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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 – Skhul lithic technology and the dispersal of Homo sapiens into Southwest Asia

*In Quaternary International 515, 30-52 (2019).*

### **HUW S. GROUCUTT, ELEANOR M.L. SCERRI, CHRIS STRINGER & MICHAEL D. PETRAGLIA – Skhul lithic technology and the dispersal of Homo sapiens into Southwest Asia**

The Levantine sites of Skhul and Qafzeh have been interpreted as indicating an early, short and unsuccessful expansion of Homo sapiens out of Africa. Chronometric age estimates, however, indicate a history of prolonged occupation, and suggest that Skhul (~130-100 thousand years ago [ka]) may have been occupied earlier than Qafzeh (beginning ~110-90 ka). Morphologically, the Skhul individuals can be described as somewhat more primitive in comparison to the Qafzeh fossils. Though the lithic assemblages of sites such as Skhul and Qafzeh are often described as being technologically similar, as part of the 'Tabun C' phase/industry, limited detailed information on the Skhul lithic assemblage has been published, and little comparative work has been conducted. Here, we present an analysis of the Skhul stone tool assemblage to describe its characteristics, to evaluate the lithic results against the fossil and chronological data, and for inter-site regional comparison. Our findings indicate that the Skhul lithic assemblage differs from other Levantine Marine Isotope Stage (MIS) 5 sites, such as Qafzeh. For example, there was more of an emphasis on diverse methods of point production at Skhul, and the available samples indicate a greater emphasis on preferential rather than recurrent Levallois reduction at Skhul. The current findings suggest that neither the Levantine Middle Palaeolithic in general, nor MIS 5 assemblages in particular, were technologically homogeneous. These data are consistent with either a long occupation of the Levant by Homo sapiens in MIS 5, or at least two phases of occupation (early MIS 5 and mid to late MIS). Whatever the fate of the Skhul and Qafzeh population(s), their occupation of the Levant was neither short nor culturally uniform. Our findings add to the growing pool of evidence that the dispersal of our species 'Out of Africa' was more complex than hitherto thought. Further work on MIS 5e contexts in the Levant and elsewhere in Southwest Asia should be a research priority.

[https://www.academia.edu/35519866/Skhul\\_lithic\\_technology\\_and\\_the\\_dispersal\\_of\\_Homo\\_sapiens\\_into\\_Southwest\\_Asia](https://www.academia.edu/35519866/Skhul_lithic_technology_and_the_dispersal_of_Homo_sapiens_into_Southwest_Asia)

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## ACADEMIA.EDU – “Contextual areas” of early H. sapiens and significance for human dispersal from Africa

*In Quaternary International 274, 5-24 (2012).*

### **JÜRGEN RICHTER et al – “Contextual areas” of early Homo sapiens and their significance for human dispersal from Africa into Eurasia between 200 ka and 70 ka**

The African origin of our species has essentially been accepted as a scientific fact, but evolutionary advantages connected with the reasons and circumstances of modern human dispersal remain widely unexplained or controversial. Consequently, this paper provides an overview of the natural and cultural context of earliest AMH (Anatomically Modern Humans). According to the locations and dating of AMH fossils, the focus is on E-Africa, NE-Africa and the Middle East within a time range from 200 ka to 70 ka. At least three different “contextual areas” appear to have existed at the time, two of them in E-Africa and NE-Africa, dominated by “Bifacial-plus-Levallois” technology, and the third one in the Middle East, mostly connected with an “only-Levallois” technology. A comparison with some non-AMH sites from Eurasia displays similarity of technological principles between artifact assemblages from African AMH sites and Eurasian non-AMH (early Neanderthal) sites on the one hand, and dissimilarity between African AMH sites and Middle Eastern AMH sites on the other hand. This is particularly surprising if environmental contexts are taken into account: tropical in Africa and glacial in Eurasia. Thus, compared to their archaic neighbors (particularly early Neanderthals), earliest modern humans currently seem to lack any specific “cultural fingerprint” and their demographic success may not be explained by behavioral superiority alone. The idea of a small group of early AMH people migrating out of Africa, enabled by cultural superiority over their neighbors appears highly questionable in the light of archaeological evidence. Moreover, the concept of virtual “migration routes” deserves a revision if ethnodemographic evidence about spatial behavior of hunter-gatherers is taken into account. The proposed concept of “contextual areas” serves as a methodological alternative, comprising linked cultural and environmental features.

[https://www.academia.edu/3633929/Contextual\\_areas\\_of\\_early\\_Homo\\_sapiens\\_and\\_their\\_significance\\_for\\_human\\_dispersal\\_from\\_Africa\\_into\\_Eurasia\\_between\\_200\\_ka\\_and\\_70\\_ka](https://www.academia.edu/3633929/Contextual_areas_of_early_Homo_sapiens_and_their_significance_for_human_dispersal_from_Africa_into_Eurasia_between_200_ka_and_70_ka)

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## ACADEMIA.EDU – Lithics of the North African Middle Stone Age

*In Quaternary International 274, 5-24 (2012).*

### **ELEANOR M. L. SCERRI & ENZA E. SPINAPOLICE – Lithics of the North African Middle Stone Age: assumptions, evidence and future directions**

North Africa features some of the earliest manifestations of the Middle Stone Age (MSA) and fossils of our species, Homo sapiens, as well as early examples of complex culture and the long distance transfer of exotic raw materials. As they are elsewhere, lithics (i.e., stone tools) present by far the most abundant source of information on this cultural period. Given the importance of North Africa in human origins, understanding the character and distribution of MSA lithics is therefore crucial, as they shed light on early human behaviour and culture. However, the lithics of the North African MSA are poorly understood, and their technological variability is frequently obfuscated by regionally specific nomenclatures, often repeated without criticism, and diverse methods of analysis that are often incompatible. Characterising dynamic technological innovations as well as apparent technological stasis remains challenging, and many narratives have not been tested quantitatively. This significantly problematizes hypotheses of human evolution and dispersals invoking these data that extend beyond North Africa. This paper therefore presents a description of the lithics of the North African MSA, including their

technological characteristics, chronology, spatial distribution and associated research traditions. A range of interpretations concerning early H. sapiens demography in North Africa are then re-evaluated in the light of this review, and the role and power of lithic data to contribute to such debates is critically assessed.

[https://www.academia.edu/41293903/Lithics\\_of\\_the\\_North\\_African\\_Middle\\_Stone\\_Age\\_assumptions\\_evidence\\_and\\_future\\_directions](https://www.academia.edu/41293903/Lithics_of_the_North_African_Middle_Stone_Age_assumptions_evidence_and_future_directions)

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## ACADEMIA.EDU – Nubian assemblages and implications for Middle Paleolithic inter-regional interactions

*In Quaternary International 408:B, 121-139 (2016).*

### **MAE GODER-GOLDBERGER, NATALIA GUBENKO & ERELLA HOVERS – “Diffusion with modifications”: Nubian assemblages in the central Negev highlands of Israel and their implications for Middle Paleolithic inter-regional interactions**

Nubian Levallois cores, now known from sites in eastern Africa, the Nile Valley and Arabia, have been used as a material culture marker for Upper Pleistocene dispersals of hominins out of Africa. The Levantine corridor, being the only land route connecting Africa to Eurasia, has been viewed as a possible dispersal route. We report here on lithic assemblages from the Negev highlands of Israel that contain both Levallois centripetal and Nubian-type cores. Wetter conditions over the Sahara and Negev deserts during MIS 6a-5e provided a generally continuous environmental corridor into the Levant that enabled the dispersal of hominin groups bearing the Nubian variant of prepared core technologies. The Negev assemblages draw renewed attention to the place of the Levant as one of the dispersal routes out of Africa during the Late Pleistocene and could suggest that processes of human dispersals and cultural diffusion resulted in the spread of Nubian technology across eastern Africa, the western Sahara and the Nile Valley, the southern Levant and Arabia.

[https://www.academia.edu/24622721/Mae\\_Goder\\_Golddberger\\_Natalia\\_Gubenko\\_Erella\\_Hovers\\_Diffusion\\_with\\_modifications\\_Nubian\\_assemblages\\_in\\_the\\_central\\_Negev\\_highlands\\_of\\_Israel\\_and\\_their\\_implications\\_for\\_Middle\\_Paleolithic\\_inter-regional\\_interactions](https://www.academia.edu/24622721/Mae_Goder_Golddberger_Natalia_Gubenko_Erella_Hovers_Diffusion_with_modifications_Nubian_assemblages_in_the_central_Negev_highlands_of_Israel_and_their_implications_for_Middle_Paleolithic_inter-regional_interactions)

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## ARXIV PREPRINTS – Kinship Is a Network Tracking Social Technology, Not an Evolutionary Phenomenon

### **TAMAS DAVID-BARRETT – Kinship Is a Network Tracking Social Technology, Not an Evolutionary Phenomenon**

On one hand, kinship is a universal human phenomenon that tends to align with biological relatedness, which might suggest evolutionary foundations. On the other hand, kinship has exceptional variation across the human populations, which points to cultural foundations. Furthermore, even if its foundation was biological, kinship is often too imprecise to track genetic relatedness efficiently, while inclusive fitness theory would suggest focusing only on the closest relatives, which is not the case in most human cultures. It was the parallel validity of these contradicting arguments that led to decades of fierce debate about the definition and measurement of the phenomenon. This paper offers a new approach to kinship. First, the model demonstrates that it is possible to generate kinship networks (a) derived from the kind of basic kin connections that our species shares with other apes, but (b) driven by network rather than biological logic beyond the immediate family. Second the model demonstrates that kinship as a network heuristic works efficiently only in high fertility societies, and gives way to similarity-based friendship with demographic transition. The results explain (i) why kinship labelling is unique to our species, (ii) why kinship is universal among human cultures, (iii) why kinship terminology systems are varied across cultures, (iv) why linguistic kin assignment is imprecise, and (v) why kinship is replaced by homophily when relatives are scarce. The model offers a unifying framework to the debate between social and evolutionary anthropology concerning the concept of human kinship.

<https://arxiv.org/abs/2204.02336>

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## NEWS

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### **BREAKING SCIENCE – Culture Plays Minimal Role in Perception of Odor Pleasantness, Says New Study**

Humans share sensory systems with a common anatomical blueprint, but individual sensory experience nevertheless varies. In olfaction, it is not known to what degree sensory perception, particularly the perception of odor pleasantness, is founded on universal principles, dictated by culture or merely a matter of personal taste.

<http://www.sci-news.com/biology/odor-pleasantness-10684.html>

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### **BREAKING SCIENCE – Mother Nature Prefers Symmetry and Simplicity, Researchers Say**

Biological structures frequently exhibit modularity and symmetry, but the origin of such trends is not well understood. It can be tempting to assume — by analogy to engineering design — that symmetry and modularity arise from natural selection. However, evolution, unlike engineers, cannot plan ahead, and so these traits must also afford some immediate selective advantage which is hard to reconcile with the breadth of systems where symmetry is observed.

<http://www.sci-news.com/biology/mother-nature-symmetry-simplicity-10690.html>

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### **NATURE BRIEFING – A growth chart for your brain**

Researchers have aggregated more than 120,000 scans to create the first comprehensive growth charts for brain development. The charts show how the brain expands and shrinks over time, and could one day be used alongside the height

and weight charts that physicians use to track child development. This work has never before been done on such a scale, but the authors call this 'a first draft' because their database isn't completely inclusive — they struggled to gather brain scans from all regions of the globe. If the charts are eventually rolled out to paediatricians, great care will be needed to ensure that they are not misinterpreted, says paediatric neurologist Hannah Tully. "A big brain is not necessarily a well-functioning brain."

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=a4e2e7310c&e=1db4b9a19b>

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### **NATURE BRIEFING – Can mushrooms 'speak'?**

Researchers who tapped into the network that connects fungi say that its patterns of electrical signals resemble human speech. Previous studies have suggested that fungi use electrical signals to communicate and process information across tiny connective threads called mycelium. In the new study, researchers inserted tiny electrodes into substrates colonized by four species of fungi. They found that spikes of electrical activity often clustered into groups that resembled vocabularies of up to 50 words and could be similar to human language. But some researchers are sceptical. "The interpretation as language seems somewhat overenthusiastic, and would require far more research and testing of critical hypotheses before we see 'Fungus' on Google Translate," says bioscientist Dan Bebber.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=a3312b5f6c&e=1db4b9a19b>

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### **SCIENCE DAILY – Monkeys routinely consume fruit containing alcohol**

Scientists analyzed the ethanol content of fruit eaten by spider monkeys in Panama, and found that the fruit regularly contained alcohol: between 1% and 2%. The researchers also collected urine samples, most of which contained secondary metabolites of ethanol. The results provide further evidence that our primate ancestors preferentially sought out fermented, alcohol-containing fruit likely for its greater nutritional value, and that humans may have inherited this proclivity for ethanol.

<https://www.sciencedaily.com/releases/2022/04/220401141345.htm>

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### **SCIENCE DAILY – Study shows fish can calculate**

Cichlids and stingrays can perform simple addition and subtraction in the number range of one to five. This has been shown in a recent study by the University of Bonn, which has now been published in the journal Scientific Reports. It is not known what the animals need their mathematical abilities for.

<https://www.sciencedaily.com/releases/2022/04/220401122240.htm>

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### **SCIENCE DAILY – Polarized speech: A function of self-persuasion**

A new study finds competitive debaters, randomly assigned a position, persuade themselves to the superiority of their side, even if it falls contrary to their own personal beliefs.

<https://www.sciencedaily.com/releases/2022/04/220401122233.htm>

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### **SCIENCE DAILY – How left brain asymmetry is related to reading ability**

Researchers report that two seemingly opposing theories of language processing are both correct. The study shows that greater left-brain asymmetry can predict both better performance and average performance on a foundational measure of reading ability, depending on whether analysis is conducted over the whole brain or in specific regions.

<https://www.sciencedaily.com/releases/2022/04/220405143525.htm>

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### **SCIENCE DAILY – Disbelief in human evolution linked to greater prejudice and racism**

A disbelief in human evolution was associated with higher levels of prejudice, racist attitudes and support of discriminatory behavior against Blacks, immigrants and the LGBTQ community in the U.S., according to recent research.

<https://www.sciencedaily.com/releases/2022/04/220404164604.htm>

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### **SCIENCE DAILY – Neolithic made us taller and more intelligent but more prone to heart disease**

After the Neolithic, European populations showed an increase in height and intelligence, reduced skin pigmentation and increased risk of cardiovascular disease due to genetic changes that lowered concentrations of 'good' HDL cholesterol. The changes reflect ongoing evolutionary processes in humans and highlight the impact the Neolithic revolution had on our lifestyle and health. Research of these past events offers interesting starting points for today's science and health care.

<https://www.sciencedaily.com/releases/2022/04/220406101723.htm>

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### **SCIENCE DAILY – After 'mama,' children's first words include 'this' and 'that'**

Across languages and cultures, words that help direct caregivers' attention are likely to be among the first children learn and use frequently, according to a new study of early vocabulary development in an Indigenous language.

<https://www.sciencedaily.com/releases/2022/04/220407145515.htm>

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## SCIENCE NEWS – Russian site peddles paper authorship in reputable journals for up to \$5000 a pop

Advertisements promised adding names to articles that appeared in dozens of journals.

<https://www.science.org/content/article/russian-website-peddles-authorships-linked-reputable-journals>

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## SCIENCE NEWS – Here's what happens in your dog's brain when you speak

Pups might process voices like we do, study says.

<https://www.science.org/content/article/here-s-what-happens-your-dog-s-brain-when-you-speak>

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## SCIENCE NEWS – Mushrooms may 'talk' to one another with up to 50 words

Electrical signals could resemble conversations between fungi.

<https://www.science.org/content/article/mushrooms-may-talk-one-another-50-words>

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## THE CONVERSATION – Friday essay: empathy or division? On the science and politics of storytelling

Writers can't always be trusted when they talk about the power and importance of story. We have a vested interest and can get sentimental, promoting the immense power of story, of narrative, as inherently benign.

<https://theconversation.com/friday-essay-empathy-or-division-on-the-science-and-politics-of-storytelling-176679>

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## PUBLICATIONS

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### American Journal of Biological Anthropology

#### PAPERS

#### **DAMIANO MARCHI et al – Morphological correlates of distal fibular morphology with locomotion in great apes, humans, and Australopithecus afarensis**

Recent studies highlighted the importance of the fibula to further our understanding of locomotor adaptations in fossil hominins. In this study, we present a three-dimensional geometric morphometric (3D-GM) investigation of the distal fibula in extant hominids and *Australopithecus afarensis* with the aim of pointing out morphological correlations to arboreal behavior. Great apes are characterized by a shorter subcutaneous triangular surface (STS), more downward facing fibulotalar articular facets, more anteriorly facing lateral malleolus and wider/deeper malleolar fossa than humans. Within great apes, orangutans are characterized by more medially facing fibulotalar articular facets. *Australopithecus afarensis* shows a unique distal fibular morphology with several traits that are generally associated more to arboreality and less to bipedalism such as a short STS, a more anteriorly facing, laterally pointing malleolus and deeper and larger malleolar fossa.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24507>

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### Current Biology

#### PAPERS

#### **TYSON AFLALO et al – Implicit mechanisms of intention**

High-level cortical regions encode motor decisions before or even absent awareness, suggesting that neural processes predetermine behavior before conscious choice. Such early neural encoding challenges popular conceptions of human agency. It also raises fundamental questions for brain-machine interfaces (BMIs) that traditionally assume that neural activity reflects the user's conscious intentions. Here, we study the timing of human posterior parietal cortex single-neuron activity recorded from implanted microelectrode arrays relative to the explicit urge to initiate movement. Participants were free to choose when to move, whether to move, and what to move, and they retrospectively reported the time they felt the urge to move. We replicate prior studies by showing that posterior parietal cortex (PPC) neural activity sharply rises hundreds of milliseconds before the reported urge. However, we find that this "preconscious" activity is part of a dynamic neural population response that initiates much earlier, when the participant first chooses to perform the task. Together with details of neural timing, our results suggest that PPC encodes an internal model of the motor planning network that transforms high-level task objectives into appropriate motor behavior. These new data challenge traditional interpretations of early neural activity and offer a more holistic perspective on the interplay between choice, behavior, and their neural underpinnings. Our results have important implications for translating BMIs into more complex real-world environments. We find that early neural dynamics are sufficient to drive BMI movements before the participant intends to initiate movement. Appropriate algorithms ensure that BMI movements align with the subject's awareness of choice.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(22\)00442-0](https://www.cell.com/current-biology/fulltext/S0960-9822(22)00442-0)

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### Frontiers for Young Minds

#### PAPERS

#### **MARIA V. IVANOVA & NINA F. DRONKERS – Aphasia: How Our Language System Can "Break"**

Our brains enable us to learn language. We develop it early on in life and use it effortlessly every day. It is only when the language system breaks down that we fully realize how complicated it is to speak and understand. In this article, we will explore what happens when brain damage leads to a language disorder called aphasia. About 15 million people worldwide

and about 2 million in the U.S. alone are affected by aphasia. Sadly, many people still do not know what aphasia is. Here, we will explain different types of aphasia, tell you about the language difficulties people with this disorder encounter, and provide information about how language is processed in the brain.

<https://kids.frontiersin.org/articles/10.3389/frym.2022.626477>

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## Frontiers in Ecology and Evolution

### PAPERS

#### **RICHARD A. WATSON, MICHAEL LEVIN & CHRISTOPHER L. BUCKLEY – Design for an Individual: Connectionist Approaches to the Evolutionary Transitions in Individuality**

The truly surprising thing about evolution is not how it makes individuals better adapted to their environment, but how it makes individuals. All individuals are made of parts that used to be individuals themselves, e.g., multicellular organisms from unicellular organisms. In such evolutionary transitions in individuality, the organised structure of relationships between component parts causes them to work together, creating a new organismic entity and a new evolutionary unit on which selection can act. However, the principles of these transitions remain poorly understood. In particular, the process of transition must be explained by “bottom-up” selection, i.e., on the existing lower-level evolutionary units, without presupposing the higher-level evolutionary unit we are trying to explain. In this hypothesis and theory manuscript we address the conditions for evolutionary transitions in individuality by exploiting adaptive principles already known in learning systems. Connectionist learning models, well-studied in neural networks, demonstrate how networks of organised functional relationships between components, sufficient to exhibit information integration and collective action, can be produced via fully-distributed and unsupervised learning principles, i.e., without centralised control or an external teacher. Evolutionary connectionism translates these distributed learning principles into the domain of natural selection, and suggests how relationships among evolutionary units could become adaptively organised by selection from below without presupposing genetic relatedness or selection on collectives. In this manuscript, we address how connectionist models with a particular interaction structure might explain transitions in individuality. We explore the relationship between the interaction structures necessary for (a) evolutionary individuality (where the evolution of the whole is a non-decomposable function of the evolution of the parts), (b) organismic individuality (where the development and behaviour of the whole is a non-decomposable function of the behaviour of component parts) and (c) non-linearly separable functions, familiar in connectionist models (where the output of the network is a non-decomposable function of the inputs). Specifically, we hypothesise that the conditions necessary to evolve a new level of individuality are described by the conditions necessary to learn non-decomposable functions of this type (or deep model induction) familiar in connectionist models of cognition and learning.

<https://www.frontiersin.org/articles/10.3389/fevo.2022.823588/full>

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## Frontiers in Neuroscience

### PAPERS

#### **LESLIE M. BLAHA et al – Understanding Is a Process**

How do we gauge understanding? Tests of understanding, such as Turing's imitation game, are numerous; yet, attempts to achieve a state of understanding are not satisfactory assessments. Intelligent agents designed to pass one test of understanding often fall short of others. Rather than approaching understanding as a system state, in this paper, we argue that understanding is a process that changes over time and experience. The only window into the process is through the lens of natural language. Usefully, failures of understanding reveal breakdowns in the process. We propose a set of natural language-based probes that can be used to map the degree of understanding a human or intelligent system has achieved through combinations of successes and failures.

<https://www.frontiersin.org/articles/10.3389/fnsys.2022.800280/full>

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## Frontiers in Psychology

### PAPERS

#### **MAËVA MICHON, JOSÉ ZAMORANO-ABRAMSON & FRANCISCO ABOITIZ – Faces and Voices Processing in Human and Primate Brains: Rhythmic and Multimodal Mechanisms Underlying the Evolution and Development of Speech**

While influential works since the 1970s have widely assumed that imitation is an innate skill in both human and non-human primate neonates, recent empirical studies and meta-analyses have challenged this view, indicating other forms of reward-based learning as relevant factors in the development of social behavior. The visual input translation into matching motor output that underlies imitation abilities instead seems to develop along with social interactions and sensorimotor experience during infancy and childhood. Recently, a new visual stream has been identified in both human and non-human primate brains, updating the dual visual stream model. This third pathway is thought to be specialized for dynamics aspects of social perceptions such as eye-gaze, facial expression and crucially for audio-visual integration of speech. Here, we review empirical studies addressing an understudied but crucial aspect of speech and communication, namely the processing of visual orofacial cues (i.e., the perception of a speaker's lips and tongue movements) and its integration with vocal auditory cues. Along this review, we offer new insights from our understanding of speech as the product of evolution and development of a

rhythmic and multimodal organization of sensorimotor brain networks, supporting volitional motor control of the upper vocal tract and audio-visual voices-faces integration.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.829083/full>

### **RONALD P. GRUBER, RICHARD A. BLOCK & CARLOS MONTEMAYOR – Physical Time Within Human Time**

A possible solution is offered to help resolve the “two times problem” regarding the veridical and illusory nature of time. First it is recognized that the flow (passage) of time is part of a wider array of temporal experiences referred to as manifest time, all of which need to be reconciled. Then, an information gathering and utilizing system (IGUS) model is used as a basis for a view of manifest time. The model IGUS robot of Hartle that solves the “unique present” debate is enhanced with veridical and (corresponding) illusory components of not only the flow of time but also the larger entity of manifest time, providing a dualistic IGUS robot that represents all of the important temporal experiences. Based upon a variety of prior experiments, that view suggests that the veridical system is a reflection of accepted spacetime cosmologies and through natural selection begets the illusory system for functional purposes. Thus, there are not two opposing times, one outside and one inside the cranium. There is just one fundamental physical time which the brain developed, now possesses and is itself sufficient for adaptation but then enhances. The illusory system is intended to provide a more satisfying experience of physical time, and better adaptive behavior. Future experiments to verify that view are provided. With a complete veridical system of temporal experiences there may be less need to reify certain temporal experiences so that the two times problem is less of a problem and more of a phenomenon.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.718505/full>

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## Journal of Language Evolution

### PAPERS

#### **DOR SHILTON – Is Language Necessary for the Social Transmission of Lithic Technology?**

Recently, a growing number of studies have considered the role of language in the social transmission of tool-making skill during human evolution. In this article, I address this question in light of a new theory of language and its evolution, and review evidence from anthropology and experimental archaeology related to it. I argue that the specific function of language—the instruction of imagination—is not necessary for the social transmission of tool-making skill. Evidence from hunter-gatherer ethnographies suggests that social learning relies mainly on observation, participation, play, and experimentation. Ethnographies of traditional stone cultures likewise describe group activities with simple, context-bound interactions embedded in the here and now. Experiments comparing gestural and verbal teaching of tool-making skills also demonstrate that language is not necessary for that process. I conclude that there is no convincing evidence that language played an important role in the social transmission of lithic technology, although the possibility that linguistic instruction was involved as part of the social interactions accompanying tool-making cannot be excluded.

<https://academic.oup.com/jole/article/4/2/124/5529267>

#### **MARK J HUDSON – Socio-ecological resilience and language dynamics: An adaptive cycle model of long-term language change**

Language is thought to be a crucial element behind Pleistocene expansions of *Homo sapiens* but our understanding of language change over the very long term is still poor. There have been two main approaches to language dynamics in this context. One assumes a continual ebb and flow of local human populations and languages, leading to high levels of ‘patchiness’ in both genes and languages. Another approach argues that long-term equilibrium leads not to patchiness but to areal diffusion and convergence. Both of these approaches assume equilibrium to be the norm. However, research in ecology since the 1970s has found that ecosystems have multiple potential states rather than a single equilibrium point. Under the name of resilience theory, such thinking is being increasingly applied to coupled socio-ecological systems using the concept of the adaptive cycle. This article proposes a model of long-term language change based on the adaptive cycle of resilience theory.

<https://academic.oup.com/jole/article/4/1/19/5089912>

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## Nature Ecology & Evolution

### PAPERS

#### **ALEX MACKAY et al – Environmental influences on human innovation and behavioural diversity in southern Africa 92–80 thousand years ago**

Africa’s Middle Stone Age preserves sporadic evidence for novel behaviours among early modern humans, prompting a range of questions about the influence of social and environmental factors on patterns of human behavioural evolution. Here we document a suite of novel adaptations dating approximately 92–80 thousand years before the present at the archaeological site Varsche Rivier 003 (VR003), located in southern Africa’s arid Succulent Karoo biome. Distinctive innovations include the production of ostrich eggshell artefacts, long-distance transportation of marine molluscs and systematic use of heat shatter in stone tool production, none of which occur in coeval assemblages at sites in more humid, well-studied regions immediately to the south. The appearance of these novelties at VR003 corresponds with a period of reduced regional wind strength and enhanced summer rainfall, and all of them disappear with increasing winter rainfall dominance after 80

thousand years before the present, following which a pattern of technological similarity emerges at sites throughout the broader region. The results indicate complex and environmentally contingent processes of innovation and cultural transmission in southern Africa during the Middle Stone Age.

<https://www.nature.com/articles/s41559-022-01667-5>

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## Nature Genetics

### PAPERS

#### **BINGXIN ZHAO et al – Common variants contribute to intrinsic human brain functional networks**

The human brain forms functional networks of correlated activity, which have been linked with both cognitive and clinical outcomes. However, the genetic variants affecting brain function are largely unknown. Here, we used resting-state functional magnetic resonance images from 47,276 individuals to discover and validate common genetic variants influencing intrinsic brain activity. We identified 45 new genetic regions associated with brain functional signatures ( $P < 2.8 \times 10^{-11}$ ), including associations to the central executive, default mode, and salience networks involved in the triple-network model of psychopathology. A number of brain activity-associated loci colocalized with brain disorders (e.g., the APOE  $\epsilon$ 4 locus with Alzheimer's disease). Variation in brain function was genetically correlated with brain disorders, such as major depressive disorder and schizophrenia. Together, our study provides a step forward in understanding the genetic architecture of brain functional networks and their genetic links to brain-related complex traits and disorders.

<https://www.nature.com/articles/s41588-022-01039-6>

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## Nature Humanities & Social Sciences Communications

### PAPERS

#### **ROBERT M. CHAPMAN, MARGARET N. GARDNER & MEGAN LYONS – Gender differences in emotional connotative meaning of words measured by Osgood's semantic differential techniques in young adults**

Semantic differential techniques are a useful, well-validated tool to assess affective processing of stimuli and determine how that processing is impacted by various demographic factors, such as gender. In this paper, we explore differences in connotative word processing between men and women as measured by Osgood's semantic differential and what those differences imply about affective processing in the two genders. We recruited 94 young participants (47 men, 47 women, ages 18–39) using an online survey and collected their affective ratings of 120 words on three rating tasks: Evaluation (E), Potency (P), and Activity (A). With these data, we explored the theoretical and mathematical overlap between Osgood's affective meaning factor structure and other models of emotional processing commonly used in gender analyses. We then used Osgood's three-dimensional structure to assess gender-related differences in three affective classes of words (words with connotation that is Positive, Neutral, or Negative for each task) and found that there was no significant difference between the genders when rating Positive words and Neutral words on each of the three rating tasks. However, young women consistently rated Negative words more negatively than young men did on all three of the independent dimensions. This confirms the importance of taking gender effects into account when measuring emotional processing. Our results further indicate there may be differences between Osgood's structure and other models of affective processing that should be further explored.

<https://www.nature.com/articles/s41599-022-01126-3>

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## Nature Neuroscience

### PAPERS

#### **RACHEL M. BROUWER et mul – Genetic variants associated with longitudinal changes in brain structure across the lifespan**

Human brain structure changes throughout the lifespan. Altered brain growth or rates of decline are implicated in a vast range of psychiatric, developmental and neurodegenerative diseases. In this study, we identified common genetic variants that affect rates of brain growth or atrophy in what is, to our knowledge, the first genome-wide association meta-analysis of changes in brain morphology across the lifespan. Longitudinal magnetic resonance imaging data from 15,640 individuals were used to compute rates of change for 15 brain structures. The most robustly identified genes GPR139, DACH1 and APOE are associated with metabolic processes. We demonstrate global genetic overlap with depression, schizophrenia, cognitive functioning, insomnia, height, body mass index and smoking. Gene set findings implicate both early brain development and neurodegenerative processes in the rates of brain changes. Identifying variants involved in structural brain changes may help to determine biological pathways underlying optimal and dysfunctional brain development and aging.

<https://www.nature.com/articles/s41593-022-01042-4>

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## Nature Reviews Psychology

### PAPERS

#### **JULIA MARSHALL & KATHERINE MCAULIFFE – Children as assessors and agents of third-party punishment**

Responding to wrongdoing is a core feature of our social lives. Indeed, a central assumption of modern institutional justice systems is that transgressors should be punished. In this Review, we synthesize the developmental literature on third-party intervention to provide insight into the types of responses to transgressions that are privileged early in ontogeny. In

particular, we focus on young children as both assessors and agents of third-party punishment. With respect to assessment, children have rich expectations about the pursuit of punishment and evaluate those who punish transgressors positively. With respect to agency, children punish wrongdoing even when doing so is costly, and their motives to do so are tethered to a variety of concerns (such as retribution and restoration). Our Review suggests that key concepts in modern institutional justice systems are apparent in early child development, and that third-party punishment is a signature of children's sophisticated toolkit for regulating social relationships and behaviour.

<https://www.nature.com/articles/s44159-022-00046-y>

## ARTICLES

### **TERESA SCHUBERT – Extended speech planning in Nungon**

Speakers of Nungon, a language of Papua New Guinea, plan their speech nearly three seconds ahead of the current word, according to new research published in *Memory & Cognition*. This result suggests that speech planning can extend nearly three times longer than the previous estimates of this capacity from other languages.

<https://www.nature.com/articles/s44159-022-00055-x>

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## Nature Scientific Reports

### PAPERS

### **KAREN E. SMITH & SETH D. POLLAK – Children's value-based decision making**

To effectively navigate their environments, infants and children learn how to recognize events predict salient outcomes, such as rewards or punishments. Relatively little is known about how children acquire this ability to attach value to the stimuli they encounter. Studies often examine children's ability to learn about rewards and threats using either classical conditioning or behavioral choice paradigms. Here, we assess both approaches and find that they yield different outcomes in terms of which individuals had efficiently learned the value of information presented to them. The findings offer new insights into understanding how to assess different facets of value learning in children.

<https://www.nature.com/articles/s41598-022-09894-3>

### **ANTOINE MULLER, CERI SHIPTON & CHRIS CLARKSON – Stone toolmaking difficulty and the evolution of hominin technological skills**

Stone tools are a manifestation of the complex cognitive and dexterous skills of our hominin ancestors. As such, much research has been devoted to understanding the skill requirements of individual lithic technologies. Yet, comparing skill across different technologies, and thus across the vast timespan of the Palaeolithic, is an elusive goal. We seek to quantify a series of commensurable metrics of knapping skill across four different lithic technologies (discoids, handaxes, Levallois, and prismatic blades). To compare the requisite dexterity, coordination, and care involved in each technology, we analysed video footage and lithic material from a series of replicative knapping experiments to quantify deliberation (strike time), precision (platform area), intricacy (flake size relative to core size), and success (relative blank length). According to these four metrics, discoidal knapping appears to be easiest among the sample. Levallois knapping involved an intricate reduction sequence, but did not require as much motor control as handaxes and especially prismatic blades. Compared with the other Palaeolithic technologies, we conclude that prismatic blade knapping is set apart by being a skill intensive means of producing numerous standardised elongate end-products.

<https://www.nature.com/articles/s41598-022-09914-2>

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## New Scientist

### NEWS

### **Fate of buried Java Man revealed in unseen notes from Homo erectus dig**

One of the first excavations to find extinct human remains took place on Java in the 1890s, and the original documentation reveals details about the mudflow that encased the fossils there.

<https://www.newscientist.com/article/2314321-fate-of-buried-java-man-revealed-in-unseen-notes-from-homo-erectus-dig/#ixzz7Psczvwc5>

### **Crows may owe their intelligence to an abundance of certain neurons**

Corvids such as rooks and crows seem to have a unusually high number of interneurons, brain cells involved in processing information.

<https://www.newscientist.com/article/2314573-crows-may-owe-their-intelligence-to-an-abundance-of-certain-neurons/#ixzz7PsdCNAB4>

## ARTICLES

### **COLIN BARRAS – How fossil footprints are revealing the joy and fear of Stone Age life**

A new wave of archaeological investigations is reconstructing intimate details of our ancestors' lives from fossilised footprints. They give us glimpses of everything from parent-child relationships to the thrill of a giant sloth hunt.

## Philosophical Transactions of the Royal Society B

### PAPERS

#### **SYLVAIN R. T. LEMOINE et al with CATHERINE CROCKFORD & ROMAN M. WITTIG – Parochial cooperation in wild chimpanzees: a model to explain the evolution of parochial altruism**

Parochial altruism, taking individual costs to benefit the in-group and harm the out-group, has been proposed as one of the mechanisms underlying the human ability of large-scale cooperation. How parochial altruism has evolved remains unclear. In this review paper, we formulate a parochial cooperation model in small-scale groups and examine the model in wild chimpanzees. As suggested for human parochial altruism, we review evidence that the oxytocinergic system and in-group cooperation and cohesion during out-group threat are integral parts of chimpanzee collective action during intergroup competition. We expand this model by suggesting that chimpanzee parochial cooperation is supported by the social structure of chimpanzee groups which enables repeated interaction history and established social ties between co-operators. We discuss in detail the role of the oxytocinergic system in supporting parochial cooperation, a pathway that appears integral already in chimpanzees. The reviewed evidence suggests that prerequisites of human parochial altruism were probably present in the last common ancestor between Pan and Homo.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0149>

#### **ANTHONY P. MASSARO et al – Correlates of individual participation in boundary patrols by male chimpanzees**

Group territory defence poses a collective action problem: individuals can free-ride, benefiting without paying the costs. Individual heterogeneity has been proposed to solve such problems, as individuals high in reproductive success, rank, fighting ability or motivation may benefit from defending territories even if others free-ride. To test this hypothesis, we analysed 30 years of data from chimpanzees (*Pan troglodytes*) in the Kasekela community, Gombe National Park, Tanzania (1978–2007). We examined the extent to which individual participation in patrols varied according to correlates of reproductive success (mating rate, rank, age), fighting ability (hunting), motivation (scores from personality ratings), costs of defecting (the number of adult males in the community) and gregariousness (sighting frequency). By contrast to expectations from collective action theory, males participated in patrols at consistently high rates (mean  $\pm$  s.d. =  $74.5 \pm 11.1\%$  of patrols,  $n = 23$  males). The best predictors of patrol participation were sighting frequency, age and hunting participation. Current and former alpha males did not participate at a higher rate than males that never achieved alpha status. These findings suggest that the temptation to free-ride is low, and that a mutualistic mechanism such as group augmentation may better explain individual participation in group territorial behaviour.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0151>

#### **CARSTEN K. W. DE DREU, JÖRG GROSS & LENNART REDDMANN – Environmental stress increases out-group aggression and intergroup conflict in humans**

Peaceful coexistence and trade among human groups can be fragile and intergroup relations frequently transition to violent exchange and conflict. Here we specify how exogenous changes in groups' environment and ensuing carrying-capacity stress can increase individual participation in intergroup conflict, and out-group aggression in particular. In two intergroup contest experiments, individuals could contribute private resources to out-group aggression (versus in-group defense). Environmental unpredictability, induced by making non-invested resources subject to risk of destruction (versus not), created psychological stress and increased participation in and coordination of out-group attacks. Archival analyses of interstate conflicts showed, likewise, that sovereign states engage in revisionist warfare more when their pre-conflict economic and climatic environment were more volatile and unpredictable. Given that participation in conflict is wasteful, environmental unpredictability not only made groups more often victorious but also less wealthy. Macro-level changes in the natural and economic environment can be a root cause of out-group aggression and turn benign intergroup relations violent.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0147>

#### **MIGUEL GARETA GARCÍA et al with REDOUAN BSHARY – Drivers and outcomes of between-group conflict in vervet monkeys**

Neighbouring groups compete over access to resources and territories in between-group encounters, which can escalate into between-group conflicts (BGCs). Both the ecological characteristics of a territory and the rival's fighting ability shape the occurrence and outcome of such contests. What remains poorly understood, however, is how seasonal variability in the ecological value of a territory together with fighting ability related to the likelihood of between-group encounters and the extent to which these escalate into conflicts. To test this, we observed and followed four vervet monkey groups in the wild, and recorded the group structure (i.e. size, composition), the locations and the outcomes of 515 BGCs. We then assessed key ecological measures at these locations, such as vegetation availability (estimated from Copernicus Sentinel 2 satellite images) and the intensity of usage of these locations. We tested to what extent these factors together influenced the occurrence and outcomes of BGCs. We found that the occurrence of BGCs increased at locations with higher vegetation availability relative to the annual vegetation availability within the group's home territory. Also, groups engaging in a BGC at locations far away from their home territory were less likely to win a BGC. Regarding group structure, we found that smaller groups

systematically won BGCs against larger groups, which can be explained by potentially higher rates of individual free-riding occurring in larger groups. This study sheds light on how the ecology of encounter locations in combination with a group's social characteristics can critically impact the dynamics of BGCs in a non-human primate species.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0145>

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