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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.

### SCIENCE NEWS – Oldest cousin of Native Americans found in Russia

A new study has revealed the oldest link yet between Native Americans and their ancestors in East Asia: a 14,000-year-old tooth belonging to a close cousin of today’s Native Americans, found thousands of kilometers from the landmass that once connected Eurasia and the Americas.

[https://www.sciencemag.org/news/2020/05/oldest-cousin-native-americans-found-russia?utm\\_campaign=news\\_daily\\_2020-05-20](https://www.sciencemag.org/news/2020/05/oldest-cousin-native-americans-found-russia?utm_campaign=news_daily_2020-05-20)

### SOCIETY FOR SCIENCE – Africa’s biggest collection of ancient human footprints has been found

Preserved impressions in East Africa offer a glimpse of ancient human behavior.

<http://click.societyforscience-email.com/?qs=b2f3041fae6c522fc3cf4d86cfbb33a51aabf73c37a3bfab12f1e71198b2453b87b6ba9c5a22a241a00f18c4cb2ec1dbb3130d2c21629ff>

### SOCIETY FOR SCIENCE – The oldest genetic link between Asians and Native Americans found in Siberia

DNA from a fragment of a 14,000-year-old tooth suggests that Native Americans have widespread Asian ancestry.

<http://click.societyforscience-email.com/?qs=ea2531221a939f1aa0c5bc91d63a22725efa03948553112f56e4db5e5346f5c9e3c12e506624993c79e739f040475e9f13376fe8afa3a41b>

### BREAKING SCIENCE – Australopithecus sediba Used Hands for Both Climbing & Human-Like Manipulation

An international team of paleoanthropologists has found that the hand of Australopithecus sediba, a small hominin that lived about 2 million years ago in what is now South Africa, was used for both human-like manipulation as well as branch grasping, and that this hand use is distinct from other fossil hominins, including Australopithecus afarensis and Australopithecus africanus.

[http://feedproxy.google.com/~r/BreakingScienceNews/~3/IG-VoDVtpsM/australopithecus-sediba-hand-use-08453.html?utm\\_source=feedburner&utm\\_medium=email](http://feedproxy.google.com/~r/BreakingScienceNews/~3/IG-VoDVtpsM/australopithecus-sediba-hand-use-08453.html?utm_source=feedburner&utm_medium=email)

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## BREAKING SCIENCE – 300,000-Year-Old Wooden Throwing Stick Found in Germany

A team of archaeologists from the University of Tübingen and the University of Liège has unearthed a well-preserved wooden throwing stick at the Middle Pleistocene open-air site at Schöningen in northern Germany. The locality of Schöningen contains over 20 archaeological sites that date to the Middle Pleistocene and is well known for its exceptional preservation. [http://feedproxy.google.com/~r/BreakingScienceNews/~3/knSz7ovTqzs/schoningen-wooden-throwing-stick-08456.html?utm\\_source=feedburner&utm\\_medium=email](http://feedproxy.google.com/~r/BreakingScienceNews/~3/knSz7ovTqzs/schoningen-wooden-throwing-stick-08456.html?utm_source=feedburner&utm_medium=email)

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## SCIENCE DAILY – Oldest connection with Native Americans identified near Lake Baikal in Siberia

Using human population genetics, ancient pathogen genomics and isotope analysis, a team of researchers assessed the population history of the Lake Baikal region, finding the deepest connection to date between the peoples of Siberia and the Americas. The current study also demonstrates human mobility, and hence connectivity, across Eurasia during the Early Bronze Age.

<https://www.sciencedaily.com/releases/2020/05/200520131657.htm>

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## SCIENCE DAILY – Supercomputer model simulations reveal cause of Neanderthal extinction

Climate scientists discover that according to new supercomputer model simulations, only competition between Neanderthals and Homo sapiens can explain the rapid demise of Neanderthals around 43 to 38 thousand years ago.

<https://www.sciencedaily.com/releases/2020/05/200520120731.htm>

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## SCIENCE DAILY – Cooperation can be contagious particularly when people see the benefit for others

Seeing someone do something good for someone else motivates witnesses to perform their own helpful acts, an insight that could help drive cooperative behavior in communities navigating through the health crisis.

<https://www.sciencedaily.com/releases/2020/05/200519144452.htm>

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## SCIENCE DAILY – Migration patterns reveal an Eden for ancient humans and animals

Researchers have discovered a new migration pattern (or lack of) at Pinnacle Point, a now-submerged region in South Africa. While it was first believed large omnivores would travel to follow the growth of vegetation to survive, our researcher came to a completely new conclusion through studying antelope teeth! They discovered that this region was an Eden to all living species that called it home, including the earliest humans.

<https://www.sciencedaily.com/releases/2020/05/200522140210.htm>

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## NATURE BRIEFING – A major reboot for carbon dating

Radiocarbon dating is due to be recalibrated using a slew of new data from around the world, including those from tree rings, lake and ocean sediments, corals and stalagmites. The result could have implications for the estimated ages of many finds — such as Siberia's oldest modern human fossils, which according to the latest calibrations are 1,000 years younger than previously thought. Archaeologists are downright giddy. "This is a particularly exciting time to be working on the past," says archaeological chronologist Tom Higham.

<https://nature.us17.list-manage.com/track/click?u=2c6057c528fdc6f73fa196d9d&id=65603de160&e=1db4b9a19b>

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## RESEARCHGATE – Crop-raiding elephants and the moon

*Animal Behavior and Cognition*, 7(2), 131-139.

### MAËL LEROUX & SIMON W. TOWNSEND – Call Combinations In Great Apes and the Evolution of Syntax

Following the observation that vervet monkeys are capable of labelling different predator types with their vocalizations, comparative research in language evolution gained increasing interest. Over the last four decades, an impressive body of data has since accumulated demonstrating that many features of language can be found in the communication systems of nonhuman primates. One stumbling block to the phylogenetic reconstruction of language, however, has been language's syntactic layer. We specifically highlight that, whilst current studies provide promising evidence for syntactic-like structures in the communication systems of monkeys, reconstructing the evolutionary origins of syntax hinges on comparable data from our closest-living relatives, the great apes. We critically assess existing data on potential candidates for combinatorial structures in the great ape clade and conclude that further experimental investigation is crucial to validating preliminary observational findings.

[https://www.researchgate.net/publication/341108789\\_Call\\_combinations\\_in\\_great\\_apes\\_and\\_the\\_evolution\\_of\\_syntax](https://www.researchgate.net/publication/341108789_Call_combinations_in_great_apes_and_the_evolution_of_syntax)

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## PUBLICATIONS

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### Current Biology

#### ARTICLES

##### **D. KIMBROUGH OLLER et al – Infant boys are more vocal than infant girls**

Although it is generally assumed females have a language advantage over males, Oller et al., studying all-day recordings of 100 infants, found that boys in the first year of life produced more speech-like vocalizations than girls and that the effect size was more than four times larger than the commonly reported female language advantage.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(20\)30419-X?dgcid=raven\\_jbs\\_etoc\\_email](https://www.cell.com/current-biology/fulltext/S0960-9822(20)30419-X?dgcid=raven_jbs_etoc_email)

#### PAPERS

##### **ANILA M. D'MELLO, JOHN D.E. GABRIELI & DEREK EVAN NEE – Evidence for Hierarchical Cognitive Control in the Human Cerebellum**

In non-habitual situations, cognitive control aligns actions with both short- and long-term goals. The capacity for cognitive control is tightly tied to the prefrontal cortex, whose expansion in humans relative to other species is thought to support our superior cognitive control. However, the posterolateral cerebellum has also expanded greatly relative to non-human primates and has an organizational structure that mirrors the prefrontal cortex. Nevertheless, cerebellar contributions to cognitive control are poorly understood. Here, we sought to explore whether a functional hierarchical processing framework, applied to the cerebellum, could elucidate cerebellar contributions to cognitive control. Using functional magnetic resonance imaging, we show that a gradient within the posterolateral cerebellum supports cognitive control with motor-adjacent cerebellar sub-regions supporting control of concrete, proximal actions and motor-distal, cerebellar sub-regions supporting abstract, future processing. This gradient was functionally hierarchical, with regions higher in the hierarchy influencing the relationship between regions lower in the hierarchy. This functional hierarchy provides the infrastructure by which context can inform current actions and prepare for future goals. Crucially, this mirrors the hierarchical organization of cognitive control within the prefrontal cortex. Based on these findings, we propose that the cerebellum contains within itself a parallel but separate hierarchical organization that, along with the prefrontal cortex, supports complex cognition.

[https://www.cell.com/current-biology/fulltext/S0960-9822\(20\)30366-3?dgcid=raven\\_jbs\\_etoc\\_email](https://www.cell.com/current-biology/fulltext/S0960-9822(20)30366-3?dgcid=raven_jbs_etoc_email)

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### Evolutionary Human Sciences

#### PAPERS

##### **YINQIU CUI et al – Bioarchaeological perspective on the expansion of Transeurasian languages in Neolithic Amur River basin**

Owing to the development of sequencing technology, paleogenomics has become an important source of information on human migration and admixture, complementing findings from archaeology and linguistics. In this study, we retrieved the whole genome and Y chromosome lineage from late Neolithic Honghe individuals in the Middle Amur region in order to provide a bioarchaeological perspective on the origin and expansion of Transeurasian languages in the Amur River basin. Our genetic analysis reveals that the population of the Amur River basin has a stable and continuous genetic structure from the Mesolithic Age up to date. Integrating linguistic and archaeological evidence, we support the hypothesis that the expansion of the Transeurasian language system in the Amur River basin is related to the agricultural development and expansion of the southern Hongshan culture. The spread of agricultural technology resulted in the addition of millet cultivation to the original subsistence mode of fishing and hunting. It played a vital role in the expansion of the population of the region, which in its turn has contributed to the spread of language.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/bioarchaeological-perspective-on-the-expansion-of-transeurasian-languages-in-neolithic-amur-river-basin/70D28FAB333D120EA9F4701AE192C891>

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### Frontiers in Psychology

#### PAPERS

##### **HELEN GOODLUCK & NINA KAZANINA – Fragments Along the Way: Minimalism as an Account of Some Stages in First Language Acquisition**

In this article we will explore some of the potential that comes out of Minimalist syntax for an account of stages in language acquisition, focussing on the early emergence of word order, and the role of interface conditions in explaining children's behavior. Our discussion does not aim to be a comprehensive account of language acquisition in a Minimalist framework—such an account would require far more research, which is (to our knowledge) yet to be done. However, we can point to a common thread in the examples we discuss: In each case, we need to understand the relationship between performance mechanisms (the mechanisms for language production and comprehension) and the syntax on which these mechanisms draw.

[https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00584/full?utm\\_source=F-AAE&utm\\_medium=EMLF&utm\\_campaign=MRK\\_1332835\\_69\\_Psycho\\_20200519\\_arts\\_A](https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00584/full?utm_source=F-AAE&utm_medium=EMLF&utm_campaign=MRK_1332835_69_Psycho_20200519_arts_A)

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## Human Nature

### GET TO KNOW PAPERS

#### **ANNA ILONA ROBERTS, LINDSAY MURRAY & SAM GEORGE BRADLEY ROBERTS – Complex Sociality of Wild Chimpanzees Can Emerge from Laterality of Manual Gestures**

Humans are strongly lateralized for manual gestures at both individual and population levels. In contrast, the laterality bias in primates is less strong, leading some to suggest that lateralization evolved after the Pan and Homo lineages diverged. However, laterality in humans is also context-dependent, suggesting that observed differences in lateralization between primates and humans may be related to external factors such as the complexity of the social environment. Here we address this question in wild chimpanzees and examine the extent to which the laterality of manual gestures is associated with social complexity. Right-handed gestures were more strongly associated with goal-directed communication such as repair through elaboration in response to communication failure than left-handed gestures. Right-handed gestures occurred in evolutionarily urgent contexts such as in interactions with central individuals in the network, including grooming reciprocity and mating, whereas left-handed gestures occurred in less-urgent contexts, such as travel and play. Right-handed gestures occurred in smaller parties and in the absence of social competition relative to left-handed gestures. Right-handed gestures increased the rate of activities indicating high physiological arousal in the recipient, whereas left-handed gestures reduced it. This shows that right- and left-handed gestures differ in cognitive and social complexity, with right-handed gestures facilitating more complex interactions in simpler social settings, whereas left-handed gestures facilitate more rewarding interactions in complex social settings. Differences in laterality between other primates and humans are likely to be driven by differences in the complexity of both the cognitive skills underpinning social interactions and the social environment.

<https://link.springer.com/article/10.1007/s12110-019-09347-3>

#### **SANDRINE GALLOIS et al – Social Networks and Knowledge Transmission Strategies among Baka Children, Southeastern Cameroon**

The dynamics of knowledge transmission and acquisition, or how different aspects of culture are passed from one individual to another and how they are acquired and embodied by individuals, are central to understanding cultural evolution. In small-scale societies, cultural knowledge is largely acquired early in life through observation, imitation, and other forms of social learning embedded in daily experiences. However, little is known about the pathways through which such knowledge is transmitted, especially during middle childhood and adolescence. This study presents new empirical data on cultural knowledge transmission during childhood. Data were collected among the Baka, a forager-farmer society in southeastern Cameroon. We conducted structured interviews with children between 5 and 16 years of age (n = 58 children; 177 interviews, with children being interviewed 1–6 times) about group composition during subsistence activities. Children's groups were generally diverse, although children tended to perform subsistence activities primarily without adults and with same-sex companions. Group composition varied from one subsistence activity to another, which suggests that the flow of knowledge might also vary according to the activity performed. Analysis of the social composition of children's subsistence groups shows that vertical and oblique transmission of subsistence-related knowledge might not be predominant during middle childhood and adolescence. Rather, horizontal transmission appears to be the most common knowledge transmission strategy used by Baka children during middle childhood and adolescence, highlighting the importance of other children in the transmission of knowledge.

<https://link.springer.com/article/10.1007/s12110-018-9328-0>

#### **BARBARA FRUTH & GOTTFRIED HOHMANN – Food Sharing across Borders: First Observation of Intercommunity Meat Sharing by Bonobos at LuiKotale, DRC**

Evolutionary models consider hunting and food sharing to be milestones that paved the way from primate to human societies. Because fossil evidence is scarce, hominoid primates serve as referential models to assess our common ancestors' capacity in terms of communal use of resources, food sharing, and other forms of cooperation. Whereas chimpanzees form male-male bonds exhibiting resource-defense polygyny with intolerance and aggression toward nonresidents, bonobos form male-female and female-female bonds resulting in relaxed relations with neighboring groups. Here we report the first known case of meat sharing between members of two bonobo communities, revealing a new dimension of social tolerance in this species. This observation testifies to the behavioral plasticity that exists in the two Pan species and contributes to scenarios concerning the traits of the last common ancestor of Pan and Homo. It also contributes to the discussion of physiological triggers of in-group/out-group behavior and allows reconsideration of the emergence of social norms in prehuman societies.

<https://link.springer.com/article/10.1007/s12110-018-9311-9>

#### **SHEINA LEW-LEVY et al – How Do Hunter-Gatherer Children Learn Subsistence Skills? A Meta-Ethnographic Review**

Hunting and gathering is, evolutionarily, the defining subsistence strategy of our species. Studying how children learn foraging skills can, therefore, provide us with key data to test theories about the evolution of human life history, cognition, and social behavior. Modern foragers, with their vast cultural and environmental diversity, have mostly been studied individually. However, cross-cultural studies allow us to extrapolate forager-wide trends in how, when, and from whom hunter-gatherer children learn their subsistence skills. We perform a meta-ethnography, which allows us to systematically extract, summarize, and compare both quantitative and qualitative literature. We found 58 publications focusing on learning subsistence skills. Learning begins early in infancy, when parents take children on foraging expeditions and give them toy

versions of tools. In early and middle childhood, children transition into the multi-age playgroup, where they learn skills through play, observation, and participation. By the end of middle childhood, most children are proficient food collectors. However, it is not until adolescence that adults (not necessarily parents) begin directly teaching children complex skills such as hunting and complex tool manufacture. Adolescents seek to learn innovations from adults, but they themselves do not innovate. These findings support predictive models that find social learning should occur before individual learning. Furthermore, these results show that teaching does indeed exist in hunter-gatherer societies. And, finally, though children are competent foragers by late childhood, learning to extract more complex resources, such as hunting large game, takes a lifetime.

<https://link.springer.com/article/10.1007/s12110-017-9302-2>

### **MICHAEL TOMASELLO & IVAN GONZALEZ-CABRERA – The Role of Ontogeny in the Evolution of Human Cooperation**

To explain the evolutionary emergence of uniquely human skills and motivations for cooperation, Tomasello et al. (2012, in *Current Anthropology* 53(6):673–92) proposed the interdependence hypothesis. The key adaptive context in this account was the obligate collaborative foraging of early human adults. Hawkes (2014, in *Human Nature* 25(1):28–48), following Hrdy (Mothers and Others, Harvard University Press, 2009), provided an alternative account for the emergence of uniquely human cooperative skills in which the key was early human infants' attempts to solicit care and attention from adults in a cooperative breeding context. Here we attempt to reconcile these two accounts. Our composite account accepts Hrdy's and Hawkes's contention that the extremely early emergence of human infants' cooperative skills suggests an important role for cooperative breeding as adaptive context, perhaps in early Homo. But our account also insists that human cooperation goes well beyond these nascent skills to include such things as the communicative and cultural conventions, norms, and institutions created by later Homo and early modern humans to deal with adult problems of social coordination. As part of this account we hypothesize how each of the main stages of human ontogeny (infancy, childhood, adolescence) was transformed during evolution both by infants' cooperative skills "migrating up" in age and by adults' cooperative skills "migrating down" in age.

<https://link.springer.com/article/10.1007/s12110-017-9291-1>

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## Mind & Language

### PAPERS

#### **WILLIAM ROCHE & ELLIOTT SOBER – Hypotheses that attribute false beliefs: A two-part epistemology (Darwin + Akaike)**

Why expect organisms that have beliefs to have false beliefs? And if an organism occasionally occupies a neural state that encodes a perceptual belief, how do you evaluate hypotheses about the state's semantic content, where some of those hypotheses attribute beliefs that are sometimes false while others attribute beliefs that are always true? To address the first of these questions, we discuss evolution by natural selection. To address the second, we discuss a problem that is widely recognized in statistics, the problem of overfitting, and use the Akaike Information Criterion to solve epistemological versions of the disjunction and distality problems.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12298?campaign=wolearlyview>

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## Nature

### PAPERS

#### **JEAN-JACQUES HUBLIN et mul with SVANTE PÄÄBO – Initial Upper Palaeolithic Homo sapiens from Bacho Kiro Cave, Bulgaria**

The Middle to Upper Palaeolithic transition in Europe witnessed the replacement and partial absorption of local Neanderthal populations by Homo sapiens populations of African origin. However, this process probably varied across regions and its details remain largely unknown. In particular, the duration of chronological overlap between the two groups is much debated, as are the implications of this overlap for the nature of the biological and cultural interactions between Neanderthals and H. sapiens. Here we report the discovery and direct dating of human remains found in association with Initial Upper Palaeolithic artefacts, from excavations at Bacho Kiro Cave (Bulgaria). Morphological analysis of a tooth and mitochondrial DNA from several hominin bone fragments, identified through proteomic screening, assign these finds to H. sapiens and link the expansion of Initial Upper Palaeolithic technologies with the spread of H. sapiens into the mid-latitudes of Eurasia before 45 thousand years ago. The excavations yielded a wealth of bone artefacts, including pendants manufactured from cave bear teeth that are reminiscent of those later produced by the last Neanderthals of western Europe. These finds are consistent with models based on the arrival of multiple waves of H. sapiens into Europe coming into contact with declining Neanderthal populations.

<https://www.nature.com/articles/s41586-020-2259-z>

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## Nature Communications

### PAPERS

#### **ZERESENAY ALEMSEGED et al – Fossils from Mille-Logya, Afar, Ethiopia, elucidate the link between Pliocene environmental changes and Homo origins**

Several hypotheses posit a link between the origin of Homo and climatic and environmental shifts between 3 and 2.5 Ma. Here we report on new results that shed light on the interplay between tectonics, basin migration and faunal change on the one hand and the fate of Australopithecus afarensis and the evolution of Homo on the other. Fieldwork at the new Mille-Logya site in the Afar, Ethiopia, dated to between 2.914 and 2.443 Ma, provides geological evidence for the northeast migration of the Hadar Basin, extending the record of this lacustrine basin to Mille-Logya. We have identified three new fossiliferous units, suggesting in situ faunal change within this interval. While the fauna in the older unit is comparable to that at Hadar and Dikika, the younger units contain species that indicate more open conditions along with remains of Homo. This suggests that Homo either emerged from Australopithecus during this interval or dispersed into the region as part of a fauna adapted to more open habitats.

<https://www.nature.com/articles/s41467-020-16060-8>

#### **JAEWEON SHIN et al – Scale and information-processing thresholds in Holocene social evolution**

Throughout the Holocene, societies developed additional layers of administration and more information-rich instruments for managing and recording transactions and events as they grew in population and territory. Yet, while such increases seem inevitable, they are not. Here we use the Seshat database to investigate the development of hundreds of polities, from multiple continents, over thousands of years. We find that sociopolitical development is dominated first by growth in polity scale, then by improvements in information processing and economic systems, and then by further increases in scale. We thus define a Scale Threshold for societies, beyond which growth in information processing becomes paramount, and an Information Threshold, which once crossed facilitates additional growth in scale. Polities diverge in socio-political features below the Information Threshold, but reconverge beyond it. We suggest an explanation for the evolutionary divergence between Old and New World polities based on phased growth in scale and information processing. We also suggest a mechanism to help explain social collapses with no evident external causes.

<https://www.nature.com/articles/s41467-020-16035-9>

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## Nature Scientific Reports

### PAPERS

#### **MADELEINE LONG, HANNAH ROHDE & PAULA RUBIO-FERNANDEZ – The pressure to communicate efficiently continues to shape language use later in life**

Language use is shaped by a pressure to communicate efficiently, yet the tendency towards redundancy is said to increase in older age. The longstanding assumption is that saying more than is necessary is inefficient and may be driven by age-related decline in inhibition (i.e. the ability to filter out irrelevant information). However, recent work proposes an alternative account of efficiency: In certain contexts, redundancy facilitates communication (e.g., when the colour or size of an object is perceptually salient and its mention aids the listener's search). A critical question follows: Are older adults indiscriminately redundant, or do they modulate their use of redundant information to facilitate communication? We tested efficiency and cognitive capacities in 200 adults aged 19–82. Irrespective of age, adults with better attention switching skills were redundant in efficient ways, demonstrating that the pressure to communicate efficiently continues to shape language use later in life.

<https://www.nature.com/articles/s41598-020-64475-6>

#### **KEVIN G. HATALA et al – Snapshots of human anatomy, locomotion, and behavior from Late Pleistocene footprints at Engare Sero, Tanzania**

Fossil hominin footprints preserve data on a remarkably short time scale compared to most other fossil evidence, offering snapshots of organisms in their immediate ecological and behavioral contexts. Here, we report on our excavations and analyses of more than 400 Late Pleistocene human footprints from Engare Sero, Tanzania. The site represents the largest assemblage of footprints currently known from the human fossil record in Africa. Speed estimates show that the trackways reflect both walking and running behaviors. Estimates of group composition suggest that these footprints were made by a mixed-sex and mixed-age group, but one that consisted of mostly adult females. One group of similarly-oriented trackways was attributed to 14 adult females who walked together at the same pace, with only two adult males and one juvenile accompanying them. In the context of modern ethnographic data, we suggest that these trackways may capture a unique snapshot of cooperative and sexually divided foraging behavior in Late Pleistocene humans.

<https://www.nature.com/articles/s41598-020-64095-0>

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## Philosophical Transactions of the Royal Society B

### PAPERS

#### **SARA E. MILLER, MICHAEL J. SHEEHAN & H. KERN REEVE – Coevolution of cognitive abilities and identity signals in individual recognition systems**

Social interactions are mediated by recognition systems, meaning that the cognitive abilities or phenotypic diversity that facilitate recognition may be common targets of social selection. Recognition occurs when a receiver compares the phenotypes produced by a sender with a template. Coevolution between sender and receiver traits has been empirically reported in multiple species and sensory modalities, though the dynamics and relative exaggeration of traits from senders versus receivers have received little attention. Here, we present a coevolutionary dynamic model that examines the conditions under which senders and receivers should invest effort in facilitating individual recognition. The model predicts coevolution of sender and receiver traits, with the equilibrium investment dependent on the relative costs of signal production versus cognition. In order for recognition to evolve, initial sender and receiver trait values must be above a threshold, suggesting that recognition requires some degree of pre-existing diversity and cognitive abilities. The analysis of selection gradients demonstrates that the strength of selection on sender signals and receiver cognition is strongest when the trait values are furthest from the optima. The model provides new insights into the expected strength and dynamics of selection during the origin and elaboration of individual recognition, an important feature of social cognition in many taxa.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2019.0467>

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## PLoS Biology

### PAPERS

#### **ANA G. PEREIRA, MATHEUS FARIAS & MARTA A. MOITA – Thalamic, cortical, and amygdala involvement in the processing of a natural sound cue of danger**

Animals use auditory cues generated by defensive responses of others to detect impending danger. Here we identify a neural circuit in rats involved in the detection of one such auditory cue, the cessation of movement-evoked sound resulting from freezing. This circuit comprises the dorsal subnucleus of the medial geniculate body (MGD) and downstream areas, the ventral area of the auditory cortex (VA), and the lateral amygdala (LA). This study suggests a role for the auditory offset pathway in processing a natural sound cue of threat.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000674>

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## PLoS One

### PAPERS

#### **LAUREL S. MORRIS et al – Dissociating self-generated volition from externally-generated motivation**

Insight into motivational processes may be gained by examining measures of willingness to exert effort for rewards, which have been linked to neuropsychiatric symptoms of anhedonia and apathy. However, while much work has focused on the development of models of motivation based on classic tasks of externally-generated levels of effort for reward, there has been less focus on the question of self-generated motivation or volition. We developed a task that aims to capture separate measures of self-generated and externally-generated motivation, with two task variants for physical and cognitive effort, and sought to test and validate this measure in two populations of healthy volunteers (N = 27 and N = 28). Similar to previous reports, a sigmoid function represented a better overall fit to the effort-reward data than a linear or Weibull model. Individual sigmoid function shapes were governed by two free parameters: bias (the amount of reward needed for effort initiation) and reward insensitivity (the amount of increase in reward needed to accelerate effort expenditure). For both physical and cognitive effort, bias was higher in the self-generated condition, indicating reduced self-generated volitional effort initiation, compared to externally-generated effort initiation, across effort domains. Bias against initial effort initiation in the self-generated condition was related to a specific dimensional measure of anticipatory anhedonia. For physical effort only, reward insensitivity was also higher in the self-generated condition compared to the externally-generated motivation condition, indicating lower self-generated effort acceleration. This work provides a novel objective measure of self-generated motivation that may provide insights into mechanisms of anhedonia and related symptoms.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0232949>

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#### **BRITTANY L. JONES et al – Five members of a mixed-sex group of bottlenose dolphins share a stereotyped whistle contour in addition to maintaining their individually distinctive signature whistles**

Most commonly, animal communication systems are driven by shared call repertoires, with some individual distinctiveness encoded as a byproduct of voice cues. We provide evidence that bottlenose dolphins produce both individually distinctive whistles, and a shared whistle type. A stereotyped whistle contour (termed the group whistle) is shared by five bottlenose dolphins that have lived, worked, and traveled together for at least 21 years. These five dolphins are members of a group of eight dolphins that work as a specialized team for the Navy Marine Mammal Program. Each dolphin is routinely recorded during periods when an individual is isolated from the others in above ground pools as part of their routine training. Each of the eight dolphins has an individually distinctive signature whistle. In addition, at least five of these dolphins share a distinct non-signature whistle type. This shared whistle contour was produced an average of 22.4% +/- 9.0% of the time during periods in which individuals were isolated. During these isolations the signature whistle was produced an average of 42.9%

+/- 11.9% of the time. This is consistent with decades of signature whistle research. A group of 10 naïve observers rated the similarity of the different whistle contours. The observers rated the group whistle contour produced by all five dolphins as highly similar ( $P < 0.01$ ). Their ratings further showed that the signature whistles of the five dolphins were very different ( $P < 0.01$ ). These findings were further supported by discriminant function analyses. That said, the shared whistle contours still exhibited individual differences which may allow conspecifics to identify the producer even when a whistle contour is shared among multiple dolphins. This is the first in-depth analysis of a non-signature whistle type shared among multiple conspecifics.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0233658>

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## PNAS

### PAPERS

#### **INGELA ALGER et al – Paternal provisioning results from ecological change**

Paternal provisioning among humans is puzzling because it is rare among primates and absent in nonhuman apes and because emergent provisioning would have been subject to paternity theft. A provisioning “dad” loses fitness at the hands of nonprovisioning, mate-seeking “cads.” Recent models require exacting interplay between male provisioning and female choice to overcome this social dilemma. We instead posit that ecological change favored widespread improvements in male provisioning incentives, and we show theoretically how social obstacles to male provisioning can be overcome. Greater availability of energetically rich, difficult-to-acquire foods enhances female–male and male–male complementarities, thus altering the fitness of dads versus cads. We identify a tipping point where gains from provisioning overcome costs from paternity uncertainty and the dad strategy becomes viable. Stable polymorphic states are possible, meaning that dads need not necessarily eliminate cads. Our simulations suggest that with sufficient complementarities, dads can emerge even in the face of high paternity uncertainty. Our theoretical focus on ecological change as a primary factor affecting the trade-off between male mating and parenting effort suggests different possibilities for using paleo-climatic, archaeological, and genomic evidence to establish the timing of and conditions associated with emergence of paternal provisioning in the hominin lineage.

<https://www.pnas.org/content/117/20/10746.abstract?etoc>

#### **XUECHUNZI BAI, MIGUEL R. RAMOS & SUSAN T. FISKE – As diversity increases, people paradoxically perceive social groups as more similar**

With globalization and immigration, societal contexts differ in sheer variety of resident social groups. Social diversity challenges individuals to think in new ways about new kinds of people and where their groups all stand, relative to each other. However, psychological science does not yet specify how human minds represent social diversity, in homogeneous or heterogeneous contexts. Mental maps of the array of society’s groups should differ when individuals inhabit more and less diverse ecologies. Nonetheless, predictions disagree on how they should differ. Confirmation bias suggests more diversity means more stereotype dispersion: With increased exposure, perceivers’ mental maps might differentiate more among groups, so their stereotypes would spread out (disperse). In contrast, individuation suggests more diversity means less stereotype dispersion, as perceivers experience within-group variety and between-group overlap. Worldwide, nationwide, individual, and longitudinal datasets ( $n = 12,011$ ) revealed a diversity paradox: More diversity consistently meant less stereotype dispersion. Both contextual and perceived ethnic diversity correlate with decreased stereotype dispersion. Countries and US states with higher levels of ethnic diversity (e.g., South Africa and Hawaii, versus South Korea and Vermont), online individuals who perceive more ethnic diversity, and students who moved to more ethnically diverse colleges mentally represent ethnic groups as more similar to each other, on warmth and competence stereotypes. Homogeneity shows more-differentiated stereotypes; ironically, those with the least exposure have the most-distinct stereotypes. Diversity means less-differentiated stereotypes, as in the melting pot metaphor. Diversity and reduced dispersion also correlate positively with subjective wellbeing.

<https://www.pnas.org/content/early/2020/05/19/2000333117.abstract?etoc>

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## Trends in Cognitive Sciences

### ARTICLES

#### **CAROLYN PARKINSON & MENG DU – How Does the Brain Infer Hidden Social Structures?**

Many everyday thoughts and actions are shaped not only by our direct relationships with others, but also by our knowledge of relations between third-parties. Lau et al. recently demonstrated how knowledge of one type of social relation – interpersonal similarity – shapes cognition and behavior, and shed light on the neural basis of such phenomena.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(20\)30113-3?dgcid=raven\\_jbs\\_aip\\_email](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(20)30113-3?dgcid=raven_jbs_aip_email)

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