

## CONTENTS

<b>NOTICES</b> .....	<b>2</b>
PUBLICATION ALERTS.....	2
ACADEMIA.EDU – Paleolithic occupations of the Göllü Dağ, Central Anatolia, Turkey .....	2
STEVEN L. KUHN et al – Paleolithic occupations of the Göllü Dağ, Central Anatolia, Turkey .....	2
ACADEMIA.EDU – New Acheulean site in the lower Sundays River Valley, South Africa .....	2
MATT GEOFFREY LOTTER & KATHLEEN KUMAN – The Acheulean in South Africa, with announcement of a new site (Penhill Farm) in the lower Sundays River Valley, Eastern Cape Province, South Africa.....	2
ACADEMIA.EDU – Lower Palaeolithic Transitions in the Northern Latitudes of Eurasia .....	3
JAN MICHAL BURDUKIEWICZ – Lower Palaeolithic Transitions in the Northern Latitudes of Eurasia .....	3
<b>NEWS</b> .....	<b>3</b>
SAPIENS – The Neanderthal Throat—Did Neanderthals Speak? .....	3
SAPIENS – Why Can't Apes Talk?.....	3
SCIENCE DAILY – Whales learn songs from each other in a cultural 'deep dive' .....	3
SCIENCE DAILY – Connectivity of language areas unique in the human brain .....	3
SCIENCE DAILY – The importance of elders.....	3
SCIENCE NEWS – Medicinal knowledge vanishes as Indigenous languages die .....	3
OTHER NEWS – LSA UPDATE – Laurels for Linguists: Mufwene Elected to American Philosophical Society.....	4
<b>PUBLICATIONS</b> .....	<b>4</b>
Frontiers for Young Minds.....	4
<b>PAPERS</b> .....	4
JOYCE LYSANNE VAN ZWET et al – How Does the Brain Help us Understand Others? .....	4
Frontiers in Psychology .....	4
<b>PAPERS</b> .....	4
FREDY QUINTERO et al with KLAUS ZUBERBÜHLER – The Evolution of Food Calls: Vocal Behaviour of Sooty Mangabey in the Presence of Food .....	4
Human Nature .....	4
<b>PAPERS</b> .....	4
ANA MATEOS, GUILLERMO ZORRILLA-REVILLA & JESÚS RODRÍGUEZ – Let's Play at Digging: How Vigorous Is This Energetic Task for a Young Forager?.....	4
GABRIEL ŠAFFA, PAVEL DUDA & JAN ZRZAVÝ – Paternity Uncertainty and Parent–Offspring Conflict Explain Restrictions on Female Premarital Sex across Societies .....	5
WEN ZHOU & BRIAN HARE – The Early Expression of Blatant Dehumanization in Children and Its Association with Outgroup Negativity.....	5
Nature Communications .....	5
<b>PAPERS</b> .....	5
XUELONG YAO et al – Comparison of chromatin accessibility landscapes during early development of prefrontal cortex between rhesus macaque and human.....	5
THOMAS W. SCOTT, ALAN GRAFEN & STUART A. WEST – Multiple social encounters can eliminate Crozier's paradox and stabilise genetic kin recognition .....	5
Nature Ecology & Evolution.....	6
<b>ARTICLES</b> .....	6
GRANT SNITKER et al – A collaborative agenda for archaeology and fire science.....	6
<b>PAPERS</b> .....	6
SANDRA OLIVEIRA et al with JOHANNES KRAUSE – Ancient genomes from the last three millennia support multiple human dispersals into Wallacea .....	6
<b>COMMENTARIES</b> .....	6
CARRIE S. MONGLE et al – Modelling hominin evolution requires accurate hominin data .....	6
HANS P. PÜSCHEL et al – Reply to: Modelling hominin evolution requires accurate hominin data.....	6
Nature Humanities & Social Sciences Communications .....	6
<b>PAPERS</b> .....	6
HANNAH M. DOUGLAS et al – Embodiment of concealable stigma disclosure through dynamics of movement and language .....	6
ANTONIO MORENO-ORTIZ, CHANTAL PÉREZ-HERNÁNDEZ & MARÍA GARCÍA-GÁMEZ – The language of happiness in self-reported descriptions of happy moments: Words, concepts, and entities .....	6
ALEXANDRE BLUET et al – Impact of technical reasoning and theory of mind on cumulative technological culture: insights from a model of micro- societies .....	7

Nature Pharmacogenomics Journal .....	7
PAPERS.....	7
SIGRID HAEGGSTRÖM et al with SVANTE PÄÄBO – The clinically relevant CYP2C8*3 and CYP2C9*2 haplotype is inherited from Neandertals .....	7
Nature Schizophrenia.....	7
PAPERS.....	7
AMIR H. NIKZAD et al – Who does what to whom? graph representations of action-predication in speech relate to psychopathological dimensions of psychosis.....	7
Nature Scientific Reports.....	7
PAPERS.....	7
SHIVANI P. PATEL et al – Verbal entrainment in autism spectrum disorder and first-degree relatives .....	7
PAUL STOEWER et al – Neural network based successor representations to form cognitive maps of space and language .....	8
PLoS One.....	8
PAPERS.....	8
JEUNGMIN LEE et al – How ‘who someone is’ and ‘what they did’ influences gossiping about them .....	8
ANNE REBOUL et al – Are monkeys sensitive to informativeness: An experimental study with baboons ( <i>Papio papio</i> ) .....	8
Science Advances.....	9
PAPERS.....	9
DIRK U. WULFF & RUI MATA – On the semantic representation of risk.....	9
WILLIAM D. SNYDER, JONATHAN S. REEVES & CLAUDIO TENNIE – Early knapping techniques do not necessitate cultural transmission .....	9
Trends in Cognitive Sciences .....	9
PAPERS.....	9
LUCA BONINI et al with VITTORIO GALLESE – Mirror neurons 30 years later: implications and applications .....	9
ELIANA HADJIANDREOU & C. DARYL CAMERON – Adversity-based identities drive social change .....	9
<b>SUBSCRIBE to the EAORC Bulletin .....</b>	<b>9</b>
<b>UNSUBSCRIBE from the EAORC Bulletin .....</b>	<b>9</b>
<b>PRODUCED BY AND FOR THE EAORC EMAIL GROUP.....</b>	<b>9</b>

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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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### ACADEMIA.EDU – Paleolithic occupations of the Göllü Dağ, Central Anatolia, Turkey

*In Journal of Field Archaeology 40:5, 581-602 (2015).*

#### **STEVEN L. KUHN et al – Paleolithic occupations of the Göllü Dağ, Central Anatolia, Turkey**

Systematic archaeological surface reconnaissance of the Göllü Dağ volcanic complex from 2007 to 2012 documented more than 230 findspots with Paleolithic artifacts, ranging from isolated finds to extensive and dense scatters of artifacts. Most of the activities represented relate to exploitation of the rich obsidian resources in the region. Paleolithic artifacts are attributed mainly to the Middle Paleolithic based on the presence of Levallois technology but there is a substantial Lower Paleolithic component represented by handaxes and other large bifacial tools. Upper and Epipaleolithic sites and artifacts are scarce or absent in the survey sample. The distributions of handaxes and Levallois elements differ substantially, reflecting differences in site preservation and exposure as well as organization of prehistoric activities. Multiple variants of Levallois are represented but centripetal preferential and unipolar flake production dominate. The frequent co-occurrence of different Levallois forms suggests flexible reduction strategies. Distributions of different classes of artifact across the survey area indicate that the Middle Paleolithic occupations of Göllü Dağ were not entirely oriented toward workshop activities.

[https://www.academia.edu/15402255/Paleolithic Occupations of the Gollu Dag Central Anatolia Turkey](https://www.academia.edu/15402255/Paleolithic_Occupations_of_the_Gollu_Dag_Central_Anatolia_Turkey)

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### ACADEMIA.EDU – New Acheulean site in the lower Sundays River Valley, South Africa

*In Quaternary International 480, 43-65 (2018).*

#### **MATT GEOFFREY LOTTER & KATHLEEN KUMAN – The Acheulean in South Africa, with announcement of a new site (Penhill Farm) in the lower Sundays River Valley, Eastern Cape Province, South Africa**

Our understanding of the South African Acheulean is heavily biased towards sites located in the interior of the country, namely in the Cradle of Humankind and those located along the Vaal and Orange Rivers. Although these sites have contributed significantly to our understanding of this complex tradition, our interpretations are often limited due to issues with site and assemblage preservation, and dating. It is therefore necessary to locate, excavate, and describe new sites and assemblages from a wider range of environments so that we can understand crucial aspects of hominid behaviour within a

variety of ecological, climatological, and environmental contexts. Only two Acheulean sites have been recorded in the Eastern Cape Province (e.g., Amanzi Springs and Geelhoutboom) and of these only one has ever been excavated (Amanzi Springs). As a result there have been no well-described and dated Acheulean assemblages in this province, even though several authors have noted the presence of this material. This paper provides an introduction to a new study region in South Africa: the lower Sundays River Valley. By providing a detailed review of the South African Acheulean, we discuss the significance of this new study region in relation to our wider understanding of the South African Acheulean.

[https://www.academia.edu/36325561/The\\_Acheulean\\_in\\_South\\_Africa\\_with\\_announcement\\_of\\_a\\_new\\_site\\_Penhill\\_Farm\\_in\\_the\\_lower\\_Sundays\\_River\\_Valley\\_Eastern\\_Cape\\_Province\\_South\\_Africa](https://www.academia.edu/36325561/The_Acheulean_in_South_Africa_with_announcement_of_a_new_site_Penhill_Farm_in_the_lower_Sundays_River_Valley_Eastern_Cape_Province_South_Africa)

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### ACADEMIA.EDU – Lower Palaeolithic Transitions in the Northern Latitudes of Eurasia

*In M. Camps & P. Chauhan (eds.), Sourcebook of Paleolithic Transitions. Springer Science: Switzerland (2009).*

#### JAN MICHAL BURDUKIEWICZ – Lower Palaeolithic Transitions in the Northern Latitudes of Eurasia

The northern latitudes of Eurasia were inhabited temporarily, during favorable, warmer periods since 1 Ma ago with a considerable transition from Mode 1 (Oldowan) or Mode 2 (Acheulean) to microlithic technology and introducing new and more effective composite tools. Until recent years, archaeologists believed that such technology occurred almost exclusively during the Mesolithic and Late Palaeolithic (Mode 5), in the form of small stone inserts held by wooden or bone hafts, producing composite tools. A significant spatial, chronological and ecological variability of Lower Palaeolithic microlithic assemblages suggests that they developed as a result of the adaptation to local environment, possibly temperate and wooded, in different areas from North-Eastern China to Northern Europe, parallel to Mode 1 and Mode 2 in southern and western part of Eurasia.

[https://www.academia.edu/26985290/Lower\\_Palaeolithic\\_Transitions\\_in\\_the\\_Northern\\_Latitudes\\_of\\_Eurasia](https://www.academia.edu/26985290/Lower_Palaeolithic_Transitions_in_the_Northern_Latitudes_of_Eurasia)

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## NEWS

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### SAPIENS – The Neanderthal Throat—Did Neanderthals Speak?

The first two pages of Claire Cameron's novel *The Last Neanderthal* contain a glossary—a handful of words used by the family of Neanderthals at the center of the story. This imaginary language helps to paint a rich picture of Neanderthal life within the fictional narrative, but it makes a massive assumption about a question still much debated by researchers: Did Neanderthals speak?

<https://www.sapiens.org/column/field-trips/did-neanderthals-speak/>

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### SAPIENS – Why Can't Apes Talk?

We all know that parrots can talk. Some people may have even seen elephants, seals, or whales mimicking speech sounds. So why can't our closest primate relatives speak like us? Our new research suggests they have the right vocal anatomy but not the brainpower to use it.

<https://www.sapiens.org/language/primate-speech/>

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### SCIENCE DAILY – Whales learn songs from each other in a cultural 'deep dive'

A new study has found humpback whales can learn incredibly complex songs from whales from other regions.

<https://www.sciencedaily.com/releases/2022/07/220701102751.htm>

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### SCIENCE DAILY – Connectivity of language areas unique in the human brain

Neuroscientists have gained new insight into how our brain evolved into a language-ready brain. Compared to chimpanzee brains, the pattern of connections of language areas in our brain has expanded more than previously thought.

<https://www.sciencedaily.com/releases/2022/07/220704180914.htm>

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### SCIENCE DAILY – The importance of elders

In a new paper, researchers challenge the longstanding view that the force of natural selection in humans must decline to zero once reproduction is complete. They assert that a long post-reproductive lifespan is not just due to recent advancements in health and medicine. The secret to our success? Our grandparents.

<https://www.sciencedaily.com/releases/2022/07/220707141755.htm>

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### SCIENCE NEWS – Medicinal knowledge vanishes as Indigenous languages die

Uldarico Matapí Yucuna, 63, is often called the last shaman of the Matapi, an Indigenous group of fewer than 70 people living along the Mirití-Paraná River in the Colombian Amazon rainforest. His father was a shaman and taught him ancestral knowledge, including how to use plants to treat all kinds of maladies. But Uldarico rejects the title because instead of living with his people, for the past 30 years he has been in Bogotá documenting in writing what is left of this knowledge.

<https://www.science.org/content/article/medicinal-knowledge-vanishes-indigenous-languages-die>

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## OTHER NEWS – LSA UPDATE – Laurels for Linguists: Mufwene Elected to American Philosophical Society

Salikoko S. Mufwene (University of Chicago) was elected to the American Philosophical Society (APS) on May 25, 2022. The APS is the oldest learned society in the United States.

Mufwene is one of the leading names in the world on the emergence of creoles and on globalization and language. His current research centers on evolutionary linguistics, focusing on the phylogenetic emergence of language and how languages have been affected by colonization and worldwide globalization. Of particular focus is the effects of indigenization and speciation of European languages in the colonies.

<https://linguisticsociety.us10.list-manage.com/track/click?u=001f7eb7302f6add98bff7e46&id=6b97ef0002&e=5154d4385c>

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## PUBLICATIONS

### Frontiers for Young Minds

#### PAPERS

#### **JOYCE LYSANNE VAN ZWET et al – How Does the Brain Help us Understand Others?**

What do you think your friends are thinking when they get a compliment? How do they feel when they get a good grade at school? Thinking about other people and what they know, believe, or want is called social cognition. Certain parts of the brain are important for social cognition, and those parts work together in a network to allow us to think about others. How do we develop these social skills, starting as babies? In this article, we will introduce the parts of the brain that are important for social cognition, and we will explain how the network of brain regions that perform social cognition develops over the years, from a new-born baby to an adult.

<https://kids.frontiersin.org/articles/10.3389/frym.2022.760058>

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### Frontiers in Psychology

#### PAPERS

#### **FREDY QUINTERO et al with KLAUS ZUBERBÜHLER – The Evolution of Food Calls: Vocal Behaviour of Sooty Mangabeys In the Presence of Food**

The two main theories of food-associated calls in animals propose functions either in cooperative recruitment or competitive spacing. However, not all social animals produce food calls and it is largely unclear under what circumstances this call type evolves. Sooty mangabeys (*Cercocebus atys*) do not have food calls, but they frequently produce grunts during foraging, their most common vocalisation. We found that grunt rates were significantly higher when subjects were foraging in the group's periphery and with small audiences, in line with the cooperative recruitment hypothesis. In a subsequent field experiment we presented highly desired food items and found that discovering individuals called, unless harassed by competitors, but that the calls never attracted others, confirming that the grunts do not convey any information referential to food. Our data thus suggest that the evolution of cooperative food calling is a two-step process, starting with increased motivation to vocalise in the feeding context, followed by the evolution of acoustic variants derived from context-general contact calls. This evolutionary transition may only occur in species that feed on clumped, high-quality resources where social feeding is competitive, a condition not met in sooty mangabeys.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.897318/full>

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### Human Nature

#### PAPERS

#### **ANA MATEOS, GUILLERMO ZORRILLA-REVILLA & JESÚS RODRÍGUEZ – Let's Play at Digging: How Vigorous Is This Energetic Task for a Young Forager?**

Extractive foraging tasks, such as digging, are broadly practiced among hunter-gatherer populations in different ecological conditions. Despite tuber-gathering tasks being widely practiced by children and adolescents, little research has focused on the physical traits associated with digging ability. Here, we assess how age and energetic expenditure affect the performance of this extractive task. Using an experimental approach, the energetic cost of digging to extract simulated tubers is evaluated in a sample of 40 urban children and adolescents of both sexes to measure the intensity of the physical effort and the influence of several anatomical variables. Digging is a moderately vigorous activity for inexperienced girls and boys from 8 to 14 years old, and it requires significant physical effort depending on strength and body size. However, extracting subterranean resources is a task that may be performed effectively without previous training. Sex-specific and age-specific differences in the net energy expenditure of digging were detected, even though both sexes exhibited similar proficiency levels when performing the task. Our results highlight that both boys and girls spend considerable energy while digging, with differences largely driven by body size and age. Other factors beyond ability and experience, such as strength and body size, may influence the proficiency of juveniles in performing certain physically intensive foraging tasks, such as gathering tubers.

<https://link.springer.com/article/10.1007/s12110-022-09428-w>

### **GABRIEL ŠAFFA, PAVEL DUDA & JAN ZRZAVÝ – Paternity Uncertainty and Parent–Offspring Conflict Explain Restrictions on Female Premarital Sex across Societies**

Although norms of premarital sex vary cross-culturally, the sexuality of adolescent girls has been consistently more restricted than that of adolescent boys. Three major theories that attempt to explain restrictions on female premarital sex (FPS) concern male, female, and parental control. These competing theories have not been tested against each other cross-culturally. In this study, we do this using a sample of 128 nonindustrial societies and socioecological predictors capturing extramarital sex, paternal care, female status, sex ratio, parental control over a daughter's mate choice, residence, and marriage transactions, while also controlling for phylogenetic non-independence across societies. We found that multiple parties benefit from restrictions on FPS. Specifically, FPS is more restricted in societies intolerant of extramarital sex and where men transfer property to their children (male control), as well as where marriages are arranged by parents (parental control). Both paternity uncertainty (partitioned among marital fidelity and paternal investment) and parent–offspring conflict (prompting parents to control their daughter's sexuality) were identified as possible mechanisms of FPS restrictions. The evidence for female control is ambiguous, mainly because it can be equally well interpreted as both male control and parental control, and because fathers, rather than mothers, are often the primary decision makers about a daughter's mate choice. Our results also emphasize the importance of social roles, rather than stereotyped sex roles, as a more useful approach to understanding the evolution of FPS restrictions.

<https://link.springer.com/article/10.1007/s12110-022-09426-y>

### **WEN ZHOU & BRIAN HARE – The Early Expression of Blatant Dehumanization in Children and Its Association with Outgroup Negativity**

Dehumanization is observed in adults across cultures and is thought to motivate human violence. The age of its first expression remains largely untested. This research demonstrates that diverse representations of humanness, including a novel one, readily elicit blatant dehumanization in adults (N = 482) and children (aged 5–12; N = 150). Dehumanizing responses in both age groups are associated with support for outgroup inferiority. Similar to the link previously observed in adults, dehumanization by children is associated with a willingness to punish outgroup transgressors. These findings suggest that exposure to cultural norms throughout adolescence and adulthood are not required for the development of outgroup dehumanization.

<https://link.springer.com/article/10.1007/s12110-022-09427-x>

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## **Nature Communications**

### **PAPERS**

#### **XUELONG YAO et al – Comparison of chromatin accessibility landscapes during early development of prefrontal cortex between rhesus macaque and human**

Epigenetic information regulates gene expression and development. However, our understanding of the evolution of epigenetic regulation on brain development in primates is limited. Here, we compared chromatin accessibility landscapes and transcriptomes during fetal prefrontal cortex (PFC) development between rhesus macaques and humans. A total of 304,761 divergent DNase I-hypersensitive sites (DHSs) are identified between rhesus macaques and humans, although many of these sites share conserved DNA sequences. Interestingly, most of the cis-elements linked to orthologous genes with dynamic expression are divergent DHSs. Orthologous genes expressed at earlier stages tend to have conserved cis-elements, whereas orthologous genes specifically expressed at later stages seldom have conserved cis-elements. These genes are enriched in synapse organization, learning and memory. Notably, DHSs in the PFC at early stages are linked to human educational attainment and cognitive performance. Collectively, the comparison of the chromatin epigenetic landscape between rhesus macaques and humans suggests a potential role for regulatory elements in the evolution of differences in cognitive ability between non-human primates and humans.

<https://www.nature.com/articles/s41467-022-31403-3>

#### **THOMAS W. SCOTT, ALAN GRAFEN & STUART A. WEST – Multiple social encounters can eliminate Crozier's paradox and stabilise genetic kin recognition**

Crozier's paradox suggests that genetic kin recognition will not be evolutionarily stable. The problem is that more common tags (markers) are more likely to be recognised and helped. This causes common tags to increase in frequency, and hence eliminates the genetic variability that is required for genetic kin recognition. It has therefore been assumed that genetic kin recognition can only be stable if there is some other factor maintaining tag diversity, such as the advantage of rare alleles in host-parasite interactions. We show that allowing for multiple social encounters before each social interaction can eliminate Crozier's paradox, because it allows individuals with rare tags to find others with the same tag. We also show that rare tags are better indicators of relatedness, and hence better at helping individuals avoid interactions with non-cooperative cheats. Consequently, genetic kin recognition provides an advantage to rare tags that maintains tag diversity, and stabilises itself.

<https://www.nature.com/articles/s41467-022-31545-4>

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## Nature Ecology & Evolution

### ARTICLES

#### **GRANT SNITKER et al – A collaborative agenda for archaeology and fire science**

Humans have influenced global fire activity for millennia and will continue to do so into the future. Given the long-term interaction between humans and fire, we propose a collaborative research agenda linking archaeology and fire science that emphasizes the socioecological histories and consequences of anthropogenic fire in the development of fire management strategies today.

<https://www.nature.com/articles/s41559-022-01759-2>

### PAPERS

#### **SANDRA OLIVEIRA et al with JOHANNES KRAUSE – Ancient genomes from the last three millennia support multiple human dispersals into Wallacea**

Previous research indicates that human genetic diversity in Wallacea— islands in present-day Eastern Indonesia and Timor-Leste that were never part of the Sunda or Sahul continental shelves—has been shaped by complex interactions between migrating Austronesian farmers and indigenous hunter–gatherer communities. Yet, inferences based on present-day groups proved insufficient to disentangle this region’s demographic movements and admixture timings. Here, we investigate the spatio-temporal patterns of variation in Wallacea based on genome-wide data from 16 ancient individuals (2600–250 years BP) from the North Moluccas, Sulawesi and East Nusa Tenggara. While ancestry in the northern islands primarily reflects contact between Austronesian- and Papuan-related groups, ancestry in the southern islands reveals additional contributions from Mainland Southeast Asia that seem to predate the arrival of Austronesians. Admixture time estimates further support multiple and/or continuous admixture involving Papuan- and Asian-related groups throughout Wallacea. Our results clarify previously debated times of admixture and suggest that the Neolithic dispersals into Island Southeast Asia are associated with the spread of multiple genetic ancestries.

<https://www.nature.com/articles/s41559-022-01775-2>

### COMMENTARIES

#### **CARRIE S. MONGLE et al – Modelling hominin evolution requires accurate hominin data**

Arising from: H. P. PÜSCHEL et al – Divergence-time estimates for hominins provide insight into encephalization and body mass trends in human evolution. *Nature Ecology & Evolution* volume 5, pages 808–819 (2021).

<https://www.nature.com/articles/s41559-021-01431-1>.

<https://www.nature.com/articles/s41559-022-01791-2>

#### **HANS P. PÜSCHEL et al – Reply to: Modelling hominin evolution requires accurate hominin data**

<https://www.nature.com/articles/s41559-022-01792-1>

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## Nature Humanities & Social Sciences Communications

### PAPERS

#### **HANNAH M. DOUGLAS et al – Embodiment of concealable stigma disclosure through dynamics of movement and language**

A concealable stigmatised identity (CSI) is any identity that can be hidden but, if revealed, can be potentially socially devaluing (e.g., sexual minority). Those living with a CSI have opportunities to disclose their identities to friends and family members or within professional contexts. According to the disclosure processes model, people adopt either approach-oriented or avoidance-oriented goals when self disclosing. The current study sought to identify how antecedent goals and relationship context are embodied in the dynamics of unintentional behaviours during disclosure. Participants simulated a disclosure event to both close other and professional other targets and were primed with either approach or avoidance-motivations. Postural activity and language were analysed using detrended fluctuation analysis and recurrence quantification analysis. Results revealed that the movement dynamics of participants who were motivated by approach goals exhibited more complex and flexible behaviour compared to those who were motivated by avoidance goals. In addition, there was more recurrent word use towards close others compared to professional others. These results support the supposition of the disclosure processes model that approach-avoidance motivation impacts behaviour and sheds light on the functional differences between relationship contexts on a CSI disclosure experience.

<https://www.nature.com/articles/s41599-022-01226-0>

#### **ANTONIO MORENO-ORTIZ, CHANTAL PÉREZ-HERNÁNDEZ & MARÍA GARCÍA-GÁMEZ – The language of happiness in self-reported descriptions of happy moments: Words, concepts, and entities**

This article attempts to study the language of happiness from a double perspective. First, the impact and relevance of sentiment words and expressions in self-reported descriptions of happiness are examined. Second, the sources of happiness that are mentioned in such descriptions are identified. A large sample of “happy moments” from the HappyDB corpus is processed employing advanced text analytics techniques. The sentiment analysis results reveal that positive lexical items have a limited role in the description of happy moments. For the second objective, unsupervised machine learning algorithms

are used to extract and cluster keywords and manually label the resulting semantic classes. Results indicate that these classes, linguistically materialized in compact lexical families, accurately describe the sources of happiness, a result that is reinforced by our named entities analysis, which also reveals the important role that commercial products and services play as a source of happiness. Thus, this study attempts to provide methodological underpinnings for the automatic processing of self-reported happy moments, and contributes to a better understanding of the linguistic expression of happiness, with interdisciplinary implications for fields such as affective content analysis, sentiment analysis, and cultural, social and behavioural studies.

<https://www.nature.com/articles/s41599-022-01202-8>

### **ALEXANDRE BLUET et al – Impact of technical reasoning and theory of mind on cumulative technological culture: insights from a model of micro-societies**

Our technologies have never ceased to evolve, allowing our lineage to expand its habitat all over the Earth, and even to explore space. This phenomenon, called cumulative technological culture (CTC), has been studied extensively, notably using mathematical and computational models. However, the cognitive capacities needed for the emergence and maintenance of CTC remain largely unknown. In the literature, the focus is put on the distinctive ability of humans to imitate, with an emphasis on our unique social skills underlying it, namely theory of mind (ToM). A recent alternative view, called the technical-reasoning hypothesis, proposes that our unique ability to understand the physical world (i.e., technical reasoning; TR) might also play a critical role in CTC. Here, we propose a simple model, based on the micro-society paradigm, that integrates these two hypotheses. The model is composed of a simple environment with only one technology that is transmitted between generations of individuals. These individuals have two cognitive skills: ToM and TR, and can learn in different social-learning conditions to improve the technology. The results of the model show that TR can support both the transmission of information and the modification of the technology, and that ToM is not necessary for the emergence of CTC although it allows a faster growth rate.

<https://www.nature.com/articles/s41599-022-01251-z>

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## Nature Pharmacogenomics Journal

### PAPERS

### **SIGRID HAEGGSTRÖM et al with SVANTE PÄÄBO – The clinically relevant CYP2C8\*3 and CYP2C9\*2 haplotype is inherited from Neandertals**

Genetic variation in genes encoding cytochrome P450 enzymes influences the metabolism of drugs and endogenous compounds. The locus containing the cytochrome genes CYP2C8 and CYP2C9 on chromosome 10 exhibits linkage disequilibrium between the CYP2C8\*3 and CYP2C9\*2 alleles, forming a haplotype of ~300 kilobases. This haplotype is associated with altered metabolism of several drugs, most notably reduced metabolism of warfarin and phenytoin, leading to toxicity at otherwise therapeutic doses. Here we show that this haplotype is inherited from Neandertals.

<https://www.nature.com/articles/s41397-022-00284-6>

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## Nature Schizophrenia

### PAPERS

### **AMIR H. NIKZAD et al – Who does what to whom? graph representations of action-predication in speech relate to psychopathological dimensions of psychosis**

Graphical representations of speech generate powerful computational measures related to psychosis. Previous studies have mostly relied on structural relations between words as the basis of graph formation, i.e., connecting each word to the next in a sequence of words. Here, we introduced a method of graph formation grounded in semantic relationships by identifying elements that act upon each other (action relation) and the contents of those actions (predication relation). Speech from picture descriptions and open-ended narrative tasks were collected from a cross-diagnostic group of healthy volunteers and people with psychotic or non-psychotic disorders. Recordings were transcribed and underwent automated language processing, including semantic role labeling to identify action and predication relations. Structural and semantic graph features were computed using static and dynamic (moving-window) techniques. Compared to structural graphs, semantic graphs were more strongly correlated with dimensional psychosis symptoms. Dynamic features also outperformed static features, and samples from picture descriptions yielded larger effect sizes than narrative responses for psychosis diagnoses and symptom dimensions. Overall, semantic graphs captured unique and clinically meaningful information about psychosis and related symptom dimensions. These features, particularly when derived from semi-structured tasks using dynamic measurement, are meaningful additions to the repertoire of computational linguistic methods in psychiatry.

<https://www.nature.com/articles/s41537-022-00263-7>

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## Nature Scientific Reports

### PAPERS

### **SHIVANI P. PATEL et al – Verbal entrainment in autism spectrum disorder and first-degree relatives**

Entrainment, the unconscious process leading to coordination between communication partners, is an important dynamic human behavior that helps us connect with one another. Difficulty developing and sustaining social connections is a hallmark

of autism spectrum disorder (ASD). Subtle differences in social behaviors have also been noted in first-degree relatives of autistic individuals and may express underlying genetic liability to ASD. In-depth examination of verbal entrainment was conducted to examine disruptions to entrainment as a contributing factor to the language phenotype in ASD. Results revealed distinct patterns of prosodic and lexical entrainment in individuals with ASD. Notably, subtler entrainment differences in prosodic and syntactic entrainment were identified in parents of autistic individuals. Findings point towards entrainment, particularly prosodic entrainment, as a key process linked to social communication difficulties in ASD and reflective of genetic liability to ASD.

<https://www.nature.com/articles/s41598-022-12945-4>

### **PAUL STOEWER et al – Neural network based successor representations to form cognitive maps of space and language**

How does the mind organize thoughts? The hippocampal-entorhinal complex is thought to support domain-general representation and processing of structural knowledge of arbitrary state, feature and concept spaces. In particular, it enables the formation of cognitive maps, and navigation on these maps, thereby broadly contributing to cognition. It has been proposed that the concept of multi-scale successor representations provides an explanation of the underlying computations performed by place and grid cells. Here, we present a neural network based approach to learn such representations, and its application to different scenarios: a spatial exploration task based on supervised learning, a spatial navigation task based on reinforcement learning, and a non-spatial task where linguistic constructions have to be inferred by observing sample sentences. In all scenarios, the neural network correctly learns and approximates the underlying structure by building successor representations. Furthermore, the resulting neural firing patterns are strikingly similar to experimentally observed place and grid cell firing patterns. We conclude that cognitive maps and neural network-based successor representations of structured knowledge provide a promising way to overcome some of the short comings of deep learning towards artificial general intelligence.

<https://www.nature.com/articles/s41598-022-14916-1>

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## **PLoS One**

### **PAPERS**

#### **JEUNGMIN LEE et al – How ‘who someone is’ and ‘what they did’ influences gossiping about them**

To understand, predict, and help correct each other’s actions we need to maintain accurate, up-to-date knowledge of people, and communication is a critical means by which we gather and disseminate this information. Yet the conditions under which we communicate social information remain unclear. Testing hypotheses generated from our theoretical framework, we examined when and why social information is disseminated about an absent third party: i.e., gossiped. Gossip scenarios presented to participants (e.g., “Person-X cheated on their exam”) were based on three key factors: (1) target (ingroup, outgroup, or celebrity), (2) valence (positive or negative), and (3) content. We then asked them (a) whether they would spread the information, and (b) to rate it according to subjective valence, ordinariness, interest level, and emotion. For ratings, the scenarios participants chose to gossip were considered to have higher valence (whether positive or negative), to be rarer, more interesting, and more emotionally evocative; thus showing that the paradigm was meaningful to subjects. Indeed, for target, valence, and content, a repeated-measures ANOVA found significant effects for each factor independently, as well as their interactions. The results supported our hypotheses: e.g., for target, more gossiping about celebrities and ingroup members (over strangers); for valence, more about negative events overall, and yet for ingroup members, more positive gossiping; for content, more about moral topics, with yet all domains of social content communicated depending on the situation—context matters, influencing needs. The findings suggest that social knowledge sharing (i.e., gossip) involves sophisticated calculations that require our highest sociocognitive abilities, and provide specific hypotheses for future examination of neural mechanisms.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0269812>

#### **ANNE REBOUL et al – Are monkeys sensitive to informativeness: An experimental study with baboons (*Papio papio*)**

Informativeness (defined as reduction of uncertainty) is central in human communication. In the present study, we investigate baboons’ sensitivity to informativeness by manipulating the informativity of a cue relative to a response display and by allowing participants to anticipate their answers or to wait for a revealed answer (with variable delays). Our hypotheses were that anticipations would increase with informativity, while response times to revealed trials would decrease with informativity. These predictions were verified in Experiment 1. In Experiments 2 and 3, we manipulated rewards (rewarding anticipation responses at 70% only) to see whether reward tracking alone could account for the results in Experiment 1. We observed that the link between anticipations and informativeness disappeared, but not the link between informativeness and decreased RTs for revealed trials. Additionally, in all three experiments, the number of correct answers in revealed trials with fast reaction times (< 250ms) increased with informativeness. We conclude that baboons are sensitive to informativeness as an ecologically sound means to tracking reward.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0270502>



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## Science Advances

### PAPERS

#### **DIRK U. WULFF & RUI MATA – On the semantic representation of risk**

What are the defining features of lay people's semantic representation of risk? We contribute to mapping the semantics of risk based on word associations to provide insight into both universal and individual differences in the representation of risk. Specifically, we introduce a mini-snowball word association paradigm and use the tools of network and sentiment analysis to characterize the semantics of risk. We find that association-based representations not only corroborate but also extend those extracted from past survey- and text-based approaches. Crucially, we find that the semantics of risk show universal properties and individual and group differences. Most notably, while semantic clusters generalize across languages, their frequency varies systematically across demographic groups, with older and female respondents showing more negative connotations and mentioning more often certain types of activities (e.g., recreational activities) relative to younger adults and males, respectively. Our work has general implications for the measurement of risk-related constructs by suggesting that "risk" can mean different things to different individuals.

<https://www.science.org/doi/full/10.1126/sciadv.abm1883>

#### **WILLIAM D. SNYDER, JONATHAN S. REEVES & CLAUDIO TENNIE – Early knapping techniques do not necessitate cultural transmission**

Early stone tool production, or knapping, techniques are claimed to be the earliest evidence for cultural transmission in the human lineage. Previous experimental studies have trained human participants to knap in conditions involving opportunities for cultural transmission. Subsequent knapping was then interpreted as evidence for a necessity of the provided cultural transmission opportunities for these techniques. However, a valid necessity claim requires showing that individual learning alone cannot lead to early knapping techniques. Here, we tested human participants (N = 28) in cultural isolation for the individual learning of early knapping techniques by providing them with relevant raw materials and a puzzle task as motivation. Twenty-five participants were technique naïve according to posttest questionnaires, yet they individually learned early knapping techniques, therewith producing and using core and flake tools. Early knapping techniques thus do not necessitate cultural transmission of know-how and could likewise have been individually derived among premodern hominins.

<https://www.science.org/doi/full/10.1126/sciadv.abo2894>

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## Trends in Cognitive Sciences

### PAPERS

#### **LUCA BONINI et al with VITTORIO GALLESE – Mirror neurons 30 years later: Implications and applications**

Mirror neurons (MNs) were first described in a seminal paper in 1992 as a class of monkey premotor cells discharging during both action execution and observation. Despite their debated origin and function, recent studies in several species, from birds to humans, revealed that beyond MNs properly so called, a variety of cell types distributed among multiple motor, sensory, and emotional brain areas form a 'mirror mechanism' more complex and flexible than originally thought, which has an evolutionarily conserved role in social interaction. Here, we trace the current limits and envisage the future trends of this discovery, showing that it inspired translational research and the development of new neurorehabilitation approaches, and constitutes a point of no return in social and affective neuroscience.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00134-6](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00134-6)

#### **ELIANA HADJIANDREOU & C. DARYL CAMERON – Adversity-based identities drive social change**

Adversity experiences have been linked to empathy and prosocial behavior. Here, we argue for unique additional advantages of such experiences, namely, the identity memberships that arise and their links to collective action and harmonious intergroup relations. We discuss challenges and future directions for the study of adversity as a source of identity.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00135-8](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00135-8)

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