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## NOTICES

### PUBLICATION ALERTS

If you have had a paper or book published, or you see something which would be of interest to the group, do please send me a publication alert so that I can include it in the newsletter. Many thanks to those who have already sent in alerts.

If there is a journal you feel I should be tracking on a regular basis, do let me know.

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

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### ACADEMIA.EDU – "Grammars of Action" and Stone Flaking Design Space

*In April Nowell and Iain Davidson (eds.), Stone Tools and the Evolution of Human Cognition. University Press of Colorado (2010)*

#### MARK W. MOORE – "Grammars of Action" and Stone Flaking Design Space

Human infants and primates use similar strategies to organize utterances and motor actions. These strategies, called "grammars of action," are initially similar followed by an ontogenetic divergence in children that leads to a separation of complex linguistic and action grammars. Thus, more complex grammars arose after the emergence of the hominin lineage. Stone tools are by-products of action grammars that track the evolutionary history of hominin cognition, and this study develops a model of the essential motor actions of stoneworking interpretable in action grammar terms. The model shows that controlled flaking is achieved through integral sets of geometrical identifications and motor actions collectively referred to as the "flake unit." The internal structure of the flake unit was elaborated early in technological evolution and later trends involved combining flake units in more complex ways. Application of the model to the archaeological record suggests that the most complex action grammars arose after 270 kya, although significant epistemological issues in stone artifact studies prevent a more nuanced interpretation.

[https://www.academia.edu/466243/Grammars\\_of\\_action\\_and\\_stone\\_flaking\\_design\\_space](https://www.academia.edu/466243/Grammars_of_action_and_stone_flaking_design_space)

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### ACADEMIA.EDU – The upper limb of *Homo naledi*

*In Journal of Human Evolution 104, 155-173 (2017)*

#### ELEN M. FEUERRIEGEL et al with LEE R. BERGER – The upper limb of *Homo naledi*

The evolutionary transition from an ape-like to human-like upper extremity occurred in the context of a behavioral shift from an upper limb predominantly involved in locomotion to one adapted for manipulation. Selection for overarm throwing and endurance running is thought to have further shaped modern human shoulder girdle morphology and its position about the thorax. *Homo naledi* (Dinaledi Chamber, Rising Star Cave, Cradle of Humankind, South Africa) combines an australopith-like cranial capacity with dental characteristics akin to early *Homo*. Although the hand, foot, and lower limb display many derived

morphologies, the upper limb retains many primitive traits. Here, we describe the *H. naledi* upper extremity (excluding the hand) in detail and in a comparative context to evaluate the diversity of clavicular, scapular, humeral, radial, and ulnar morphology among early hominins and later *Homo*. *Homo naledi* had a scapula with a markedly cranially-oriented glenoid, a humerus with extremely low torsion, and an australopith-like clavicle. These traits indicate that the *H. naledi* scapula was situated superiorly and laterally on the thorax. This shoulder girdle configuration is more similar to that of *Australopithecus* and distinct from that of modern humans, whose scapulae are positioned low and dorsally about the thorax. Although early *Homo erectus* maintains many primitive clavicular and humeral features, its derived scapular morphology suggests a loss of climbing adaptations. In contrast, the *H. naledi* upper limb is markedly primitive, retaining morphology conducive to climbing while lacking many of the derived features related to effective throwing or running purported to characterize other members of early *Homo*.

[https://www.academia.edu/30404622/The\\_upper\\_limb\\_of\\_Homo\\_naledi](https://www.academia.edu/30404622/The_upper_limb_of_Homo_naledi)

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## ACADEMIA.EDU – The Oldowan: The Tool Making of Early Hominins and Chimpanzees Compared

*In The Annual Review of Anthropology 38, 289-305 (2009)*

### NICHOLAS TOTH & KATHY SCHICK – The Oldowan: The Tool Making of Early Hominins and Chimpanzees Compared

The Oldowan was the term first coined by Louis Leakey to describe the world's earliest stone industries, named after the famous site of Olduvai (formerly Oldoway) Gorge in Tanzania. The Oldowan Industrial Complex documents the first definitive evidence of early hominin culture as well as the earliest known archaeological record. This review examines our state of knowledge about the Oldowan and the hominin tool makers who produced this archaeological record and compares and contrasts these patterns with the technological and cultural patterns of modern apes, especially chimpanzees and bonobos. Of special interest are methodological approaches that can attempt to make direct comparisons between the early archaeological record and modern ape material culture, including a long-term collaborative experimental program in teaching modern apes to make and use stone tools.

[https://www.academia.edu/3529349/The\\_Oldowan\\_The\\_Tool\\_Making\\_of\\_Early\\_Hominins\\_and\\_Chimpanzees\\_Compared](https://www.academia.edu/3529349/The_Oldowan_The_Tool_Making_of_Early_Hominins_and_Chimpanzees_Compared)

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## NEWS

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### BREAKING SCIENCE – Is Junk DNA What Makes Human Brain Unique?

In the genome of *Homo sapiens*, about 98% of DNA sequences are non-coding regions that were previously disregarded as 'junk DNA.' In fact, junk DNA contains a variety of regions which precisely control the expression of genes.

[http://feedproxy.google.com/~r/BreakingScienceNews/~3/Vkh3frfWAKc/human-brain-junk-dna-10156.html?utm\\_source=feedburner&utm\\_medium=email](http://feedproxy.google.com/~r/BreakingScienceNews/~3/Vkh3frfWAKc/human-brain-junk-dna-10156.html?utm_source=feedburner&utm_medium=email)

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### NATURE BRIEFING – Tobacco remnants in a prehistoric fire

Hunter-gatherers in North America might have been using tobacco around 12,300 years ago — 9,000 years earlier than was previously documented. Archaeologists found four burnt tobacco-plant seeds in an ancient hearth excavated in Utah. The seeds themselves were too small and fragile to be dated, but other burned woody material in the hearth is around 12,300 years old. "People in the Pleistocene likely smoked tobacco or chewed tobacco in a similar fashion to how it's used today," says archaeologist Jaime Kennedy.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=763a0a8022&e=1db4b9a19b>

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### SAPIENS – What Drove *Homo Erectus* Out of Africa?

Excavations at the site of 'Ubeidiya are at the heart of a debate about *Homo erectus* migrations, with profound implications for questions of human resilience and adaptability.

<https://www.sapiens.org/archaeology/ubeidiya-homo-erectus/>

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### SCIENCE DAILY – Islands are cauldrons of evolution

Islands are hot spots of evolutionary adaptation that can also advantage species returning to the mainland, according to a new study.

<https://www.sciencedaily.com/releases/2021/10/211012112317.htm>

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### SCIENCE DAILY – Gorillas can tell human voices apart

A new study is the first to show that gorillas are able to recognize familiar human voices based on their relationship with the speaker.

<https://www.sciencedaily.com/releases/2021/10/211012112251.htm>

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### SCIENCE DAILY – Early modern human from Southeast Asia adapted to a rainforest environment

Although there has been evidence of our species living in rainforest regions in Southeast Asia from at least 70,000 years ago, the poor preservation of organic material in these regions limits how much we know about their diet and ecological

adaptations to these habitats. An international team of scientists has now applied a new method to investigate the diet of fossil humans: the analysis of stable zinc isotopes from tooth enamel. This method proves particularly helpful to learn whether prehistoric humans and animals were primarily eating meat or plants.

<https://www.sciencedaily.com/releases/2021/10/211014141955.htm>

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### SCIENCE DAILY – Primates' ancestors may have left trees to survive asteroid

When an asteroid struck 66 million years ago and wiped out dinosaurs not related to birds and three-quarters of life on Earth, early ancestors of primates and marsupials were among the only tree-dwelling (arboreal) mammals that survived, according to a new study.

<https://www.sciencedaily.com/releases/2021/10/211013114039.htm>

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### SCIENCE DAILY – Popular theory of Native American origins debunked by genetics and skeletal biology

A widely accepted theory of Native American origins coming from Japan has been attacked in a new scientific study, which shows that the genetics and skeletal biology 'simply does not match-up.'

<https://www.sciencedaily.com/releases/2021/10/211013081606.htm>

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### SOCIETY FOR SCIENCE – How catching birds bare-handed may hint at Neandertals' hunting tactics

By pretending to be Neandertals, researchers show that the ancient hominids likely had the skills to easily hunt crowlike birds called choughs.

<http://click.societyforscience->

[email.com/?qs=e9787934fabd1a678bb9b064cec747e92ccbcbab4ff96e5d2b80a0e4f172cd146544fab21412d33cd255d9ec5233efb30f3f3495c324bcce](mailto:email.com/?qs=e9787934fabd1a678bb9b064cec747e92ccbcbab4ff96e5d2b80a0e4f172cd146544fab21412d33cd255d9ec5233efb30f3f3495c324bcce)

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## PUBLICATIONS

### American Journal of Physical Anthropology

#### PAPERS

#### ASHLEY S. HAMMOND – Ancient bones

*{No abstract or even the slightest hint of what this is about. Seems as if, to some people, we are all just pre-fossils.}*

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24393>

#### REVIEWS

#### JULIE LAWRENCE – Controversy and credibility in the history of paleoanthropology

Review of 'The Orce Man: Controversy, media and politics in human origins research' by Miquel Carandell Baruzzi (2020). Brill Academic Publishers, 264 pp. ISBN 978-90-04-43149-2. (hardcover). ISBN: 978-90-04-43150-8 (E-Book) \$155.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24390>

#### JEFFREY K. MCKEE – Theology and evolutionary anthropology

Review of 'Theology and evolutionary anthropology—Dialogues on wisdom, humility, and grace' by Celia Deane-Drummond & Agustín Fuentes. Routledge (2020).

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24402>

#### COMMENTARIES

#### EDGARD CAMARÓS – Remarks on the cut marks: The Gravettian child from El Castillo (Cantabrian Spain) and the absence of anthropic modifications inferred through taphonomic analysis.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24182>

#### JESÚS GONZÁLEZ-URQUIJO, SHARA E. BAILEY & TALIA LAZUEN – Axlor's level IV human remains are convincingly Neanderthals: A reply to Gómez-Olivencia et al.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24252>

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## Current Biology

#### ARTICLES

#### KRISTINA B. BECK & JOSH A. FIRTH – Animal behavior: Innovation in the city

Behavioral innovations may help animals cope with new environments, but how such behaviors start is hard to capture. A new study reports the innovation and transmission of a new foraging culture in an urban parrot.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(21\)01129-5](https://www.cell.com/current-biology/fulltext/S0960-9822(21)01129-5)

## PAPERS

### **MAXIMILIAN LARENA et al – Philippine Ayta possess the highest level of Denisovan ancestry in the world**

Multiple lines of evidence show that modern humans interbred with archaic Denisovans. Here, we report an account of shared demographic history between Australasians and Denisovans distinctively in Island Southeast Asia. Our analyses are based on ~2.3 million genotypes from 118 ethnic groups of the Philippines, including 25 diverse self-identified Negrito populations, along with high-coverage genomes of Australopapuans and Ayta Magbukon Negritos. We show that Ayta Magbukon possess the highest level of Denisovan ancestry in the world—~30%–40% greater than that of Australians and Papuans—consistent with an independent admixture event into Negritos from Denisovans. Together with the recently described *Homo luzonensis*, we suggest that there were multiple archaic species that inhabited the Philippines prior to the arrival of modern humans and that these archaic groups may have been genetically related. Altogether, our findings unveil a complex intertwined history of modern and archaic humans in the Asia-Pacific region, where distinct Islander Denisovan populations differentially admixed with incoming Australasians across multiple locations and at various points in time.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(21\)00977-5](https://www.cell.com/current-biology/fulltext/S0960-9822(21)00977-5)

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## Frontiers in Ecology and Evolution

### PAPERS

#### **ANDREW V. SUAREZ & MICHAEL A. D. GOODISMAN – Non-kin Cooperation in Ants**

Eusociality represents an extreme form of social behavior characterized by a reproductive division of labor. Eusociality necessarily evolved through kin selection, which requires interactions among related individuals. However, many eusocial taxa also show cooperation between non-kin groups, challenging the idea that cooperative actions should only occur among relatives. This review explores the causes and consequences of non-kin cooperation in ants. Ants display a diversity of behaviors that lead to non-kin cooperation within and between species. These interactions occur among both reproductive and non-reproductive individuals. The proximate and ultimate mechanisms leading to non-kin cooperative interactions differ substantially depending on the biotic and abiotic environment. We end this review with directions for future research and suggest that the investigation of non-kin cooperative actions provides insight into processes leading to social evolution.

<https://www.frontiersin.org/articles/10.3389/fevo.2021.736757/full>

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## Frontiers in Psychology

### PAPERS

#### **JOSÉ MANUEL RODRÍGUEZ ARCE & MICHAEL JAMES WINKELMAN – Psychedelics, Sociality, and Human Evolution**

Our hominin ancestors inevitably encountered and likely ingested psychedelic mushrooms throughout their evolutionary history. This assertion is supported by current understanding of: early hominins' paleodiet and paleoecology; primate phylogeny of mycophagical and self-medicative behaviors; and the biogeography of psilocybin-containing fungi. These lines of evidence indicate mushrooms (including bioactive species) have been a relevant resource since the Pliocene, when hominins intensified exploitation of forest floor foods. Psilocybin and similar psychedelics that primarily target the serotonin 2A receptor subtype stimulate an active coping strategy response that may provide an enhanced capacity for adaptive changes through a flexible and associative mode of cognition. Such psychedelics also alter emotional processing, self-regulation, and social behavior, often having enduring effects on individual and group well-being and sociality. A homeostatic and drug instrumentalization perspective suggests that incidental inclusion of psychedelics in the diet of hominins, and their eventual addition to rituals and institutions of early humans could have conferred selective advantages. Hominin evolution occurred in an ever-changing, and at times quickly changing, environmental landscape and entailed advancement into a socio-cognitive niche, i.e., the development of a socially interdependent lifeway based on reasoning, cooperative communication, and social learning. In this context, psychedelics' effects in enhancing sociality, imagination, eloquence, and suggestibility may have increased adaptability and fitness. We present interdisciplinary evidence for a model of psychedelic instrumentalization focused on four interrelated instrumentalization goals: management of psychological distress and treatment of health problems; enhanced social interaction and interpersonal relations; facilitation of collective ritual and religious activities; and enhanced group decision-making. The socio-cognitive niche was simultaneously a selection pressure and an adaptive response, and was partially constructed by hominins through their activities and their choices. Therefore, the evolutionary scenario put forward suggests that integration of psilocybin into ancient diet, communal practice, and proto-religious activity may have enhanced hominin response to the socio-cognitive niche, while also aiding in its creation. In particular, the interpersonal and prosocial effects of psilocybin may have mediated the expansion of social bonding mechanisms such as laughter, music, storytelling, and religion, imposing a systematic bias on the selective environment that favored selection for prosociality in our lineage.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.729425/full>

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#### **GERD GIGERENZER – Embodied Heuristics**

Intelligence evolved to cope with situations of uncertainty generated by nature, predators, and the behavior of conspecifics. To this end, humans and other animals acquired special abilities, including heuristics that allow for swift action in face of scarce information. In this article, I introduce the concept of embodied heuristics, that is, innate or learned rules of thumb that exploit evolved sensory and motor abilities in order to facilitate superior decisions. I provide a case study of the gaze

heuristic, which solves coordination problems from intercepting prey to catching a fly ball. Various species have adapted this heuristic to their specific sensorimotor abilities, such as vision, echolocation, running, and flying. Humans have enlisted it for solving tasks beyond its original purpose, a process akin to exaptation. The gaze heuristic also made its way into rocket technology. I propose a systematic study of embodied heuristics as a research framework for situated cognition and embodied bounded rationality.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.711289/full>

### **JESSICA N. STEIL, CLAUDIA K. FRIEDRICH & ULRIKE SCHILD – No Evidence of Robust Noun-Referent Associations in German-Learning 6- to 14-Month-Olds**

Work with the looking-while-listening (LWL-) paradigm suggested that 6-month-old English-learning infants associated several labels for common nouns with pictures of their referents: While one distractor picture was present, infants systematically fixated the named target picture. However, recent work revealed constraints of infants' noun comprehension. The age at which these abilities can be obtained appears to relate to the infants' familiarity with the talker, the target language, and word frequency differences in target-distractor pairs. Here, we present further data to this newly established field of research. We tested 42 monolingual German-learning infants aged 6–14 months by means of the LWL-paradigm. Infants saw two pictures side-by-side on a screen, whilst an unfamiliar male talker named one of both. Overall, infants did not fixate the target picture more than the distractor picture. In line with previous results, infants' performance on the task was higher when target and distractor differed within their word frequency—as operationalized by the parental rating of word exposure. Together, our results add further evidence for constraints on early word learning. They point to cross-linguistic differences in early word learning and strengthen the view that infants might use extra-linguistic cues within the stimulus pairing, such as frequency imbalance, to disambiguate between two potential referents.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.718742/full>

### **MINGYUE ZHANG, JINGYI LU & WILLIAM K. HALLMAN – Sharing on Facebook and Face-to-Face What Others Do or Approve: Word-of-Mouth Driven by Social Norms**

Information sharing on social media [i.e., electronic word-of-mouth, (eWOM) and face-to-face word-of-mouth (fWOM)] plays an important role in message dissemination. This study investigates the effectiveness of group norms in motivating eWOM and fWOM. Drawing upon the psychological distance and construal level literature, this study tests the impact of group norms, the interaction effect of norms type (descriptive vs. injunctive norms), and the group distance on eWOM and fWOM. Based on one field study and three laboratory experiments, this study finds that normative cues in messages are impactful in driving WOM and the impact becomes especially stronger when the psychological distance of the social group is congruent with that of norms type tied to the group. Specifically, an interaction effect emerges, such as distant (close) group injunctive (descriptive) norms, are more impactful in driving WOM than close (distant) group injunctive (descriptive) norms. Contrary to the conventional wisdom that a close group has greater impacts than distant groups in terms of social influence, this study shows that messages with distant groups are more (or at least equally) likely to be shared than with a close group when tied with injunctive norms. The findings suggest that group norms are perceived to be more relevant when there is a match between the psychological distance of the social group and the norms type tied to the group.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.712253/full>

### **NICOLAS STEFANIAK, VÉRONIQUE BALTAZART & CHRISTELLE DECLERCQ – Processing Verb Meanings and the Declarative/Procedural Model: A Developmental Study**

According to the Declarative/Procedural Model, the lexicon depends on declarative memory while grammar relies on procedural memory. Furthermore, procedural memory underlies the sequential processing of language. Thus, this system is important for predicting the next item in a sentence. Verb processing represents a good candidate to test this assumption. Semantic representations of verbs include information about the protagonists in the situations they refer to. This semantic knowledge is acquired implicitly and used during verb processing, such that the processing of a verb preactivates its typical patients (e.g., the window for break). Thus, determining how the patient typicality effect appears during children's cognitive development could provide evidence about the memory system that is dedicated to this effect. Two studies are presented in which French children aged 6–10 and adults made grammaticality judgments on 80 auditorily presented sentences. In Experiment 1, the verb was followed by a typical patient or by a less typical patient. In Experiment 2, grammatical sentences were constructed such that the verb was followed either by a typical patient or by a noun that could not be a patient of that verb. The typicality effect occurs in younger children and is interpreted in terms of developmental invariance. We suggest that this effect may depend on procedural memory, in line with studies that showed that meaning is necessary to allow procedural memory to learn the sequence of words in a sentence.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.714523/full>

### **JUNRU WU et al – Cross-Dialectal Novel Word Learning and Borrowing**

The objective of this paper was to study the cognitive processes underlying cross-dialectal novel word borrowing and loanword establishment in a Standard-Chinese-to-Shanghainese (SC-SH) auditory lexical learning and borrowing experiment. To investigate these underlying cognitive processes, SC-SH bi-dialectals were compared with SC monolectals as well as bi-dialectals of SC and other Chinese dialects (OD) to investigate the influence of short-term and long-term linguistic experience.

Both comprehension and production borrowings were tested. This study found that early and proficient bi-dialectism, even if it is not directly related to the recipient dialect of lexical borrowing, has a protective effect on the ability of cross-dialectal lexical borrowing in early adulthood. Bi-dialectals tend to add separate lexical representations for incidentally encountered dialectal variants, while monolectals tend to assimilate dialectal variants to standard forms. Bi-dialectals, but not monolectals, use etymologically related morphemes between the source and recipient dialects to create nonce-borrowing compounds. Dialectal variability facilitates lexical borrowing via enriching instead of increasing the short-term lexical experience of learners. The long-term bi-dialectal experience of individuals, as well as their short-term exposure to each specific loanword, may collectively shape the route of lexical evolution of co-evolving linguistic varieties.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.734527/full>

### **KEN YAOI, MARIKO OSAKA & NAOYUKI OSAKA – Does Implicit Self-Reference Effect Occur by the Instantaneous Own-Name?**

Self-reference effect (SRE) is defined as better recall or recognition performance when the materials that are memorized refer to the self. The SRE paradigm usually requires participants to explicitly refer items to themselves, but some researchers have found that the SRE also can occur for implicitly self-referenced items. Few studies though have investigated the effect of self-related stimuli without awareness. In this study, we presented self-related (participants' names) or other (other's names or nouns) stimuli for a very short time between masks and then explicitly presented subsequent trait adjectives to participants. Recognition performance showed no significant differences between the own-name and the other two conditions in Experiment 1 that had random-order conditions. On the other hand, the result of Experiment 2 that had block-order conditions and greater prime stimuli suggests that SRE can occur as a result of the instantaneous stimulus: Subjects who showed better memory performance also had relatively high recognition of the trait adjectives that they viewed after their instantaneously presented own-name. This effect would show that self-representation can be activated by self-related stimuli without awareness and that subsequent items are unconsciously referenced to that self-representation.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.709601/full>

## **COMMENTARIES**

### **DUSTIN J. PENN & SZABOLCS SZÁMADÓ – Commentary: Why Are No Animal Communication Systems Simple Languages?**

*A Commentary on 'Why Are No Animal Communication Systems Simple Languages?' by Beecher, M. D. (2021). Front. Psychol. 12:602635. doi: 10.3389/fpsyg.2021.602635*

Ever since Darwin, scientists have sought to understand the origins of human language, which has been called "the hardest problem in science" (see Christiansen and Kirby, 2003; Számadó and Szathmáry, 2006 for review). It is difficult to understand why humans are the only species that evolved language. Beecher (2021), a pioneer in the study of birdsong, recently considered this problem and the implications of animal communication research for the evolution of language. He did a splendid job describing the "design features" of language vs. other animal communication systems. However, his summary of honest signaling theory is inaccurate, and he overlooked gene-culture co-evolution for explaining language.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.722685/full>

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## **Nature Neuropsychopharmacology**

### **PAPERS**

#### **SHARON M. KOLK & PASKO RAKIC – Development of prefrontal cortex**

During evolution, the cerebral cortex advances by increasing in surface and the introduction of new cytoarchitectonic areas among which the prefrontal cortex (PFC) is considered to be the substrate of highest cognitive functions. Although neurons of the PFC are generated before birth, the differentiation of its neurons and development of synaptic connections in humans extend to the 3rd decade of life. During this period, synapses as well as neurotransmitter systems including their receptors and transporters, are initially overproduced followed by selective elimination. Advanced methods applied to human and animal models, enable investigation of the cellular mechanisms and role of specific genes, non-coding regulatory elements and signaling molecules in control of prefrontal neuronal production and phenotypic fate, as well as neuronal migration to establish layering of the PFC. Likewise, various genetic approaches in combination with functional assays and immunohistochemical and imaging methods reveal roles of neurotransmitter systems during maturation of the PFC. Disruption, or even a slight slowing of the rate of neuronal production, migration and synaptogenesis by genetic or environmental factors, can induce gross as well as subtle changes that eventually can lead to cognitive impairment. An understanding of the development and evolution of the PFC provide insight into the pathogenesis and treatment of congenital neuropsychiatric diseases as well as idiopathic developmental disorders that cause intellectual disabilities.

<https://www.nature.com/articles/s41386-021-01137-9>

#### **STÉPHANIE MASSOL, JONATHAN MIRAULT & JONATHAN GRAINGER – The contribution of semantics to the sentence superiority effect**

When a sequence of written words is presented briefly and participants are asked to report the identity of one of the words, identification accuracy is higher when the words form a correct sentence. Here we examined the extent to which this sentence superiority effect can be modulated by semantic content. The central hypothesis guiding this study is that the sentence superiority effect is primarily a syntactic effect. We therefore predicted little or no modulation of the effect by semantics. The influence of semantic content was measured by comparing the sentence superiority effect obtained with semantically regular sentences (e.g., son amie danse bien [her friend dances well]) and semantically anomalous but syntactically correct sentences (e.g., votre sac boit gros [your bag drinks big]), with effects being measured against ungrammatical scrambled versions of the same words in both cases. We found sentence superiority effects with both types of sentences, and a significant interaction, such that the effects were greater with semantically regular sentences compared with semantically anomalous sentences. We conclude that sentence-level semantic information can constrain word identities under parallel word processing, albeit with less impact than that exerted by syntax.

<https://www.nature.com/articles/s41598-021-99565-6>

#### **UWE KIRSCHER et al – Age constraints for the Trachilos footprints from Crete**

We present an updated time frame for the 30 m thick late Miocene sedimentary Trachilos section from the island of Crete that contains the potentially oldest hominin footprints. The section is characterized by normal magnetic polarity. New and published foraminifera biostratigraphy results suggest an age of the section within the Mediterranean biozone MMi13d, younger than ~ 6.4 Ma. Calcareous nannoplankton data from sediments exposed near Trachilos and belonging to the same sub-basin indicate deposition during calcareous nannofossil biozone CN9bB, between 6.023 and 6.727 Ma. By integrating the magneto- and biostratigraphic data we correlate the Trachilos section with normal polarity Chron C3An.1n, between 6.272 and 6.023 Ma. Using cyclostratigraphic data based on magnetic susceptibility, we constrain the Trachilos footprints age at ~ 6.05 Ma, roughly 0.35 Ma older than previously thought. Some uncertainty remains related to an inaccessible interval of ~ 8 m section and the possibility that the normal polarity might represent the slightly older Chron C3An.2n. Sediment accumulation rate and biostratigraphic arguments, however, stand against these points and favor a deposition during Chron C3An.1n.

<https://www.nature.com/articles/s41598-021-98618-0>

#### **Gifted dogs can learn 12 words in a week and remember them for months**

Dogs with a special ability to understand human language can learn as many as 12 new words per week – and usually still remember them after a two-month lapse.

<https://www.newscientist.com/article/2292447-gifted-dogs-can-learn-12-words-in-a-week-and-remember-them-for-months/#ixzz79SrKUKTZ>

#### **ULRIKE KUHL et al with LEGASCREEN CONSORTIUM – Mathematical learning deficits originate in early childhood from atypical development of a frontoparietal brain network**

*This is an uncorrected proof.*

Mathematical learning deficits are defined as a neurodevelopmental disorder (dyscalculia) in the International Classification of Diseases. It is not known, however, how such deficits emerge in the course of early brain development. Here, we conducted functional and structural magnetic resonance imaging (MRI) experiments in 3- to 6-year-old children without formal mathematical learning experience. We followed this sample until the age of 7 to 9 years, identified individuals who developed deficits, and matched them to a typically developing control group using comprehensive behavioral assessments. Multivariate pattern classification distinguished future cases from controls with up to 87% accuracy based on the regional functional activity of the right posterior parietal cortex (PPC), the network-level functional activity of the right dorsolateral prefrontal cortex (DLPFC), and the effective functional and structural connectivity of these regions. Our results indicate that mathematical learning deficits originate from atypical development of a frontoparietal network that is already detectable in early childhood.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001407>

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## PNAS

### PAPERS

#### **LAUREL PERKINS & JEFFREY LIDZ – Eighteen-month-old infants represent nonlocal syntactic dependencies**

The human ability to produce and understand an indefinite number of sentences is driven by syntax, a cognitive system that can combine a finite number of primitive linguistic elements to build arbitrarily complex expressions. The expressive power of syntax comes in part from its ability to encode potentially unbounded dependencies over abstract structural configurations. How does such a system develop in human minds? We show that 18-mo-old infants are capable of representing abstract nonlocal dependencies, suggesting that a core property of syntax emerges early in development. Our test case is English wh-questions, in which a fronted wh-phrase can act as the argument of a verb at a distance (e.g., What did the chef burn?). Whereas prior work has focused on infants' interpretations of these questions, we introduce a test to probe their underlying syntactic representations, independent of meaning. We ask when infants know that an object wh-phrase and a local object of a verb cannot co-occur because they both express the same argument relation (e.g., \*What did the chef burn the pizza). We find that 1) 18 mo olds demonstrate awareness of this complementary distribution pattern and thus represent the nonlocal grammatical dependency between the wh-phrase and the verb, but 2) younger infants do not. These results suggest that the second year of life is a period of active syntactic development, during which the computational capacities for representing nonlocal syntactic dependencies become evident.

<https://www.pnas.org/content/118/41/e2026469118.abstract>

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## Proceedings of the Royal Society B

### PAPERS

#### **BEN J. EVANS et al – Mitonuclear interactions and introgression genomics of macaque monkeys (*Macaca*) highlight the influence of behaviour on genome evolution**

In most macaques, females are philopatric and males migrate from their natal ranges, which results in pronounced divergence of mitochondrial genomes within and among species. We therefore predicted that some nuclear genes would have to acquire compensatory mutations to preserve compatibility with diverged interaction partners from the mitochondria. We additionally expected that these sex-differences would have distinctive effects on gene flow in the X and autosomes. Using new genomic data from 29 individuals from eight species of Southeast Asian macaque, we identified evidence of natural selection associated with mitonuclear interactions, including extreme outliers of interspecies differentiation and metrics of positive selection, low intraspecies polymorphism and atypically long runs of homozygosity associated with nuclear-encoded genes that interact with mitochondria-encoded genes. In one individual with introgressed mitochondria, we detected a small but significant enrichment of autosomal introgression blocks from the source species of her mitochondria that contained genes which interact with mitochondria-encoded loci. Our analyses also demonstrate that sex-specific demography sculpts genetic exchange across multiple species boundaries. These findings show that behaviour can have profound but indirect effects on genome evolution by influencing how interacting components of different genomic compartments (mitochondria, the autosomes and the sex chromosomes) move through time and space.

<https://royalsocietypublishing.org/doi/full/10.1098/rspb.2021.1756>

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## Science Advances

### PAPERS

#### **JILLIAN J. JORDAN & MARYAM KOUCHAKI – Virtuous victims**

How do people perceive the moral character of victims? We find, across a range of transgressions, that people frequently see victims of wrongdoing as more moral than nonvictims who have behaved identically. Across 17 experiments (total n = 9676), we document this Virtuous Victim effect and explore the mechanisms underlying it. We also find support for the Justice Restoration Hypothesis, which proposes that people see victims as moral because this perception serves to motivate punishment of perpetrators and helping of victims, and people frequently face incentives to enact or encourage these "justice-restorative" actions. Our results validate predictions of this hypothesis and suggest that the Virtuous Victim effect does not merely reflect (i) that victims look good in contrast to perpetrators, (ii) that people are generally inclined to positively evaluate those who have suffered, or (iii) that people hold a genuine belief that victims tend to be people who behave morally.

<https://www.science.org/doi/full/10.1126/sciadv.abg5902>

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