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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.

ACADEMIA.EDU – Human origin sites and the World Heritage Convention in Asia

World Heritage Papers 39. United Nations Educational, Scientific and Cultural Organization: Paris(2014).

NURIA SANZ (ED.) – Human origin sites and the World Heritage Convention in Asia

Prehistoric sites are the cornerstone for research into the origins of humanity, its evolution and social development – but they are underrepresented in the UNESCO World Heritage List. We are all familiar with iconic prehistoric sites in Africa, Latin America and Europe, but less so with such sites in Asia.

https://www.academia.edu/10036445/Out_of_Africa_and_the_evolution_of_human_populations_in_Asia_thoughts_about_the_nomination_of_prehistoric_sites_to_the_World_Heritage_List_in_UNESCO_World_Heritage_papers_no_39

ACADEMIA.EDU – The Indian Subcontinent and ‘Out of Africa I’

J.G. Fleagle et al. (eds.), Out of Africa I: The First Hominin Colonization of Eurasia, Springer (2010).

PARTH R. CHAUHAN – The Indian Subcontinent and ‘Out of Africa I’

The last few decades of paleoanthropological research has raised important issues about the rate and chrono-geographical extent of early hominin dispersals from Africa into Eurasia. Owing to its geographic position, the Indian subcontinent has a pivotal role to play in addressing such issues. This ecologically diverse landmass critically lies between the three sources of the oldest Homo fossils in the Old World and a southern route of expansion from Africa to Southeast Asia, through this region, has often been inferred. Claims of Plio-Pleistocene Oldowan assemblages have been made since the 1960s and come from the Narmada Valley in central India and from the Siwalik Hills in northern Pakistan and northern India. This paper critically reviews each of these claims and broadly discusses associated Plio-Pleistocene environments and geographic routes of entry. A large majority of these reported occurrences represents unsubstantiated claims and require further scientific verification through additional evidence. Tentative scenarios for the current absence of paleoanthropological evidence older than the Middle Pleistocene are also briefly discussed. This current lack of Oldowan assemblages, however, does not reflect an unquestionable absence of hominin occupation in the region. Ecologically conducive environments in the form of open grasslands, a seasonal monsoon regime, diverse fauna and eco-habitats (i.e., diverse hunting/scavenging opportunities), and an abundance of water and stone resources suggest the possible earlier presence of hominins in South Asia. Obviously, much more field research is required to test and confirm their early presence/absence in this geographically important region of the Old World.

[https://www.academia.edu/1261934/The Indian Subcontinent and Out of Africa I](https://www.academia.edu/1261934/The_Indian_Subcontinent_and_Out_of_Africa_I)

ACADEMIA.EDU – The Early Paleolithic of the Indian Subcontinent

J.G. Fleagle et al. (eds.), Out of Africa I: The First Hominin Colonization of Eurasia, Springer (2010).

MICHAEL D. PETRAGLIA – The Early Paleolithic of the Indian Subcontinent: Hominin Colonization, Dispersals and Occupation History

The Indian subcontinent contains a multitude of Early Paleolithic sites which are important for understanding dispersal processes and the paleodemography of early humans. Mode I sites appear to be scarce whereas Acheulean occurrences are found in some abundance, particularly within basins that provided a perennial water supply, high biomass, and raw material sources. Though the record of Acheulean habitation appears to extend over the long term in South Asia, site distributions and site counts do not necessarily imply that populations were large and permanent in any particular region. Acheulean tool-making traditions in South Asia contrast considerably with contemporaneous tool assemblages in East Asia, though there are intriguing technological similarities with the Chinese stone tool assemblages from the Luonan Basin, suggesting a more complicated scenario for the evolution of populations in Asia.

[https://www.academia.edu/484866/The Early Paleolithic of the Indian Subcontinent Hominin Colonization Dispersals and Occupation History](https://www.academia.edu/484866/The_Early_Paleolithic_of_the_Indian_Subcontinent_Hominin_Colonization_Dispersals_and_Occupation_History)

NEWS

BREAKING SCIENCE – Scientists Investigate Stone Tool Making and Using Abilities in Orangutans

Early stone tools represent one of the most important technological milestones in human evolution. The production and use of sharp stone tools significantly widened the ecological niche of our ancestors, allowing them to exploit new food resources. However, despite their importance, it is still unclear how these early stone technologies emerged and which behaviors served as stepping-stones for the development of systematic stone tool production in our lineage.

http://www.sci-news.com/biology/stone-tool-making-orangutans-10562.html?utm_source=feedburner&utm_medium=email

SCIENCE DAILY – Orangutans instinctively use hammers to strike and sharp stones to cut

Untrained, captive orangutans can complete two major steps in the sequence of stone tool use: striking rocks together and cutting using a sharp stone, according to a new study.

<https://www.sciencedaily.com/releases/2022/02/220216140255.htm>

SCIENCE DAILY – Sudden evolutionary change

Researchers have identified a case of a sudden evolutionary change. In a new study, the scientists describe a population of columbines that have lost their petals, including the characteristic nectar spurs. The finding adds weight to the idea that adaptation can occur in large jumps, rather than merely plodding along over extended timespans.

<https://www.sciencedaily.com/releases/2022/02/220216112300.htm>

SCIENCE DAILY – What lies behind a baby’s eyes

We give meaning to our world through the categorization of objects. When and how does this process begin? By studying the gaze of one hundred infants, scientists have demonstrated that, by the age of fourth months, babies can assign objects that

they have never seen to the animate or inanimate category. These findings reveal measurable changes in neural organization, which reflect the transition from simply viewing the world to understanding it.

<https://www.sciencedaily.com/releases/2022/02/220216112257.htm>

SCIENCE DAILY – More evidence suggests self-awareness is also for some fish

Researchers address criticisms to previous work by providing additional evidence to suggest the cleaner fish *Labroides dimidiatus* has Mirror Self-Recognition.

<https://www.sciencedaily.com/releases/2022/02/220217141331.htm>

SCIENCE DAILY – Flies possess more sophisticated cognitive abilities than previously known

Common flies feature more advanced cognitive abilities than previously believed. Using a custom-built immersive virtual reality arena, neurogenetics and real-time brain activity imaging, researchers found attention, working memory and conscious awareness-like capabilities in fruit flies.

<https://www.sciencedaily.com/releases/2022/02/220217141245.htm>

PUBLICATIONS

American Journal of Biological Anthropology

ARTICLES

PAIGE MADISON – Encountering the new Neanderthals

No abstract is available for this article.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24484>

eLife

PAPERS

CHRISTIAN BRODBECK et al with ELLEN LAU – Parallel processing in speech perception with local and global representations of linguistic context

Speech processing is highly incremental. It is widely accepted that human listeners continuously use the linguistic context to anticipate upcoming concepts, words, and phonemes. However, previous evidence supports two seemingly contradictory models of how a predictive context is integrated with the bottom-up sensory input: Classic psycholinguistic paradigms suggest a two-stage process, in which acoustic input initially leads to local, context-independent representations, which are then quickly integrated with contextual constraints. This contrasts with the view that the brain constructs a single coherent, unified interpretation of the input, which fully integrates available information across representational hierarchies, and thus uses contextual constraints to modulate even the earliest sensory representations. To distinguish these hypotheses, we tested magnetoencephalography responses to continuous narrative speech for signatures of local and unified predictive models. Results provide evidence that listeners employ both types of models in parallel. Two local context models uniquely predict some part of early neural responses, one based on sublexical phoneme sequences, and one based on the phonemes in the current word alone; at the same time, even early responses to phonemes also reflect a unified model that incorporates sentence-level constraints to predict upcoming phonemes. Neural source localization places the anatomical origins of the different predictive models in nonidentical parts of the superior temporal lobes bilaterally, with the right hemisphere showing a relative preference for more local models. These results suggest that speech processing recruits both local and unified predictive models in parallel, reconciling previous disparate findings. Parallel models might make the perceptual system more robust, facilitate processing of unexpected inputs, and serve a function in language acquisition.

<https://elifesciences.org/articles/72056>

Evolutionary Anthropology

PAPERS

LUCA POZZI & ANNA PENNA – Rocks and clocks revised: New promises and challenges in dating the primate tree of life

In recent years, multiple technological and methodological advances have increased our ability to estimate phylogenies, leading to more accurate dating of the primate tree of life. Here we provide an overview of the limitations and potentials of some of these advancements and discuss how dated phylogenies provide the crucial temporal scale required to understand primate evolution. First, we review new methods, such as the total-evidence dating approach, that promise a better integration between the fossil record and molecular data. We then explore how the ever-increasing availability of genomic-level data for more primate species can impact our ability to accurately estimate timetrees. Finally, we discuss more recent applications of mutation rates to date divergence times. We highlight example studies that have applied these approaches to estimate divergence dates within primates. Our goal is to provide a critical overview of these new developments and explore the promises and challenges of their application in evolutionary anthropology.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21940>

REVIEWS

MANUEL DOMÍNGUEZ-RODRIGO – Savannas, human evolution, and only in Africa

No abstract is available for this article.

“\$59 secures a copy. I believe it is called “buying a pig in a poke”.”

<https://onlinelibrary.wiley.com/doi/abs/10.1002/evan.21938>

Frontiers for Young Minds

PAPERS

KATHERINE A. CRONIN & LYDIA M. HOPPER – Do Monkeys Care What Is Fair?

Scientists study fairness in humans, apes, and monkeys to understand the evolutionary origins of our own behavior and to better understand the behavior of other primates. Scientists studying monkeys have found that, sometimes, monkeys will share food equally with others, but their choices often depend on their species and the specific circumstances. Monkeys are more likely to help friends, but even then, monkeys rarely go out of their way to act fairly. Furthermore, while monkeys appear to recognize unfair outcomes, they only seem concerned by inequity when they receive less than others, not when they receive more.

<https://kids.frontiersin.org/articles/10.3389/frym.2020.550299>

NATALIA GRUBE, HECTOR H. GARCIA & GEORGE H. PERRY – Human Diet Evolution: Meat, Fire, and Tapeworms

The human diet today is very different than the diets of other primates, implying major changes following the split of the human and chimpanzee/bonobo lineages about 6 million years ago. For example, at various timepoints our ancestors began consistently eating meat, cooking food with fire, and consuming products from domesticated plants and animals. Such dietary shifts are important to study because they were likely associated with important cultural and biological changes like tool use and increased brain size. However, the timing of some of these dietary shifts is extremely difficult to study with only archeological and fossil data, leading to uncertainty. In this article, we discuss how studies of human tapeworm parasites can help. Tapeworms could only have been acquired once meat was being consistently consumed and then may have later adapted to heat stress from human cooking.

<https://kids.frontiersin.org/articles/10.3389/frym.2020.555342>

Frontiers in Communication

PAPERS

LAURA ISRAEL, LARS KONIECZNY & EVELYN C. FERSTL – Cognitive and Affective Aspects of Verbal Humor: A Visual-World Eye-Tracking Study

Many theories of verbal humour postulate that the funniness of jokes is caused by an incongruity in the punchline whose resolution yields a feeling of mirth. While there are studies testing the prediction that this situation model updating leads to increases in processing costs, there are few studies directly assessing the time course of when the alternative situation models are entertained. In a visual world paradigm, stories were presented auditorily and displays were presented illustrating either the situation implied by the context or the final interpretation after the punchline. Eye movement data confirmed the switch from the initial to the final interpretation for jokes as well as for non-funny control stories that also required a situation model revision. In addition to these effects of the cognitive revision requirements, the pupil dilations were sensitive to the affective component of joke comprehension. These results are discussed in light of incongruity theories of verbal humour.

<https://www.frontiersin.org/articles/10.3389/fcomm.2021.758173/full>

FRÉDÉRIC TOMAS, OLIVIER DODIER & SAMUEL DEMARCHI – Computational Measures of Deceptive Language: Prospects and Issues

In this article, we wish to foster a dialogue between theory-based and classification-oriented stylometric approaches regarding deception detection. To do so, we review how cue-based and model-based stylometric systems are used to detect deceit. Baseline methods, common cues, recent methods, and field studies are presented. After reviewing how computational stylometric tools have been used for deception detection purposes, we show that the he stylometric methods and tools cannot be applied to deception detection problems on the field in their current state. We then identify important advantages and issues of stylometric tools. Advantages encompass quickness of extraction and robustness, allowing for best interviewing practices. Issues are discussed in terms of oral data transcription issues and automation bias emergence. We finally establish future research proposals: We emphasize the importance of baseline assessment and the need for transcription methods, and the concern of ethical standards regarding the applicability of stylometry for deception detection purposes in practical settings, while encouraging the cooperation between linguists, psychologists, engineers, and practitioners requiring deception detection methods.

<https://www.frontiersin.org/articles/10.3389/fcomm.2022.792378/full>

Frontiers in Ecology and Evolution

PAPERS

MADELEINE M. OSTWALD, BRIAN R. HANEY & JENNIFER H. FEWELL – Ecological Drivers of Non-kin Cooperation in the Hymenoptera

Despite the prominence of kin selection as a framework for understanding the evolution of sociality, many animal groups are comprised of unrelated individuals. These non-kin systems provide valuable models that can illuminate drivers of social evolution beyond indirect fitness benefits. Within the Hymenoptera, whose highly related eusocial groups have long been cornerstones of kin selection theory, groups may form even when indirect fitness benefits for helpers are low or absent. These non-kin groups are widespread and abundant, yet have received relatively little attention. We review the diversity and organization of non-kin sociality across the Hymenoptera, particularly among the communal bees and polygynous ants and wasps. Further, we discuss common drivers of sociality across these groups, with a particular focus on ecological factors. Ecological contexts that favor non-kin sociality include those dominated by resource scarcity or competition, climatic stressors, predation and parasitism, and/or physiological constraints associated with reproduction and resource exploitation. Finally, we situate Hymenopteran non-kin sociality within a broader biological context by extending insights from these systems across diverse taxa, especially the social vertebrates. Non-kin social groups thus provide unique demonstrations of the importance of ecological factors in mediating the evolutionary transition from solitary to group living.

<https://www.frontiersin.org/articles/10.3389/fevo.2022.768392/full>

SAMIR OKASHA – The Major Transitions in Evolution—A Philosophy-of-Science Perspective

Over the last thirty years, the study of major evolutionary transitions has become a thriving research program within evolutionary biology. In addition to its obvious scientific interest, this research program raises interesting philosophical questions. These fall into two categories: conceptual and ontological. The former category includes questions about what exactly an evolutionary transition is, what form an evolutionary explanation of a transition should take, and whether a general theory that applies to all transitions is possible. The latter category includes questions about the status of the higher-level units to which evolutionary transitions give rise (e.g., organism, superorganism, or individual), and about the nature of the resulting hierarchical organization. Tackling these questions requires an integrative approach that draws on both biology and the philosophy of science.

<https://www.frontiersin.org/articles/10.3389/fevo.2022.793824/full>

Frontiers in Psychology

PAPERS

JÜRGEN KRÜGER – Inattentive Perception, Time, and the Incomprehensibility of Consciousness

Cerebral energy supply is insufficient to support continuous neuronal processing of the plethora of time-constant objects that we are aware of. As a result, the brain is forced to limit processing resources to (the most relevant) cases of change. The neuronally generated world is thus temporally discontinuous. This parallels the fact that, in all relevant microscopic fundamental equations of nature, temporal change plays a dominant role. When a scientist calculates a “solution” to such an equation, integration over time is an essential step. The present Hypothesis expresses that the step from neuronal activity to phenomenal content of consciousness is reflective of a (phenomenal) “solution:” the main source of the incomprehensibility of consciousness is proposed to result from the introduction of phenomenal time-constant entities. These are “filled-in” via integration, even though neuronal data only exists for changes to these entities. In this way, a temporally continuous picture of the world phenomenally appears. Qualia are “initial conditions,” which are required for integration and cannot be deduced from present data. Phenomenal “identity” (vs. “high similarity”) is related to qualia. Inattentive visual perception, which is only rarely investigated, offers insights into these relationships. Introspectively, unattended vision appears rich because percepts are cumulated over long time spans, whereas attentive perception relies purely on present neuronal signals. The present Hypothesis is that a brief neuronal activity can signify long-lasting and constant phenomenal content of consciousness. Experimental support is presented that comes from discrepancies between neuronal activity and perception: transient neuronal responses to sustained stimuli, “filling-in,” change blindness, identity vs. close resemblance.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.804652/full>

YING-YU CHEN, DUSTIN R. RUBENSTEIN & SHENG-FENG SHEN – Cooperation and Lateral Forces: Moving Beyond Bottom-Up and Top-Down Drivers of Animal Population Dynamics

Biologists have long known that animal population dynamics are regulated by a combination of bottom-up (resource availability) and top-down forces (predation). Yet, economists have argued that human population dynamics can also be influenced by intraspecific cooperation. Despite awareness of the role of interspecific cooperation (mutualism) in influencing resource availability and animal population dynamics, the role of intraspecific cooperation (sociality) under different environmental conditions has rarely been considered. Here we examine the role of what we call “lateral forces” that act within populations and interact with external top-down and bottom-up forces in influencing population dynamics using an individual-based model linking environmental quality, intraspecific cooperation, and population size. We find that the proportion of cooperators is higher when the environment is poor and population sizes are greatest under intermediate resources levels due to the contrasting effects of resource availability on behavior and population size. We also show that

social populations are more resilient to environmental change than non-social ones because the benefits of intraspecific cooperation can outweigh the effects of constrained resource availability. Our study elucidates the complex relationship between environmental harshness, cooperation, and population dynamics, which is important for understanding the ecological consequences of cooperation.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.768773/full>

MANASVI LINGAM – The Possible Role of Body Temperature in Modulating Brain and Body Sizes in Hominin Evolution

Many models have posited that the concomitant evolution of large brains and body sizes in hominins was constrained by metabolic costs. In such studies, the impact of body temperature has arguably not been sufficiently addressed despite the well-established fact that the rates of most physiological processes are manifestly temperature-dependent. Hence, the potential role of body temperature in regulating the number of neurons and body size is investigated by means of a heuristic quantitative model. It is suggested that modest deviations in body temperature (i.e., by a couple of degrees Celsius) might allow for substantive changes in brain and body parameters. In particular, a higher body temperature may prove amenable to an increased number of neurons, a higher brain-to-body mass ratio and fewer hours expended on feeding activities, while the converse could apply when the temperature is lowered. Future studies should, therefore, endeavor to explore and incorporate the effects of body temperature in metabolic theories of hominin evolution, while also integrating other factors such as foraging efficiency, diet, and fire control in tandem.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.774683/full>

TILL NIKOLAUS VON HEISELER – How Language and Human Altruism Evolved Hand in Hand – The Backchannel Hypothesis

This paper contributes to two debates: the debate about language evolution and the debate about the foundations of human collaboration. While both cooperation and language may give the impression of being adaptations that evolved for the “good of the group,” it is well established that the evolution of complex traits cannot be a direct result of group selection. In this paper I suggest how this tension can be solved: both language and cooperation evolved in a unique two-level evolutionary system which was triggered by a well-documented geological event—the drying out of the climate—in East Africa, which subsequently reduced the intermating between groups and thus made it possible that the mechanism that produced differences between groups (including social forms of selection such as female choice) could be the target of natural selection on the group level. If a social form of selection (e.g., sexual selection) produced differences in fitness between groups, the displacement process between groups would indirectly select those forms of social selection that produce groups that would displace all others. The main hypothesis presented in this paper is that, in this situation, a backchannel between the two levels of selection naturally evolves. A backchannel between the two levels would, for example, emerge when sexual selection (or any other form of social selection) was sensitive to the individual’s contribution to the group. Examples of systems utilizing a backchannel are nerve cells being better nourished when used more frequently, enabling them to be conducive to the survival of the whole organism, or a law firm in which all employees get paid to the extent that they contribute to the survival and success of the firm. In both cases, the selection on the higher level informs the selection on the lower level. The aim of the paper is to illuminate these rather opaque claims, to which the reader probably has many objections in this abridged form.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.735375/full>

HUI-XIAN LI & XIAOMENG HU – Dialectical Thinking Is Linked With Smaller Left Nucleus Accumbens and Right Amygdala

Our current work examined the interface between thinking style and emotional experience at both the behavioral and neuropsychological levels. Thirty-nine Chinese participants completed the triad task, and we calculated the rate of individually selected relationship pairings to overall selections to represent their holistic thinking tendencies. In addition, participants in the top one-third of the ratio score were classified into the high holistic thinking group, while those in the bottom one-third of the ratio score were classified into the low holistic thinking group. We used the sensitivity to punishment and sensitivity to reward questionnaire (SPSRQ) to examine how people elicit positive and negative affective behaviors. Additionally, we examined the volume of the amygdala and nucleus accumbens and their functional connectivity in the resting-state. We found that high holistic thinkers were much less sensitive to rewards than low holistic thinkers. In other words, individuals with high holistic thinking are less likely to pursue behaviors that have positive emotional outcomes. Furthermore, their bilateral nucleus accumbens and right amygdala volumes were smaller than those of low holistic thinkers. Hierarchical regression analysis showed that holistic thinking tendency can negatively predict the volume of the left nucleus accumbens and right amygdala. Finally, resting-state functional connectivity results showed increased functional connectivity FC between left nucleus accumbens and bilateral amygdala in high holistic thinkers. These findings provide emotion-related manifestations of thinking styles at the behavioral and neural levels.

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.760489/full>

Language Sciences

PAPERS

ROBERTA COLONNA DAHLMAN & JOOST VAN DE WEIJER – Cognitive factive verbs across languages

In the last few years, the traditional analysis of know as a factive verb has been lively debated by linguists and philosophers of language: several scholars have pointed out that know may be used non-factively in ordinary language. The aim of the present study is to expand this inquiry to other cognitive factive verbs than know, such as discover, realize, etc., and to investigate cross-linguistically the question of whether know and other cognitive factive verbs may occur in non-factive contexts, that is, in contexts where it is clear that the embedded proposition is false. Moreover, we investigate whether so-called evidential uses of cognitive factive verbs are acceptable across languages. We administered an online survey to native speakers of nine different languages (English, French, German, Greek, Italian, Portuguese, Serbian, Spanish, and Swedish), and we found considerable cross-linguistic variation in the acceptability of the use of know and other cognitive factive verbs in non-factive contexts. For Italian and English, we put forward the claim that non-factive uses of cognitive factives instantiate a case of polysemy resulting from a process of semantic change that moves along a three-step pattern: from a factive sense to a more general non-factive sense to a non-factive sense characterized by an evidential function.

<https://www.sciencedirect.com/science/article/pii/S0388000121001054>

Mind & Language

PAPERS

MICHAEL DEIGAN – Don't trust Fodor's guide in Monte Carlo: Learning concepts by hypothesis testing without circularity

Fodor argued that learning a concept by hypothesis testing would involve an impossible circularity. I show that Fodor's argument implicitly relies on the assumption that actually ϕ -ing entails an ability to ϕ . But this assumption is false in cases of ϕ -ing by luck, and just such luck is involved in testing hypotheses with the kinds of generative random sampling methods that many cognitive scientists take our minds to use. Concepts thus can be learned by hypothesis testing without circularity, and it is plausible that this is how humans in fact acquire at least some of their concepts.

<https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.12366>

Nature Communications

ARTICLES

EDITORIAL – Language matters for impact, not acceptance

Authors from non-English speaking countries can feel disadvantaged if they are not fluent in English. At Communications Earth & Environment, we disregard language imperfections in our decisions, and ask our reviewers to do the same—as long as the science is clear.

<https://www.nature.com/articles/s43247-022-00370-4>

PAPERS

CHARLOTTE CAUCHETEUX & JEAN-RÉMI KING – Brains and algorithms partially converge in natural language processing

Deep learning algorithms trained to predict masked words from large amount of text have recently been shown to generate activations similar to those of the human brain. However, what drives this similarity remains currently unknown. Here, we systematically compare a variety of deep language models to identify the computational principles that lead them to generate brain-like representations of sentences. Specifically, we analyze the brain responses to 400 isolated sentences in a large cohort of 102 subjects, each recorded for two hours with functional magnetic resonance imaging (fMRI) and magnetoencephalography (MEG). We then test where and when each of these algorithms maps onto the brain responses. Finally, we estimate how the architecture, training, and performance of these models independently account for the generation of brain-like representations. Our analyses reveal two main findings. First, the similarity between the algorithms and the brain primarily depends on their ability to predict words from context. Second, this similarity reveals the rise and maintenance of perceptual, lexical, and compositional representations within each cortical region. Overall, this study shows that modern language algorithms partially converge towards brain-like solutions, and thus delineates a promising path to unravel the foundations of natural language processing.

<https://www.nature.com/articles/s42003-022-03036-1>

Nature Scientific Data

PAPERS

NICOLÁS NIETO et al – Thinking out loud, an open-access EEG-based BCI dataset for inner speech recognition

Surface electroencephalography is a standard and noninvasive way to measure electrical brain activity. Recent advances in artificial intelligence led to significant improvements in the automatic detection of brain patterns, allowing increasingly faster, more reliable and accessible Brain-Computer Interfaces. Different paradigms have been used to enable the human-machine interaction and the last few years have broad a mark increase in the interest for interpreting and characterizing the

“inner voice” phenomenon. This paradigm, called inner speech, raises the possibility of executing an order just by thinking about it, allowing a “natural” way of controlling external devices. Unfortunately, the lack of publicly available electroencephalography datasets, restricts the development of new techniques for inner speech recognition. A ten-participant dataset acquired under this and two others related paradigms, recorded with an acquisition system of 136 channels, is presented. The main purpose of this work is to provide the scientific community with an open-access multiclass electroencephalography database of inner speech commands that could be used for better understanding of the related brain mechanisms.

<https://www.nature.com/articles/s41597-022-01147-2>

Nature Scientific Reports

PAPERS

MICHEL BELYK et al – Individual differences in vocal size exaggeration

The human voice carries socially relevant information such as how authoritative, dominant, and attractive the speaker sounds. However, some speakers may be able to manipulate listeners by modulating the shape and size of their vocal tract to exaggerate certain characteristics of their voice. We analysed the veridical size of speakers’ vocal tracts using real-time magnetic resonance imaging as they volitionally modulated their voice to sound larger or smaller, corresponding changes to the size implied by the acoustics of their voice, and their influence over the perceptions of listeners. Individual differences in this ability were marked, spanning from nearly incapable to nearly perfect vocal modulation, and was consistent across modalities of measurement. Further research is needed to determine whether speakers who are effective at vocal size exaggeration are better able to manipulate their social environment, and whether this variation is an inherited quality of the individual, or the result of life experiences such as vocal training.

<https://www.nature.com/articles/s41598-022-05170-6>

SONIA DÍAZ-NAVARRO et al – The first otologic surgery in a skull from El Pendón site (Reinosa, Northern Spain)

Archaeological research in the Dolmen of El Pendón (Reinosa, Burgos, Spain) has brought to light the complex biography of a megalithic monument used throughout the 4th millennium cal. BC. The ossuary of this burial holds the bones of nearly a hundred individuals who suffered from diverse pathologies and injuries. This study presents the discovery of a skull with two bilateral perforations on both mastoid bones. These evidences point to a mastoidectomy, a surgical procedure possibly performed to relieve the pain this prehistoric individual may have suffered as a result of otitis media and mastoiditis. The hypothesis of surgical intervention is also supported by the presence of cut marks at the anterior edge of the trepanation made in the left ear. Furthermore, the results of this paper demonstrate the survival of the individual to both interventions. Given the chronology of this dolmen, this find would be the earliest surgical ear intervention in the history of mankind.

<https://www.nature.com/articles/s41598-022-06223-6>

New Scientist

NEWS

Modern humans moved into cave one year after Neanderthals abandoned it

About 10,000 years before modern humans colonised Europe, a small group of them moved into a cave in southern France that had just been abandoned by Neanderthals – but they only stayed there for about 40 years.

<https://www.newscientist.com/article/2307747-modern-humans-moved-into-cave-one-year-after-neanderthals-abandoned-it/#ixzz7LBoPuR1D>

PLoS Biology

ARTICLES

AKIKO CALLAN & DANIEL E. CALLAN – Understanding how the human brain tracks emitted speech sounds to execute fluent speech production

Auditory feedback of one’s own speech is used to monitor and adaptively control fluent speech production. A new study in PLOS Biology using electrocorticography (ECoG) in listeners whose speech was artificially delayed identifies regions involved in monitoring speech production.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001533>

PAPERS

MUGE OZKER et al – A cortical network processes auditory error signals during human speech production to maintain fluency

Hearing one’s own voice is critical for fluent speech production as it allows for the detection and correction of vocalization errors in real time. This behavior known as the auditory feedback control of speech is impaired in various neurological disorders ranging from stuttering to aphasia; however, the underlying neural mechanisms are still poorly understood. Computational models of speech motor control suggest that, during speech production, the brain uses an efference copy of the motor command to generate an internal estimate of the speech output. When actual feedback differs from this internal estimate, an error signal is generated to correct the internal estimate and update necessary motor commands to produce

intended speech. We were able to localize the auditory error signal using electrocorticographic recordings from neurosurgical participants during a delayed auditory feedback (DAF) paradigm. In this task, participants hear their voice with a time delay as they produced words and sentences (similar to an echo on a conference call), which is well known to disrupt fluency by causing slow and stutter-like speech in humans. We observed a significant response enhancement in auditory cortex that scaled with the duration of feedback delay, indicating an auditory speech error signal. Immediately following auditory cortex, dorsal precentral gyrus (dPreCG), a region that has not been implicated in auditory feedback processing before, exhibited a markedly similar response enhancement, suggesting a tight coupling between the 2 regions. Critically, response enhancement in dPreCG occurred only during articulation of long utterances due to a continuous mismatch between produced speech and reafferent feedback. These results suggest that dPreCG plays an essential role in processing auditory error signals during speech production to maintain fluency.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001493>

MASANORI KOHDA et al with REDOUAN BSHARY – Further evidence for the capacity of mirror self-recognition in cleaner fish and the significance of ecologically relevant marks

Preceding Article: 7 Feb 2019: Kohda M, Hotta T, Takeyama T, Awata S, Tanaka H, et al. (2019) If a fish can pass the mark test, what are the implications for consciousness and self-awareness testing in animals?. PLOS Biology 17(2): e3000021.

<https://doi.org/10.1371/journal.pbio.3000021>

An animal that tries to remove a mark from its body that is only visible when looking into a mirror displays the capacity for mirror self-recognition (MSR), which has been interpreted as evidence for self-awareness. Conservative interpretations of existing data conclude that convincing evidence for MSR is currently restricted to great apes. Here, we address proposed shortcomings of a previous study on MSR in the cleaner wrasse *Labroides dimidiatus*, by varying preexposure to mirrors and by marking individuals with different colors. We found that (1) 14/14 new individuals scraped their throat when a brown mark had been provisioned, but only in the presence of a mirror; (2) blue and green color marks did not elicit scraping; (3) intentionally injecting the mark deeper beneath the skin reliably elicited spontaneous scraping in the absence of a mirror; (4) mirror-naïve individuals injected with a brown mark scraped their throat with lower probability and/or lower frequency compared to mirror-experienced individuals; (5) in contrast to the mirror images, seeing another fish with the same marking did not induce throat scraping; and (6) moving the mirror to another location did not elicit renewed aggression in mirror-experienced individuals. Taken together, these results increase our confidence that cleaner fish indeed pass the mark test, although only if it is presented in ecologically relevant contexts. Therefore, we reiterate the conclusion of the previous study that either self-awareness in animals or the validity of the mirror test needs to be revised.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001529>

WILLEM M. OTTE et al – Analysis of 567,758 randomized controlled trials published over 30 years reveals trends in phrases used to discuss results that do not reach statistical significance

This is an uncorrected proof.

The power of language to modify the reader's perception of interpreting biomedical results cannot be underestimated. Misreporting and misinterpretation are pressing problems in randomized controlled trials (RCT) output. This may be partially related to the statistical significance paradigm used in clinical trials centered around a P value below 0.05 cutoff. Strict use of this P value may lead to strategies of clinical researchers to describe their clinical results with P values approaching but not reaching the threshold to be "almost significant." The question is how phrases expressing nonsignificant results have been reported in RCTs over the past 30 years. To this end, we conducted a quantitative analysis of English full texts containing 567,758 RCTs recorded in PubMed between 1990 and 2020 (81.5% of all published RCTs in PubMed). We determined the exact presence of 505 predefined phrases denoting results that approach but do not cross the line of formal statistical significance ($P < 0.05$). We modeled temporal trends in phrase data with Bayesian linear regression. Evidence for temporal change was obtained through Bayes factor (BF) analysis. In a randomly sampled subset, the associated P values were manually extracted. We identified 61,741 phrases in 49,134 RCTs indicating almost significant results (8.65%; 95% confidence interval (CI): 8.58% to 8.73%). The overall prevalence of these phrases remained stable over time, with the most prevalent phrases being "marginally significant" (in 7,735 RCTs), "all but significant" (7,015), "a nonsignificant trend" (3,442), "failed to reach statistical significance" (2,578), and "a strong trend" (1,700). The strongest evidence for an increased temporal prevalence was found for "a numerical trend," "a positive trend," "an increasing trend," and "nominally significant." In contrast, the phrases "all but significant," "approaches statistical significance," "did not quite reach statistical significance," "difference was apparent," "failed to reach statistical significance," and "not quite significant" decreased over time. In a random sampled subset of 29,000 phrases, the manually identified and corresponding 11,926 P values, 68.1% ranged between 0.05 and 0.15 (CI: 67. to 69.0; median 0.06). Our results show that RCT reports regularly contain specific phrases describing marginally nonsignificant results to report P values close to but above the dominant 0.05 cutoff. The fact that the prevalence of the phrases remained stable over time indicates that this practice of broadly interpreting P values close to a predefined threshold remains prevalent. To enhance responsible and transparent interpretation of RCT results, researchers, clinicians, reviewers, and editors may reduce the focus on formal statistical significance thresholds and stimulate reporting of P values with corresponding effect sizes and CIs and focus on the clinical relevance of the statistical difference found in RCTs.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001562>

ALBA MOTES-RODRIGO et al – Experimental Investigation of orangutans’ lithic percussive and sharp stone tool behaviours

Early stone tools, and in particular sharp stone tools, arguably represent one of the most important technological milestones in human evolution. The production and use of sharp stone tools significantly widened the ecological niche of our ancestors, allowing them to exploit novel food resources. However, despite their importance, it is still unclear how these early lithic technologies emerged and which behaviours served as stepping-stones for the development of systematic lithic production in our lineage. One approach to answer this question is to collect comparative data on the stone tool making and using abilities of our closest living relatives, the great apes, to reconstruct the potential stone-related behaviours of early hominins. To this end, we tested both the individual and the social learning abilities of five orangutans to make and use stone tools. Although the orangutans did not make sharp stone tools initially, three individuals spontaneously engaged in lithic percussion, and sharp stone pieces were produced under later experimental conditions. Furthermore, when provided with a human-made sharp stone, one orangutan spontaneously used it as a cutting tool. Contrary to previous experiments, social demonstrations did not considerably improve the stone tool making and using abilities of orangutans. Our study is the first to systematically investigate the stone tool making and using abilities of untrained, unenculturated orangutans showing that two proposed pre-requisites for the emergence of early lithic technologies—lithic percussion and the recognition of sharp-edged stones as cutting tools—are present in this species. We discuss the implications that ours and previous great ape stone tool experiments have for understanding the initial stages of lithic technologies in our lineage.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0263343>

AHMED KHORSHEED et al – What second-language speakers can tell us about pragmatic processing

Upon hearing the phrase Some cats meow, a listener might pragmatically infer that ‘Some but not all cats meow’. This is known as a scalar implicature and it often arises when a speaker produces a weak linguistic expression instead of a stronger one. Several L2 studies claim that pragmatic inferences are generated by default and their comprehension presents no challenges to L2 learners. However, the evidence obtained from these studies largely stems from offline-based tasks that provide limited information about how scalar implicatures are processed. This study investigated scalar implicature processing among L2 speakers of English and the degree to which differences in L2 proficiency and Theory of Mind abilities would modulate pragmatic responding. The experiment used an online sentence verification paradigm that required participants to judge, among multiple control items, the veracity of under-informative sentences, such as Some cats are mammals, and to respond as quickly as possible. A true response to this item is indicative of a logical some and perhaps all reading and a false response to a pragmatic some but not all reading. Our results showed evidence that scalar inferences are not generated by default. The answer linked to the pragmatic reading some but not all took significantly longer to make relative to the answer that relies on the logical interpretation some and perhaps all. This processing slowdown was also significantly larger among participants with lower English proficiency. Further exploratory analyses of participants’ Theory of Mind, as measured by the Social Skill subscale in the Autism Spectrum Quotient, revealed that socially inclined participants are more likely than the socially disinclined to derive a scalar inference. These results together provide new empirical insights into how L2 learners process scalar implicatures and thus implications for processing theories in experimental pragmatics and second language acquisition.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0263724>

PAULA KAHUMBU – Richard Leakey (1944–2022)

Richard Leakey, renowned paleoanthropologist, wildlife conservationist, and pro-democracy activist, died on 2 January. He was 77. Fortright and courageous, Richard nurtured the emergence of a new generation of scientists in postcolonial Africa. He faced frequent threats to his life with a fierce determination that at times bordered on recklessness. His achievements defied his treatment as an outsider by mainstream academics.

<https://www.science.org/doi/10.1126/science.abo2200>

ERIC S. DICKSON, SANFORD C. GORDON & GREGORY A. HUBER – Identifying legitimacy: Experimental evidence on compliance with authority

To what extent do individuals’ perceptions of legitimacy affect their intrinsic motivations to comply with an authority? Answering this question has critical implications for law enforcement but is challenging because actions or institutions that affect intrinsic motivations typically also affect extrinsic, material ones. To disentangle these, we propose an experimental approach that separately identifies the effect of an authority’s costly action to improve enforcement fairness on citizen behavior through both intrinsic and extrinsic channels. In experiment 1, the authority’s simple attempt to institute fairer enforcement increases prosocial behavior by 10 to 12 percentage points via the intrinsic channel. A follow-up experiment

demonstrates that this is not motivated by citizen attempts to “pay back” authorities. Our findings provide causally credible evidence that an authority’s actions can directly shape citizens’ behavior by enhancing her legitimacy and have important implications in policy domains where this conflicts with other incentives.

<https://www.science.org/doi/full/10.1126/sciadv.abj7377>

SARAH K. COWAN et al – Discordant benevolence: How and why people help others in the face of conflicting values

What happens when a request for help from friends or family members invokes conflicting values? In answering this question, we integrate and extend two literatures: support provision within social networks and moral decision-making. We examine the willingness of Americans who deem abortion immoral to help a close friend or family member seeking one. Using data from the General Social Survey and 74 in-depth interviews from the National Abortion Attitudes Study, we find that a substantial minority of Americans morally opposed to abortion would enact what we call discordant benevolence: providing help when doing so conflicts with personal values. People negotiate discordant benevolence by discriminating among types of help and by exercising commiseration, exemption, or discretion. This endeavor reveals both how personal values affect social support processes and how the nature of interaction shapes outcomes of moral decision-making.

<https://www.science.org/doi/full/10.1126/sciadv.abj5851>

Trends in Cognitive Sciences

PAPERS

RUBY BASYOUNI & CAROLYN PARKINSON – Mapping the social landscape: tracking patterns of interpersonal relationships

It is widely believed that the demands of living in large, complexly bonded social groups played a key role in the evolution of human cognition. This review focuses on a critical but understudied skillset in the social-living toolkit: the ability to acquire, maintain, and use knowledge of the interpersonal relationships among the people around oneself. We provide a multidisciplinary synthesis of a diverse set of relevant findings, including recent work on the neural encoding and cognitive and behavioral consequences of knowledge of real-world social networks, research on how third-party relationship knowledge is tracked and used by children and other highly social primates, and research examining how people’s knowledge of their social networks can be leveraged to inform the design of interventions aiming to promote behavior change or to efficiently spread information. We also highlight important unanswered questions and avenues in need of further exploration.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(21\)00314-4](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(21)00314-4)

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