic perspectives .....	7
Neuron.....	7
<b>ARTICLES</b> .....	7
MITCHELL STEINSCHNEIDER – Toward an understanding of vowel encoding in the human auditory cortex.....	7
New Scientist .....	7
<b>NEWS</b> .....	7
Stone tools in Filipino cave were used to make ropes 40,000 years ago .....	7
Orangutans can make two sounds at once like a beatboxer .....	7
Ape family tree suggests human ancestors weren't particularly violent.....	7
The myth that men hunt while women stay at home is entirely wrong.....	8
PLoS One.....	8
<b>PAPERS</b> .....	8
NIR LOTAN & EINAT MINKOV – Social world knowledge: Modeling and applications .....	8
GINEVRA CORADESCHI et al – Anthracological study of a Chalcolithic funerary deposit from Perdigões (Alentejo, Portugal): A new analytical methodology to establish the wood burning temperature .....	8
RYOHEI UMETANI et al – Individuals reciprocate negative actions revealing negative upstream reciprocity .....	8
QIN YING MD., MUKITUL HOQUE & SANG-JOON LEE – What factors determine users' knowledge payment decisions? A mixed-method study .....	9
Proceedings of the Royal Society B.....	9
<b>PAPERS</b> .....	9
ANDREW B. BARRON, MARTA HALINA & COLIN KLEIN – Transitions in cognitive evolution .....	9
BAIHUI WU, HANZHI ZHANG & MENGHAN ZHANG – Phylogenetic insight into the origin of tones.....	9
<b>SUBSCRIBE to the EAORC Bulletin</b> .....	9
<b>UNSUBSCRIBE from the EAORC Bulletin</b> .....	9
<b>PRODUCED BY AND FOR THE EAORC EMAIL GROUP</b> .....	9

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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, 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, let me know.

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

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### EDITORIAL INTERJECTIONS

Comments in curly brackets are editorial interjections. The Editor reserves the right to be wrong.

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### ACADEMIA.EDU – Recovering Forgotten European Memories

*Roslyn Frank (2023).*

#### **ROSLYN FRANK – Recovering Forgotten European Memories: An Essay in Cultural Linguistics**

Over the past two decades increasing attention has been given to exploring the highly dynamic interactive relationship between language and culture, specifically the way in which language systems, understood as supra-individual entities, both reflect and constrain processes of identity and selfhood formation. Our notions of self, drawn from our tacit understandings of the dominant cultural conceptualizations circulating around us, are transmitted from one generation to the next through a combination of language and social practice. Together they bring about the implicit conceptual consensus that characterizes a given population of speakers at any given point in time. For example, people living in Europe today would reject out of hand the notion that humans descended from bears. Yet, as will be demonstrated, in Europe there is solid evidence for the presence of an older consensus view, an older interpretive frame which not only entertained that possibility, but also mirrored it in language use and social practice. In this investigation you will discover that words can be stubborn, that they can carry memories turning them into remarkable mnemonic devices. Even though you might think you know the meaning of curious expressions like bugbear or bogeyman, this study will take you to places you never thought you would go. You will come face to face with the older meanings and sociocultural instantiations of these and other related terms, meanings that have continued functioning, hovering there in the background just out of reach. What will be brought into view is evidence for a relatively cohesive and persistent pattern of beliefs and social practices connected to this older pan-European animist cosmology and its ursine genealogy.

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## NEWS

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### NATURE BRIEFING – Academic systems cultivate bullying

“Bullying happens when we have power differences, and, unfortunately, in academia we have unique power difference structures,” says nanomedicine researcher and anti-bullying advocate Morteza Mahmoudi. Many major decisions in an early-career researcher’s life are in the hands of one person, their supervisor or principal investigator. And often, says Mahmoudi, the academic system seems to protect the bullier. Last month, former co-workers of the ancient-DNA researcher Alan Cooper were shocked to find that he had landed a new role after being fired amid allegations of bullying. For those who find themselves the target of harassment, Mahmoudi advises to “document everything”. “Academic bullies are clever,” he says. “They barely leave a trace of their actions.”

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=a971186bc3&e=1db4b9a19b>

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### SAPIENS – Neanderthals Traversed Vast Distances

Stone tools reveal the expansive regions connecting Europe to Asia covered by our explorer cousins.

<https://www.sapiens.org/archaeology/neanderthal-dispersal/>

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### SAPIENS – Were Neanderthals More Than Cousins to Homo Sapiens?

These members of the genus Homo have long occupied two different branches on the family tree. But now that researchers think these groups interbred, scholars are giving serious consideration to whether we are the same species after all.

<https://www.sapiens.org/biology/hominin-species-neanderthals/>

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### SAPIENS – Did Neanderthals Make Art?

Experts continue to debate whether Neanderthals were painters and jewelry-makers. A paleoanthropologist explores the evidence for Neanderthal art and the sources of people’s skepticism.

<https://www.sapiens.org/archaeology/did-neanderthals-make-art/>

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### SCIENCE.ORG NEWS – Did our ancient relatives practice cannibalism?

1.45-million-year-old tool marks on a leg fossil hint at butchery.

<https://www.science.org/content/article/did-our-ancient-relatives-practice-cannibalism>

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### SCIENCE.ORG NEWS – The most outstanding leader of the Iberian Copper Age was a woman

Opulent grave suggests “Ivory Lady” played a key role in society 5000 years ago.

<https://www.science.org/content/article/most-outstanding-leader-iberian-copper-age-was-woman>

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### THE CONVERSATION – How climate change is causing communication breakdown in the animal world

Some animals are finding it harder to detect chemicals they use to communicate.

<https://theconversationuk.cmail19.com/t/r-l-ttiudkuy-khhililahh-p/>

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## PUBLICATIONS

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eLife

### NEWS

#### Smart as a bee

Honeybees use complex strategies to assess which flowers are worth exploring.

<https://elifesciences.org/digests/86176/smart-as-a-bee>

### PAPERS

#### ANDREAS BERGHÄNEL et al – Adolescent length growth spurts in bonobos and other primates: Mind the scale

Adolescent growth spurts (GS) in body length seem to be absent in non-human primates and are considered a distinct human trait. However, this distinction between present and absent length-GSs may reflect a mathematical artefact that makes it arbitrary. We first outline how scaling issues and inappropriate comparisons between length (linear) and weight (volume) growth rates result in misleading interpretations like the absence of length-GSs in non-human primates despite pronounced weight-GSs, or temporal delays between length- and weight-GSs. We then apply a scale-corrected approach to a comprehensive dataset on 258 zoo-housed bonobos that includes weight and length growth as well as several physiological markers related to growth and adolescence. We found pronounced GSs in body weight and length in both sexes. Weight and length growth trajectories corresponded with each other and with patterns of testosterone and IGFBP-3 levels, resembling

adolescent GSs in humans. We further re-interpreted published data of non-human primates, which showed that aligned GSs in weight and length exist not only in bonobos. Altogether, our results emphasize the importance of considering scaling laws when interpreting growth curves in general, and further show that pronounced, human-like adolescent length-GSs exist in bonobos and probably also many other non-human primates.

<https://elifesciences.org/reviewed-preprints/86635>

### **AMÉLIE BEAUDET & EDWIN DE JAGER – Broca's area, variation and taxic diversity in early Homo from Koobi Fora (Kenya)**

Because brain tissues rarely fossilize, pinpointing when and how modern human cerebral traits emerged in the hominin lineage is particularly challenging. The fragmentary nature of the fossil material, coupled with the difficulty of characterizing such a complex organ, have been the source of long-standing debates. Prominent among them is the uncertainties around the derived or primitive state of the brain organization in the earliest representatives of the genus Homo, more particularly in key areas such as the Broca's area. By revisiting a particularly well-preserved fossil endocast from the Turkana basin (Kenya) attributed to early Homo, here we confirm that humans in Africa had a primitive organization of the Broca's area ca. 1.9 million years ago. Additionally, our description of KNM-ER 3732 adds further information about the variation pattern of the inferior frontal gyrus in fossil hominins, with implications for early Homo taxic diversity (i.e., one or two Homo species at Koobi Fora) and the nature of the mechanisms involved in the emergence of derived cerebral traits.

<https://elifesciences.org/reviewed-preprints/89054>

## Frontiers in Artificial Intelligence

### PAPERS

#### **DAMION DOOLEY & TARINI NARAVANE – Ontological how and why: action and objective of planned processes in the food domain**

The computational modeling of food processing, aimed at various applications including industrial automation, robotics, food safety, preservation, energy conservation, and recipe nutrition estimation, has been ongoing for decades within food science research labs, industry, and regulatory agencies. The datasets from this prior work have the potential to advance the field of data-driven modeling if they can be harmonized, but this requires a standardized language as a starting point. Our primary goal is to explore two interdependent aspects of this language: the granularity of process modeling sub-parts and parameter details and the substitution of compatible inputs and processes. A delicate semantic distinction—categorizing planned processes based on the objectives they seek to fulfill vs. categorizing them by the actions or mechanisms they utilize—helps organize and facilitate this endeavor. To bring an ontological lens to process modeling, we employ the Open Biological and Biomedical Ontology Foundry ontological framework to organize two main classes of the FoodOn upper-level material processing hierarchy according to objective and mechanism, respectively. We include examples of material processing by mechanism, ranging from abstract ones such as “application of energy” down to specific classes such as “heating by microwave.” Similarly, material processing by objective—often a transformation to bring about materials with certain qualities or composition—can, for example, range from “material processing by heating threshold” to “steaming rice”.

<https://www.frontiersin.org/articles/10.3389/frai.2023.1137961/full>

## Frontiers in Behavioral Economics

### PAPERS

#### **JANA HOFMEIER & LOUIS STRANG – Image concerns and the dynamics of prosocial behavior**

Past experimental studies have documented a positive effect of observability on prosocial behavior. However, little is known about spillover effects on subsequent, unobserved prosocial actions. This paper studies the dynamic effect of observability on prosocial behavior. We hypothesize a twofold positive effect. First, in accordance with previous literature, people should act more prosocially when being observed. Second, this increased level of prosociality should motivate an ongoing elevated altruistic attitude, in accordance with the concept of altruistic capital formation. We test our predictions by running two experiments in which subjects make a first donation decision either observably or anonymously. Subsequently, all subjects face a second anonymous donation decision. In general, we observe high rates of altruistic behavior. However, we find only weak positive effects of observability on first-stage prosocial behavior and no effects on second-stage prosocial behavior.

<https://www.frontiersin.org/articles/10.3389/frbhe.2023.1220007/full>

## Frontiers in Communication

### PAPERS

#### **CHRIS GENOVESI – Grice's Café: coffee, cream, and metaphor comprehension**

Some theorists argue that Grice's account of metaphor is intended as a rational reconstruction of a more general inferential process of linguistic communication (i.e., conversational implicature). However, there is a multi-source trend which treats Grice's remarks on metaphor as unabashedly psychological. The psychologized version of Grice's view runs in serial: compute what is said; reject what is said as contextually inappropriate; run pragmatic processing to recover contextually appropriate meaning. Citing data from reaction time studies, critics reject Grice's project as psychologically implausible. The alternative

model does not rely on serial processing or input from what is said (i.e., literal meaning). I argue the serial processing model and its criticisms turn on a misunderstanding of Grice's account. My aim is not to defend Grice's account of metaphor per se, but to reinterpret auxiliary hypotheses attributed to him. I motivate two points in relation to my reinterpretation. The first point concerns the relationship between competence and performance-based models. To the second point: Several of the revised hypotheses make predictions that are largely consistent with psycho and neurolinguistic data.

<https://www.frontiersin.org/articles/10.3389/fcomm.2023.1175587/full>

## Frontiers in Ecology and Evolution

### PAPERS

#### **JULIA MÖRCHEN et al with CAREL P. VAN SCHAIK – Migrant orangutan males use social learning to adapt to new habitat after dispersal**

Dispersal has been suggested to be challenging, especially for species that heavily rely on social learning for knowledge acquisition. One of the obstacles that migrants face is learning how to cope with an unfamiliar, new habitat, which may involve learning from resident individuals. So far, only very few studies have looked at social learning in migrants after dispersal. Here we examine how migrant male orangutans use a behavior called “peering” (an indicator of observational social learning), to learn from local individuals. In total, we analyzed 4,009 daily dyadic associations with and without peering events of 77 males of the highly sociable Sumatran orangutans (*Pongo abelii*) at the Suaq population and 75 males of the less sociable Bornean orangutans (*Pongo pygmaeus wurmbii*) at the Tuanan population, covering a combined study time of 30 years. Analysis using generalized linear mixed models supported our prediction that migrant males in Suaq preferentially peered at the local adult females. However, in Tuanan, migrants peered mostly at other adult males and local immatures. Migrants’ peering rates were highest shortly after their arrival, and significantly decreased with increasing time spent in the area. Migrants in both sites peered significantly more at peering targets’ feeding on food items that are rarely eaten within the locals’ diet, than at commonly eaten ones and peered significantly more at skill-intense food items than easy-to-process ones. Further, migrants interacted significantly more with the peered-at food item after the peering event, than before, suggesting that they practice the observed behavior. Our results therefore suggest that migrant males use peering to learn new ecological knowledge after dispersal (e.g., where and what to feed on), and continue to learn complex skills even within adulthood, (e.g., how to feed on skill-intense food items). To do so, migrants selectively attend to the most knowledgeable and/or available individuals, practice the new skill afterwards and even flexibly adjust their learning, e.g., when confronted with intolerant locals or when the need for learning decreases. Together, our study provides important evidence that social learning in great apes expands towards adulthood, an ability which critically impacted also human evolution.

<https://www.frontiersin.org/articles/10.3389/fevo.2023.1158887/full>

## Frontiers in Environmental Archaeology

### PAPERS

#### **CLARA BOULANGER et al – Inland fishing by *Homo sapiens* during early settlement of Wallacea**

*Homo sapiens* were adept at fishing in a range of aquatic habitats by the time they left Africa and reached Southeast Asia ca. 73 kya. In the insular region of Wallacea, humans adapted to a significant maritime environment with sophisticated marine fishing methods and technology by at least 42 kya. However, despite a growing array of evidence suggesting an early inland terrestrial adaptation on large islands in this tropical region, there was previously no evidence of fishing in inland wetlands habitats on the depauperate islands of Wallacea. Here we present new evidence of both marine and freshwater fishing recovered from different occupation phases from the cave sites Laili (ca. 44.6–11.7 kya) and Matja Kuru 2 (ca. 40 kya to Late Holocene) on the island of Timor (Timor-Leste), located near significant riverine and lake environments respectively. This indicates that humans adapted to a wider range of aquatic habitats over time and space in Wallacea than previously thought and moved freely between inland and coastal habitats. Diversification of fishing strategies likely improved chances of survival in an island landscape with an impoverished suite of terrestrial vertebrates under changing climatic conditions.

<https://www.frontiersin.org/articles/10.3389/fearc.2023.1201351/full>

## Heliyon

### PAPERS

#### **AGNÈS FALCO et al – Younger adults are more prosocial than older adults in economic decision making results from the give and take game**

The present study was designed to investigate the disadvantageous and advantageous inequity aversion of young and older adults in situations which allowed them to maximize or minimize payoff inequalities. Given the very limited evidence regarding an actual age-related effect on inequity aversion, the purpose of this study was to examine this question using an economic game, “the Give-and-Take Game”, which is able to circumvent certain limitations of the Ultimatum Game, to evaluate inequity aversion (i.e., a same behaviour which can be induced by opposite motivations: prosocial vs. pro-self vs. altruistic orientations). In the “Give-and-Take Game”, a sum of money was randomly distributed between the participant and a dummy player. These distributions created monetary inequalities, advantageous either for the participant (to examine advantageous inequity aversion) or for the other player (to examine disadvantageous inequity aversion). Different response

options were proposed to the participants to either maximize or minimize payoff inequalities between the players. This procedure not only allowed to differentiate individual's profiles with more prosocial vs. pro-self vs. altruistic orientations, but also to examine age-related effects on these profiles. The results showed that older adults showed a more important pro-self orientation compared to their younger counterparts. They more frequently selected the options which maximized their own payoffs and were less averse to advantageous inequity compared to young adults. In contrast, young adults showed a similar level of advantageous and disadvantageous inequity aversion. Older adults focused on the economic and competitive dimension of the game, which may have motivated them to maximize their own payoffs. Conversely, young adults took into account the social dimension of the game, focusing on a fair monetary distribution.

[https://www.cell.com/heliyon/fulltext/S2405-8440\(23\)05074-0](https://www.cell.com/heliyon/fulltext/S2405-8440(23)05074-0)

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## National Geographic

### ARTICLES

#### **PAULA RAMÓN – A 'women-only' village? The truth is much more complex—and fascinating**

Noiva do Cordeiro in southeast Brazil is a community of tolerance and acceptance. Women have played a major role in shaping it.

<https://www.nationalgeographic.com/premium/article/noiva-do-cordeiro-brazil-matriarchy-feature>

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## Nature Communications

### PAPERS

#### **NACE MIKUS et al – Blocking D2/D3 dopamine receptors in male participants increases volatility of beliefs when learning to trust others**

The ability to learn about other people is crucial for human social functioning. Dopamine has been proposed to regulate the precision of beliefs, but direct behavioural evidence of this is lacking. In this study, we investigate how a high dose of the D2/D3 dopamine receptor antagonist sulpiride impacts learning about other people's prosocial attitudes in a repeated Trust game. Using a Bayesian model of belief updating, we show that in a sample of 76 male participants sulpiride increases the volatility of beliefs, which leads to higher precision weights on prediction errors. This effect is driven by participants with genetically conferred higher dopamine availability (Taq1a polymorphism) and remains even after controlling for working memory performance. Higher precision weights are reflected in higher reciprocal behaviour in the repeated Trust game but not in single-round Trust games. Our data provide evidence that the D2 receptors are pivotal in regulating prediction error-driven belief updating in a social context.

<https://www.nature.com/articles/s41467-023-39823-5>

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## Nature Communications Biology

### PAPERS

#### **CÉLINE AMIEZ et al with MICHAEL PETRIDES & CHET C. SHERWOOD – The relevance of the unique anatomy of the human prefrontal operculum to the emergence of speech**

Identifying the evolutionary origins of human speech remains a topic of intense scientific interest. Here we describe a unique feature of adult human neuroanatomy compared to chimpanzees and other primates that may provide an explanation of changes that occurred to enable the capacity for speech. That feature is the Prefrontal extent of the Frontal Operculum (PFOp) region, which is located in the ventrolateral prefrontal cortex, adjacent and ventromedial to the classical Broca's area. We also show that, in chimpanzees, individuals with the most human-like PFOp, particularly in the left hemisphere, have greater oro-facial and vocal motor control abilities. This critical discovery, when combined with recent paleontological evidence, suggests that the PFOp is a recently evolved feature of human cortical structure (perhaps limited to the genus Homo) that emerged in response to increasing selection for cognitive and motor functions evident in modern speech abilities.

<https://www.nature.com/articles/s42003-023-05066-9>

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## Nature Ecology & Evolution

### OBITUARIES

#### **TRAVIS RAYNE PICKERING et al – Charles Kimberlin (Bob) Brain (1931–2023)**

Human evolutionary studies lost a monumental figure on 6 June 2023, when Charles Kimberlin (Bob) Brain died at his home in Irene, South Africa. Bob's interest in the natural world was expansive. He worked comfortably on topics in both the biosphere and the fossil record, applying what he learned about cause-and-effect in today's world to interpret the past. In doing so, by the 1960s he had become a major figure in the development of palaeoanthropological taphonomy, a discipline that is concerned with the postmortem alteration of bones and how these changes affect our understanding of human evolution.

<https://www.nature.com/articles/s41559-023-02129-2>

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## Nature Scientific Reports

### PAPERS

#### **MARTA CINTAS-PEÑA et al – Amelogenin peptide analyses reveal female leadership in Copper Age Iberia (c. 2900–2650 BC)**

Given the absence of written records, the main source of information available to analyze gender inequalities in early complex societies is the human body itself. And yet, for decades, archaeologists have struggled with the sex estimation of poorly preserved human remains. Here we present an exceptional case study that shows how ground-breaking new scientific methods may address this problem. Through the analysis of sexually dimorphic amelogenin peptides in tooth enamel, we establish that the most socially prominent person of the Iberian Copper Age (c. 3200–2200 BC) was not male, as previously thought, but female. The analysis of this woman, discovered in 2008 at Valencina, Spain, reveals that she was a leading social figure at a time where no male attained a remotely comparable social position. Only other women buried a short time after in the Montelirio tholos, part of the same burial area, appear to have enjoyed a similarly high social position. Our results invite to reconsider established interpretations about the political role of women at the onset of early social complexity, and question traditionally held views of the past. Furthermore, this study anticipates the changes that newly developed scientific methods may bring to prehistoric archaeology and the study of human social evolution.

<https://www.nature.com/articles/s41598-023-36368-x>

#### **C. DEBRACQUE et al with K. E. SLOCOMBE & Z. CLAY – Humans recognize affective cues in primate vocalizations: acoustic and phylogenetic perspectives**

Humans are adept at extracting affective information from vocalizations of humans and other animals. However, the extent to which human recognition of vocal affective cues of other species is due to cross-taxa similarities in acoustic parameters or the phylogenetic closeness between species is currently unclear. To address this, we first analyzed acoustic variation in 96 affective vocalizations, taken from agonistic and affiliative contexts, of humans and three other primates—rhesus macaques (*Macaca mulatta*), chimpanzees and bonobos (*Pan troglodytes* and *Pan paniscus*). Acoustic analyses revealed that agonistic chimpanzee and bonobo vocalizations were similarly distant from agonistic human voices, but chimpanzee affiliative vocalizations were significantly closer to human affiliative vocalizations, than those of bonobos, indicating a potential derived vocal evolution in the bonobo lineage. Second, we asked 68 human participants to categorize and also discriminate vocalizations based on their presumed affective content. Results showed that participants reliably categorized human and chimpanzee vocalizations according to affective content, but not bonobo threat vocalizations nor any macaque vocalizations. Participants discriminated all species calls above chance level except for threat calls by bonobos and macaques. Our results highlight the importance of both phylogenetic and acoustic parameter level explanations in cross-species affective perception, drawing a more complex picture to the origin of vocal emotions.

<https://www.nature.com/articles/s41598-023-37558-3>

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## Neuron

### ARTICLES

#### **MITCHELL STEINSCHNEIDER – Toward an understanding of vowel encoding in the human auditory cortex**

In this issue of *Neuron*, Oganian et al. performed intracranial recordings in the auditory cortex of human subjects to clarify how vowels are encoded by the brain. Formant-based tuning curves demonstrated the organization of vowel encoding. The need for population codes and demonstration of speaker normalization were emphasized.

[https://www.cell.com/neuron/fulltext/S0896-6273\(23\)00462-2](https://www.cell.com/neuron/fulltext/S0896-6273(23)00462-2)

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## New Scientist

### NEWS

#### **Stone tools in Filipino cave were used to make ropes 40,000 years ago**

Marks on stone tools found in the Tabon Caves on Palawan island in the Philippines suggest they were used for processing plant fibres, allowing the creation of ropes, baskets and other items.

<https://www.newscientist.com/article/2380684-stone-tools-in-filipino-cave-were-used-to-make-ropes-40000-years-ago/>

#### **Orangutans can make two sounds at once like a beatboxer**

Two separate groups of orangutans have been observed making calls that use two sounds simultaneously. The finding could help researchers better understand the origins of human communication.

<https://www.newscientist.com/article/2379866-orangutans-can-make-two-sounds-at-once-like-a-beatboxer/>

#### **Ape family tree suggests human ancestors weren't particularly violent**

An evolutionary analysis of behavioural traits across primate species may shed light on the question of whether humans are violent by nature.

<https://www.newscientist.com/article/2379915-ape-family-tree-suggests-human-ancestors-werent-particularly-violent/>

**The myth that men hunt while women stay at home is entirely wrong**

An analysis of foraging societies from around the world has found that women hunt in the vast majority of those looked at, confirming that the idea of gender division in providing food is a myth.

<https://www.newscientist.com/article/2380011-the-myth-that-men-hunt-while-women-stay-at-home-is-entirely-wrong/>

## PLoS One

## PAPERS

**NIR LOTAN & EINAT MINKOV – Social world knowledge: Modeling and applications**

Social world knowledge is a key ingredient in effective communication and information processing by humans and machines alike. As of today, there exist many knowledge bases that represent factual world knowledge. Yet, there is no resource that is designed to capture social aspects of world knowledge. We believe that this work makes an important step towards the formulation and construction of such a resource. We introduce SocialVec, a general framework for eliciting low-dimensional entity embeddings from the social contexts in which they occur in social networks. In this framework, entities correspond to highly popular accounts which invoke general interest. We assume that entities that individual users tend to co-follow are socially related, and use this definition of social context to learn the entity embeddings. Similar to word embeddings which facilitate tasks that involve text semantics, we expect the learned social entity embeddings to benefit multiple tasks of social flavor. In this work, we elicited the social embeddings of roughly 200K entities from a sample of 1.3M Twitter users and the accounts that they follow. We employ and gauge the resulting embeddings on two tasks of social importance. First, we assess the political bias of news sources in terms of entity similarity in the social embedding space. Second, we predict the personal traits of individual Twitter users based on the social embeddings of entities that they follow. In both cases, we show advantageous or competitive performance using our approach compared with task-specific baselines. We further show that existing entity embedding schemes, which are fact-based, fail to capture social aspects of knowledge. We make the learned social entity embeddings available to the research community to support further exploration of social world knowledge and its applications.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0283700>

**GINEVRA CORADESCHI et al – Anthracological study of a Chalcolithic funerary deposit from Perdigões (Alentejo, Portugal): A new analytical methodology to establish the wood burning temperature**

Anthracological analyses of charcoal samples retrieved from Pit 16 of Perdigões (Reguengos de Monsaraz, Portugal), a secondary deposition of cremated human remains dated back to the middle of the 3rd millennium BC, enabled the identification of 7 different taxa: *Olea europaea*, *Quercus* spp. (evergreen), *Pinus pinaster*, *Fraxinus* cf. *angustifolia*, *Arbutus unedo*, *Cistus* sp. and *Fabaceae*. All taxa are characteristic of both deciduous and evergreen Mediterranean vegetation, and this data might indicate that the gathering of woods employed for the human cremation/s occurred either on site, or in its vicinity. However, considering both the large distribution of the identified taxa and data about human mobility, it is not possible to conclusively determine the origin of the wood used in the cremation(s). Chemometric analysis were carried out to estimate the absolute burning temperature of woods employed for the human cremation/s. An in-lab charcoal reference collection was created by burning sound wood samples of the three main taxa identified from Pit 16, *Olea europaea* var. *sylvestris*, *Quercus suber* (evergreen type) and *Pinus pinaster*, at temperatures between 350 and 600 °C. The archaeological charcoal samples and the charcoal reference collection were chemically characterized by using mid-infrared (MIR) spectroscopy in the 1800–400 cm<sup>-1</sup> range, and Partial Least Squares (PLS) regression method was used to build calibration models to predict the absolute combustion temperature of the archaeological woods. Results showed successful PLS forecasting of burn temperature for each taxon (significant (P < 0.05) cross validation coefficients). The anthracological and chemometric analysis evidenced differences between the taxa coming from the two stratigraphic units within the Pit, SUs 72 and 74, suggesting that they may come from two different pyres or two different depositional moments.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0287531>

**RYOHEI UMETANI et al – Individuals reciprocate negative actions revealing negative upstream reciprocity**

Indirect reciprocity is widely recognized as a mechanism for explaining cooperation and can be divided into two sub-concepts: downstream and upstream reciprocity. Downstream reciprocity is supported by reputation; if someone sees you helping someone else, the person who sees this will think higher of you, and you will be more likely to be helped. Upstream reciprocity is helping someone because you are being helped by somebody else, which often happens in everyday life and experimental games. This paper focuses on the behavior of “take” and examines negative upstream reciprocity using an upstream reciprocity framework. The term “take” is defined as “to steal rather than give resources to others.” “If something is taken from you, do you take from others?” is an important extension for indirect reciprocity research; subsequently, this paper discusses experiments conducted on whether negative upstream reciprocity is chained and what causes it. The results demonstrated differences between positive and negative upstream reciprocity. In analyzing the data of nearly 600 participants to determine the extent to which negative upstream reciprocity is observed and the causes of negative upstream reciprocity, the study found that If individual A takes resources from individual B, then B is more likely to take resources from a third-party, individual C. Notably, some causes of positive upstream reciprocity were found to have no effect or the opposite effect on negative upstream reciprocity. The results also demonstrate that the first person to take can cause a chain



reaction. This paper demonstrates the importance of the first person not taking from someone else and suggests the need to consider various behavioral options for future research on cooperation.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0288019>

### **QIN YING MD., MUKITUL HOQUE & SANG-JOON LEE – What factors determine users' knowledge payment decisions? A mixed-method study**

Methods for obtaining valuable knowledge from the vast amount of mixed-quality information have become a top priority for knowledge demanders. As an online knowledge-sharing channel, the socialized question and answer (Q&A) platform provides important support services for knowledge payment. Based on the personal psychological dimensions of users and social capital theory, this paper aims to study the behavior mechanisms of knowledge payment users and examine the significant factors affecting user payment. Our research was conducted in two steps: a qualitative study to find these factors and a research model based on a quantitative study for testing the hypothesis. The results show that the three dimensions of individual psychology are not all positively correlated with cognitive and structural capital. Our results fill a gap in the literature on the formation of social capital in the knowledge payment environment by showing how individual psychological dimensions affect cognitive and structural capital differently. Thus, this study offers effective countermeasures for knowledge producers on social Q&A platforms to better amass their social capital. This research also makes practical recommendations for social Q&A platforms to strengthen the knowledge payment model.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0287560>

## Proceedings of the Royal Society B

### PAPERS

#### **ANDREW B. BARRON, MARTA HALINA & COLIN KLEIN – Transitions in cognitive evolution**

The evolutionary history of animal cognition appears to involve a few major transitions: major changes that opened up new phylogenetic possibilities for cognition. Here, we review and contrast current transitional accounts of cognitive evolution. We discuss how an important feature of an evolutionary transition should be that it changes what is evolvable, so that the possible phenotypic spaces before and after a transition are different. We develop an account of cognitive evolution that focuses on how selection might act on the computational architecture of nervous systems. Selection for operational efficiency or robustness can drive changes in computational architecture that then make new types of cognition evolvable. We propose five major transitions in the evolution of animal nervous systems. Each of these gave rise to a different type of computational architecture that changed the evolvability of a lineage and allowed the evolution of new cognitive capacities. Transitional accounts have value in that they allow a big-picture perspective of macroevolution by focusing on changes that have had major consequences. For cognitive evolution, however, we argue it is most useful to focus on evolutionary changes to the nervous system that changed what is evolvable, rather than to focus on specific cognitive capacities.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.0671>

#### **BAIHUI WU, HANZHI ZHANG & MENGHAN ZHANG – Phylogenetic insight into the origin of tones**

The origin of tone, also known as tonogenesis, has long been a topic of great interest in language evolution and human cognition studies. Several linguistic studies of tonal languages have proposed various hypotheses that tonal origin may be related to different changes of phonological structures. However, such hypotheses have not been quantitatively tested in an evolutionary framework. Here, we conducted phylogenetic comparative analyses to assess the likelihood of different hypotheses of tonogenetic mechanisms across 106 Sino-Tibetan languages, of which approximately 70% are tonal. Our results showed that the presence of tones has a strong phylogenetic pattern and that Proto-Sino-Tibetan languages were most likely non-tonal. Our findings identified that tonal origin was strongly associated with the evolution of specific phonological structures, such as the loss of syllable-final consonants and voice quality on vowels. Furthermore, we found that tonal origin probably did not influence the diversification rates of Sino-Tibetan languages. These findings enabled us to better understand that tone arose as a compensatory mechanism for the structural organization and evolution of languages.

<https://royalsocietypublishing.org/doi/10.1098/rspb.2023.0606>

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