EAORC BULLETIN 1,157 – 17 August 2025

CONTENTS

NOTICES

FORMATTED VERSION OF THIS BULLETIN

A pdf formatted version of this Bulletin is available for download at martinedwardes.me.uk/eaorc/eaorc_bulletins.htm.

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.

EDITORIAL INTERJECTIONS

Comments in curly brackets are editorial interjections. The Editor reserves the right to be wrong, and doesn't object to being called out on it.

CONFERENCE ALERT – EvoLang 2026 News & Updates

Evolang XVI Call for Papers & Call for Workshop Proposals

We are delighted to announce the Call for Papers and the Call for Workshop Proposals for the 16th International Conference on the Evolution of Language (Evolang XVI), which will take place in Plovdiv, Bulgaria, April 7-10, 2026.
If you want to keep up to date about Evolang XVI, please make sure to join the dedicated mailing list for Evolang XVI by filling in this form: https://forms.gle/s6BKLrHAgWE6pq7j7
The calls for Evolang XVI can be found below and on the Evolang XVI website, where you will also find up-to-date information about the conference at any time. We look forward to your submissions and hope to see many of you in Plovdiv next year.
The Evolang XVI scientific committee

Call for Papers

Submission Deadline: October 26, 2025 (anywhere on Earth)
The deadline for submission to EvoLang XVI (Plovdiv, Bulgaria, 7–10 April 2026) is 26 October 2025 (AoE). To submit to EvoLang XVI, use: https://openreview.net/group?id=EVOLANG.org/2026/Conference
(Submissions will be possible from August 18 onward.) All submission information and templates can be found here: https://sites.google.com/york.ac.uk/evolang2026/submission
Please carefully read the guidelines – and further details within the provided submission templates – to prepare your submission. In addition to your submission, you will be asked to provide a 150-word summary of your contribution. If you have a problem with your submission, please email scientific-committee@evolang.org
Submissions may be in any relevant discipline, and should aim to make clear their own substantive claim relating to relevant, current scientific literature in the field of language evolution. Submissions which do not have clear relevance to the field or do not adhere to the guidelines may be rejected without review. The conference language at Evolang XVI will be English with additional accessibility support in the form of captions.

Call for Workshop Proposals

Submission Deadline: September 22, 2025 (anywhere on Earth)
Notification of Acceptance: 3 Oct 2025
EvoLang XVI will host up to six thematically focused, half-day workshops on 7 April 2026. The half-day format can accommodate, for example, 8 half-hour slots with 15 minutes for an introduction and 30 minutes for breaks. Other formats within the allotted time are also welcome.

Workshop proposals should be no more than 500 words excluding references. Please specify the following:

- The theme of the workshop and how it fits EvoLang;
- How many talks and how they will be reviewed;
- A list of invited speakers, should they be known;
- Whether and how the organisers plan to publish the proceedings/results of the workshop;
- If applicable, a detailed motivation to limit the number of participants. How to Submit:

Send proposals by 22 Sept 2025 (AoE) as a PDF attachment to workshops@gmail.com
Notification of acceptance will be given by 3 Oct 2025. The detailed scheduling of the workshops and the quality of workshop contributions will be left to the workshop organisers, who are independently responsible for inviting and reviewing submissions and/or speakers for their workshop, and notifying participants in due time to register for the conference.

NEWS

NATURE BRIEFING – Evolution isn't a straight line: Modern humans come from 2 ancient lineages

After more than a million years of separation, two branches of humanity reunited around 300,000 years ago, suggests new research.
https://bigthink.com/strange-maps/double-ancestry/

NATURE BRIEFING – 'Sex reversal' is common in birds

A surprising number of birds are 'sex reversed', in which their appearance and reproductive organs don't align with the genetic sex determined by chromosomes. In a study of nearly 500 birds belonging to five common species that were brought into an animal hospital in Australia, researchers found that up to 6% of individuals were sex-reversed. Most examples were genetically female birds with male reproductive organs, but the group included a genetically male bird who appeared to have recently laid an egg.
https://www.science.org/content/article/sex-reversal-surprisingly-common-birds-new-study-suggests

NATURE BRIEFING – Mental password mutes mind-reading

A prototype brain–computer interface can decipher the imagined sentences of people who have conditions that interfere with speech — and it comes with password protection to avoid revealing private thoughts. The system begins decoding users' internal speech only after they think of a specific keyword. The research addresses the risk that devices intended to help people who can't speak could broadcast their private thoughts or spontaneous 'self-talk'.
{It reminds me of the "Don't think about the elephant" experiment.}
https://www.nature.com/articles/d41586-025-02589-5

NEWS FROM SCIENCE – When female gorillas relocate, they look for where their besties live

New study sheds light on social structures within our great ape cousins.
https://www.science.org/content/article/when-female-gorillas-relocate-they-look-where-their-besties-live

NEWS FROM SCIENCE – 'Sex reversal' is surprisingly common in birds, new study suggests

Survey of five Australian avians finds numerous discordant individuals, including a genetically male bird that had laid an egg.
https://www.science.org/content/article/sex-reversal-surprisingly-common-birds-new-study-suggests

NEWS FROM SCIENCE – 'Superefficient' weaver ants show remarkable strength in numbers

Unlike people, these nest-building insects pull harder in teams.
https://www.science.org/content/article/superefficient-weaver-ants-show-remarkable-strength-numbers

NEWS FROM SCIENCE – Fossil teeth reveal a previously unknown human ancestor from eastern Africa

Scientists say the teeth belonged to a type of Australopithecus, a relative of Lucy's species, that coexisted with our genus, Homo.
https://www.science.org/content/article/fossil-teeth-reveal-previously-unknown-human-ancestor-eastern-africa

SCIENCEADVISER – Sex reversal may not be a rare bird

Laughing kookaburra are among the Australian birds in which scientists have found instances of sex reversal, where an individual has the physical features of one sex but the genetic makeup of the other. Neil Bowman/FLPA/Minden
A rooster is easily recognizable by his big, bright comb and ear-splitting cock-a-doodle-doo. Bachelor birds-of-paradise flaunt their vibrant plumage in elaborate courtship displays to attract more subdued females. And the male peacock's feathered train is so long and ostentatious that it famously threw even Charles Darwin for a loop.

But identifying a bird's sex isn't always so simple. When males and females look pretty much the same, scientists must try a bit harder to separate the cocks from the hens. According to a new study of wild Australian birds, however, DNA testing fails to identify cases of sex reversal—where an individual's gonads and outward appearance don't align with the genetic sex determined by its chromosomes. As scientists report in Biology Letters, this phenomenon may be more common than anyone expected.

The new study, which is likely to ruffle some feathers, examined hundreds of birds belonging to five common Australian species: the Australian magpie, laughing kookaburra, crested pigeon, rainbow lorikeet, and the scaly breasted lorikeet. Researchers were surprised to find examples of sex-reversed individuals in all five species, with rates of sex reversal ranging from 3% to 6%. The vast majority of these incongruous birds were genetically female but had male reproductive organs, although the researchers also identified genetic males with ovaries—including a genetically male kookaburra with a distended oviduct. "It looked female from the outside. It laid an egg," says study senior author Dominique Potvin. "It just happened to have these other chromosomes."

https://www.science.org/content/article/sex-reversal-surprisingly-common-birds-new-study-suggests

SCIENCEADVISER – Teamwork makes the ant dream work

We already know that ants are better than us at carrying objects 50 times their body weight. Turns out they are also better than us teamwork. Unlike humans, they work harder as their group gets bigger—though their extremely sticky feet do give them an advantage.

https://www.science.org/content/article/superefficient-weaver-ants-show-remarkable-strength-numbers

THE CONVERSATION – Antarctic leopard seal 'songs' are surprisingly similar to nursery rhymes

The fact that animals don't use words makes it hard to decode their communication. But technology is starting to make it easier.

https://theconversation.com/antarctic-leopard-seal-songs-are-surprisingly-similar-to-nursery-rhymes-262822

THE CONVERSATION – Some people just don't like music – it may be down to their brain wiring

How can music be such an extraordinary tonic for most of us, but leave others cold?

https://theconversation.com/some-people-just-dont-like-music-it-may-be-down-to-their-brain-wiring-263066

PUBLICATIONS

Cell

PAPERS

ADAM C. NELSON et al – Molecular and neural control of social hierarchy by a forebrain-thalamocortical circuit

Many animal groups are organized hierarchically, which generates behavioral states that facilitate social interactions. Although generally stable, social status can change, underscoring the plasticity of underlying neural circuits. We examined competition among unfamiliar male mice and uncovered how the molecular and biophysical characteristics of a forebrain-thalamocortical circuit affect hierarchy. We identify the mediodorsal thalamus (MDT) as a hub receiving inputs from the orbitofrontal cortex and basal forebrain and projecting to the caudal anterior cingulate cortex (cACC) to regulate competitive performance. This circuit becomes potentiated or depressed in high- and low-rank males, respectively, in part through altered expression of the voltage-gated ion channel Trpm3 and synaptic plasticity. In high-rank mice, MDT projections drive inhibition of cACC pyramidal cells, promoting winning, in a pattern strikingly opposite to the dorsomedial prefrontal cortex, where winners display increased pyramidal cell activity. Our data suggest a model in which hierarchy modulation relies on coordinated remodeling of multiple forebrain-thalamocortical circuits.

https://www.cell.com/cell/fulltext/S0092-8674(25)00810-4

Cell Reports

PAPERS

CARLA C. WINTER, KUAN HONG WANG & ZHIGANG HE – From thought to action: The organization of spinal projecting neurons

Spinal projecting neurons (SPNs) are specialized neurons with cell bodies residing in the brain and axons extending into the spinal cord, providing a direct communication pathway that enables top-down control of nearly every bodily function. Disruptions to these pathways contribute to a wide range of neurological disorders, including developmental, degenerative, and traumatic pathologies. Advances in retrograde labeling, activity monitoring, and circuit manipulation have enabled increasingly precise and comprehensive characterizations of SPNs. Here, we provide a historical overview of brain-spinal cord connectivity research, followed by an in-depth synthesis of the current knowledge of SPN anatomical connections, molecular identities, and functional properties. We then propose a conceptual framework in which distinct SPN modules coordinately regulate motor, autonomic, and sensory processes to support bodily readiness and drive behavioral action. Beyond revealing

the organizational logic of SPNs, these insights provide a foundation for designing therapies to restore brain-spinal cord communication following injury or disease.
https://www.cell.com/cell-reports/fulltext/S2211-1247(25)00924-6

Current Biology

PAPERS

MADELYNE STEWARDSON et al – Superefficient teamwork in weaver ants

Teamwork is often assumed to enhance group performance, particularly for physical tasks. However, in both human and non-human animal teams, the effort contributed by each member may, in fact, decrease as team size grows. This counterintuitive phenomenon, known as the Ringelmann effect, is generally ascribed to poor coordination or differences in motivation. Weaver ants (Oecophylla smaragdina) display some of the most impressive feats of teamwork in the natural world, including self-assembly into pulling teams that fold leaves into nesting chambers. Here, we investigated whether weaver ant pulling teams suffer from the Ringelmann effect by measuring the force that weaver ant teams of varying sizes produce during nest construction. The average force contribution per individual almost doubled as team size increased, demonstrating that weaver ants not only avoid the Ringelmann effect but achieve the opposite—they are "superefficient" team workers. We propose that this superefficiency is facilitated by a division of labor within teams: "active pullers" work together to generate a pulling force that is stored in chains of "passive resisters," which capitalize on the remarkable frictional strength of weaver ant attachment organs; weaver ant teams thereby act as a "force ratchet." Our results highlight a novel mechanism of teamwork in a highly coordinated natural system and may inspire optimization algorithms for superefficient teams in distributed artificial systems, including swarm robotics.
https://www.cell.com/current-biology/abstract/S0960-9822(25)00939-X

LÉNA DE FRAMOND et al – Stream noise induces song plasticity and a shift to visual signals in a riverine songbird

Environmental noise can severely impair acoustic communication, thereby affecting key behaviors such as predator avoidance, territory defense, and reproduction. Persistent noise in some habitats is thought to have favored the emergence of multimodal communication systems. Multimodal signals, which integrate information across several sensory channels, can enhance signal detection and improve message clarity in challenging environments. The capacity to flexibly adjust signaling strategies in response to noise is considered critical to the resilience and evolutionary success of communication systems. However, direct evidence for noise-induced shifts between sensory modalities—termed "multimodal shift"—remains scarce. Although river noise has been linked to the evolution of multimodal displays and shifts in torrent frogs, examples from other taxa are lacking. Here, we investigate how the white-throated dipper (Cinclus cinclus), a riverine songbird, modulates both acoustic and visual signaling along noisy rivers. We find that the dippers adjust their songs to the ambient noise level. In addition, they use conspicuous blinking with white-feathered eyelids to compensate for acoustic masking in high-noise environments. Blinking rate was linked to local river noise, aggressive behavior, and conspecific presence. Calibrated field measurements revealed a negative correlation between song amplitude and blinking rate, consistent with a noise-driven multimodal shift. This indicates that song plasticity operates in tandem with visual signaling, showing that animals can dynamically reallocate investment across modalities in response to fluctuating environmental pressures. The fine-tuning of both signal performance and modality underscores the critical role of noise interference and signal flexibility in the evolution of complex communication systems.
https://www.cell.com/current-biology/fulltext/S0960-9822(25)00958-3

ATSUSHI YOSHIDA & OKIHIDE HIKOSAKA – Excitatory drive to the globus pallidus external segment facilitates action initiation in non-human primates

The external segment of the globus pallidus (GPe) has been conventionally regarded as a key relay in the indirect pathway of the basal ganglia, primarily mediating movement suppression. However, recent studies in rodents suggest a more complex role, including active facilitation of actions. Here, we investigated whether the primate GPe exhibits similar functional diversity by recording single-unit activity in two macaque monkeys performing a novel sequential choice task. This task separated the process of action initiation and suppression by requiring the monkeys to either accept a "good" object for reward or reject a "bad" object using one of multiple strategies. We identified three distinct neuronal clusters based on their firing patterns. Clusters 1 and 2 were linked to action facilitation: cluster 1 increased activity for saccades to both object types, while cluster 2 was selectively active for good-object saccades and suppressed during rejections—similar to cluster 3, which showed suppression during bad-object rejection. Local pharmacological blockade of glutamate receptors within the caudal dorsal GPe prolonged saccade latencies and reduced the frequency of rejection saccades, confirming a causal role for excitatory drive in saccade facilitation. These findings expand the traditional view of the GPe beyond a purely inhibitory station, indicating that in primates, it simultaneously mediates both motor facilitation and proactive suppression. Our results emphasize the importance of characterizing circuit-specific and cell-type-specific roles of the GPe within basal ganglia networks, with implications for normal motor function and movement disorder pathophysiology under complex reward-based decision processes in non-human primates.
https://www.cell.com/current-biology/abstract/S0960-9822(25)00960-1

eLife

PAPERS

ISAÏH SCHWAB-MOHAMED et al – Bridging verbal coordination and neural dynamics

Our use of language, which is profoundly social in nature, essentially takes place in interactive contexts and is shaped by precise coordination dynamics that interlocutors must observe. Thus, language interaction is highly demanding on fast adjustment of speech production. Here, we developed a real-time coupled-oscillators virtual partner (VP) that allows – by changing the coupling strength parameters – to modulate the ability to synchronise speech with a virtual speaker. Then, we recorded the intracranial brain activity of 16 patients with drug-resistant epilepsy while they performed a verbal coordination task with the VP. More precisely, patients had to repeat short sentences synchronously with the VP. This synchronous speech task is efficient to highlight both the dorsal and ventral language pathways. Importantly, combining time-resolved verbal coordination and neural activity shows more spatially differentiated patterns and different types of neural sensitivity along the dorsal pathway. More precisely, high-frequency activity (HFa) in left secondary auditory regions is highly sensitive to verbal coordinative dynamics, while primary regions are not. Finally, while bilateral engagement was observed in the HFa of the inferior frontal gyrus BA44 – which seems to index online coordinative adjustments that are continuously required to compensate deviation from synchronisation – interpretation of right hemisphere involvement should be approached cautiously due to relatively sparse electrode coverage. These findings illustrate the possibility and value of using a fully dynamic, adaptive, and interactive language task to gather deeper understanding of the subtending neural dynamics involved in speech perception, production as well as their interaction.
https://elifesciences.org/articles/99547

Frontiers in Cognition

PAPERS

SAMANTHA KLEINBERG et al – Causal information changes how we reason: a mixed-methods analysis of decision-making with causal information

Causal information, from health guidance on diets that prevent disease to financial advice for growing savings, is everywhere. Psychological research has shown that people can readily use causal information to make decisions and choose interventions. However, this work has mainly focused on novel systems rather than everyday domains, such as health and finance. Recent research suggests that in familiar scenarios, causal information can lead to worse decisions than having no information at all, but the mechanism behind this effect is not yet known. We aimed to address this by studying whether people reason differently when they receive causal information and whether the type of reasoning affects decision quality. For a set of decisions about health and personal finance, we used quantitative (e.g., decision accuracy) and qualitative (e.g., free-text descriptions of decision processes) methods to capture decision quality and how people used the provided information. We found that participants given causal information focused on different aspects than did those who did not receive causal information and that reasoning linked to better decisions with no information was associated with worse decisions with causal information. Furthermore, people brought in many aspects of their existing knowledge and preferences, going beyond the conclusions licensed by the provided information. Our findings provide new insights into why decision quality differs systematically between familiar and novel scenarios and suggest directions for future work guiding everyday choices.
https://www.frontiersin.org/journals/cognition/articles/10.3389/fcogn.2025.1608842/full

Frontiers in Human Neuroscience

PAPERS

S. SHALU, R. MURALIKRISHNAN & KAMAL KUMAR CHOUDHARY – Similar does not mean the same: ERP correlates of mental and physical experiencer verb processing in Malayalam complex constructions

This study examined the neurophysiological correlates of processing mental experiencer verbs and physical experiencer verbs in Malayalam complex constructions, where the subject argument assumed the role of the experiencer. Event-related brain potentials (ERPs) were recorded as 28 first-language speakers of Malayalam read intransitive sentences with the two types of experiencer verbs. The subject case either matched (acceptable) or violated (unacceptable) the requirements of the verb in the critical stimuli. Both mental and physical experiencer verbs engendered negative effects in the 400–600-ms time window when the subject case did not match the verb's requirements. Additionally, mental experiencer verbs evoked a left anterior negativity LAN-like effect in the same time window, regardless of grammaticality. Thus, even though both kinds of experiencer verbs are processed qualitatively similarly, inherent differences between mental and physical experiencer verbs in Malayalam persist and are discernible.
https://www.frontiersin.org/journals/human-neuroscience/articles/10.3389/fnhum.2025.1632844/full

Frontiers in Psychology

PAPERS

JIANHENG ZHANG et al – A thematic-cognitive perspective for exploring the writing skills of children: a textual analysis using ENA

Primary school is a critical period for children's language development, coinciding with rapid cognitive growth that supports the emergence of writing skills. Understanding how children's cognitive structures manifest in writing is essential for improving instructional strategies.

This study employed epistemic network analysis (ENA) to encode and analyze six years of student writing data. Cognitive network maps were constructed to examine developmental trends and differences across grades and genders from both subject-matter and cognitive perspectives.

The analysis demonstrates ENA's effectiveness in visualizing the cognitive features embedded in written texts. Distinct patterns emerged across subjects, grades, and genders, revealing a complex and nuanced cognitive network structure.

These findings highlight important nuances in children's writing development. Recognizing subject-specific, developmental, and gender-related cognitive differences can inform more personalized and effective writing instruction.

https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1494111/full

RIMI HINO et al – Neural basis of linguistic factors involved in thought: an fMRI study with native signers

Linguistic factors are critically involved in our conscious thinking processes, but neuroscientific evidence of their involvement is scant. To examine commonalities that underlie reasoning and language tasks, we prepared illustrative quizzes under five conditions in a Reasoning task: Context, Fill-in, Rotation, Sequence, and Analogy. These conditions differentially involved linguistic factors of the recursive, propositional, and clausal, as well as non-linguistic factors. We also used story videos in Japanese Sign Language (JSL) in a Sign task as a language comprehension task. Brain activations measured with functional magnetic resonance imaging (fMRI) were examined for native JSL signers, with the following results. First, in the comparison of the Context condition with the Fill-in condition, which controlled non-linguistic factors, multiple bilateral regions were activated, including language areas such as the left lateral premotor cortex (L. LPMC) and left inferior frontal gyrus (L. IFG). By using conjunction and region of interest analyses, we clarified two distinct systems, which were differentially recruited under the Sequence and Analogy conditions: the recursive system (L. LPMC/dorsal IFG and right LPMC) and the propositional system (L. IFG), respectively. Secondly, during the Sign task, we identified activations in the L. LPMC, L. IFG, and other temporal regions. Moreover, by focusing on the contextual comprehension processes in the Sign task, we found that the L. IFG and bilateral posterior temporal gyri (pTG) were commonly activated between the Sign task and Context condition. Thirdly, in the bilateral pTG, activations were selective only under the Context condition and not under the other four conditions, confirming its role as the clausal system. We thus successfully identified three critical systems for both language and thought processes.

https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2025.1582136/full

iScience

PAPERS

ANAS U. KHAN et al – Neural dynamics of proactive and reactive cognitive control in medial and lateral prefrontal cortex

Goal-directed behavior requires adjusting cognitive control, both in preparation for and in reaction to conflict. Theta oscillations and population activity in dorsomedial prefrontal cortex (dmPFC) and dorsolateral PFC (dlPFC) are known to support reactive control. Here, we investigated their role in proactive control using human intracranial EEG recordings during a Stroop task that manipulated conflict expectations. During response selection, conflict processing enhanced dlPFC beta desynchronization, dmPFC theta increases, and high-frequency activity (HFA, which indexes local population activity) in both regions. After responses, conflict suppressed theta and boosted beta rebounds in both regions. Importantly, pre-trial dmPFC theta increased when conflict was anticipated, and within-trial theta, beta, and HFA dynamics were accentuated when conflict was rare. These findings reveal how the balance of reactive and proactive control modulates shared HFA and dissociable theta–beta conflict signals in dmPFC and dlPFC and identifies pre-trial dmPFC theta as a candidate substrate for proactive control.

https://www.cell.com/iscience/fulltext/S2589-0042(25)01636-0

Journal of the Royal Society Interface

PAPERS

TOMOKI YOSHITANI et al – Individual vocal identity is enhanced by the enlarged external nose in male proboscis monkeys (Nasalis larvatus)

Adult male proboscis monkeys, Nasalis larvatus, develop an enlarged external nose. Males often produce loud, long-distance calls filtered through the nasal passage. The enlarged nose probably functions as a visual badge of social status and a visual key representing the owner's physical and sexual quality, and thus is useful for females in selecting mates. In addition to such visual signalling, a larger external nose enhances the lower frequencies in calls, possibly exaggerating acoustic signals related

to body size. Here, we used computational simulations with three-dimensional models of the nasal passage to show how the external nose modifies the acoustic property, indicating that the external nose develops to enhance lower frequencies in adults but varies in a specific formant position among adult males. This finding suggests that the external nose generates acoustic signals about physical–sexual maturity in adult males and individual identity among them. The unusual features of the social organization in this species, a patrilineality of a multilevel community consisting of one-male–multi-female units, may reinforce the functional importance of individual male recognition for males and females to monitor the location of both their own units and those of other males.
https://royalsocietypublishing.org/doi/10.1098/rsif.2025.0098

Language and Cognition

PAPERS

SILVIA P. GENNARI – Situating language in higher-order cognition
Language is known to interact flexibly with non-verbal representations, but the processing mechanisms governing these interactions remain unclear. This article reviews general cognitive processes that operate across various tasks and stimulus types and argues that these processes may drive the interactions between language and cognition, regardless of whether these interactions occur cross-linguistically or within a language. These general processes include goal-directed behaviour, reliance on context-relevant semantic knowledge and attuning to task demands. An overview of existing findings suggests that resorting to language in non-verbal or multi-modal tasks may depend on how linguistic representations align with current task goals and demands. Progress in understanding these mechanisms requires theories that make specific processing predictions about how tasks and experimental contexts encourage or discourage access to linguistic knowledge. Systematic testing of alternative mechanisms is necessary to explain how and why linguistic information influences some cognitive tasks but not others.
https://www.cambridge.org/core/journals/language-and-cognition/article/situating-language-in-higherorder-cognition/623838C8DF1FDCEE88CF9C98AACCFA04

Mind & Language

PAPERS

FRANCESCO ANTILICI & YIFAN MEI – Knowledge before belief in non-human primates: A rebuttal
Several scientists and philosophers have argued that knowledge is more basic than belief, partly by appeal to evidence that non-human primates attribute the former but not the latter. We re-examine this evidence and argue that it is, in fact, more consistent with the presence of belief-attribution than its absence. We also highlight the benefits of belief-attribution and cast doubt on its alleged costs. While further research is needed to settle the debate, we recommend an attitude of cautious optimism: The understanding of the mind our close relatives possess may be more like ours than previously assumed.
https://onlinelibrary.wiley.com/doi/abs/10.1111/mila.70002

Nature

PAPERS

BRIAN VILLMOARE et al – New discoveries of Australopithecus and Homo from Ledi-Geraru, Ethiopia
The time interval between about three and two million years ago is a critical period in human evolution—this is when the genera Homo and Paranthropus first appear in the fossil record and a possible ancestor of these genera, Australopithecus afarensis, disappears. In eastern Africa, attempts to test hypotheses about the adaptive contexts that led to these events are limited by a paucity of fossiliferous exposures that capture this interval. Here we describe the age, geologic context and dental morphology of new hominin fossils recovered from the Ledi-Geraru Research Project area, Ethiopia, which includes sediments from this critically underrepresented period. We report the presence of Homo at 2.78 and 2.59 million years ago and Australopithecus at 2.63 million years ago. Although the Australopithecus specimens cannot yet be identified to species level, their morphology differs from A. afarensis and Australopithecus garhi. These specimens suggest that Australopithecus and early Homo co-existed as two non-robust lineages in the Afar Region before 2.5 million years ago, and that the hominin fossil record is more diverse than previously known. Accordingly, there were as many as four hominin lineages living in eastern Africa between 3.0 and 2.5 million years ago: early Homo, Paranthropus, A. garhi, and the newly discovered Ledi-Geraru Australopithecus.
https://www.nature.com/articles/s41586-025-09390-4

GLENNIS A. LOGSDON et mul – Complex genetic variation in nearly complete human genomes
Diverse sets of complete human genomes are required to construct a pangenome reference and to understand the extent of complex structural variation. Here we sequence 65 diverse human genomes and build 130 haplotype-resolved assemblies (median continuity of 130 Mb), closing 92% of all previous assembly gaps and reaching telomere-to-telomere status for 39% of the chromosomes. We highlight complete sequence continuity of complex loci, including the major histocompatibility complex (MHC), SMN1/SMN2, NBPF8 and AMY1/AMY2, and fully resolve 1,852 complex structural variants. In addition, we completely assemble and validate 1,246 human centromeres. We find up to 30-fold variation in α-satellite higher-order

repeat array length and characterize the pattern of mobile element insertions into α-satellite higher-order repeat arrays. Although most centromeres predict a single site of kinetochore attachment, epigenetic analysis suggests the presence of two hypomethylated regions for 7% of centromeres. Combining our data with the draft pangenome reference significantly enhances genotyping accuracy from short-read data, enabling whole-genome inference to a median quality value of 45. Using this approach, 26,115 structural variants per individual are detected, substantially increasing the number of structural variants now amenable to downstream disease association studies.
https://www.nature.com/articles/s41586-025-09140-6

Nature Human Behaviour

PAPERS

CATHERINE MOLHO et al – Guilt drives prosociality across 20 countries

Impersonal prosociality is considered a cornerstone of thriving civic societies and well-functioning institutions. Previous research has documented cross-societal variation in prosociality using monetary allocation tasks such as dictator games. Here we examined whether different societies may rely on distinct mechanisms—guilt and internalized norms versus shame and external reputation—to promote prosociality. We conducted a preregistered experiment with 7,978 participants across 20 culturally diverse countries. In dictator games, we manipulated guilt by varying information about the consequences of participants' decisions, and shame by varying observability. We also used individual- and country-level measures of the importance of guilt over shame. We found robust evidence for guilt-driven prosociality and wilful ignorance across countries. Prosociality was higher when individuals received information than when they could avoid it. Furthermore, more guilt-prone individuals (but not countries) were more responsive to information. In contrast, observability by strangers had negligible effects on prosociality. Our findings highlight the importance of providing information about the negative consequences of individuals' choices to encourage prosocial behaviour across cultural contexts.
https://www.nature.com/articles/s41562-025-02286-3

Nature Humanities & Social Sciences Communications

PAPERS

TURKIAH ALOTAIBI, NORAH ALMUSHARRAF & MUHAMMAD IMRAN – Examining the linguistic and behavioural patterns of gender identity in women with dissociative identity disorder

Despite extensive psycholinguistic research on gendered language, investigations of how psychological gender identity shapes linguistic behavior in clinical populations remain scarce. Drawing on Lakoff's deficit model, which links hedges, tag questions and intensifiers to low authority and self-confidence, we explore gender-linked speech variation in dissociative identity disorder (DID). Publicly available interview transcripts from six women diagnosed with DID were examined, and the speech of their male-identity versus female-identity alters was compared. Qualitative thematic analysis showed that male identity alters predominantly employed hedges—markers of uncertainty—whereas female identity alters favored intensifiers and expressions of powerlessness. To quantify these differences, we ran regression analyses on feature frequencies; baseline rates of hedges (B = 1.54, SE = 0.46) and intensifiers (B = 1.92, SE = 0.65) were both reliably above zero, yet neither hedges nor intensifiers varied significantly by gender identity. These results highlight the influence of psychological gender on language use in DID and point to the need for further research into the cognitive drivers of these patterns.
https://www.nature.com/articles/s41599-025-05672-4

CHRISTOPHER LOUGHNANE – The technical milieu and its evolution: Uexküll, Kapp, Cassirer, Simondon

This paper rethinks the classic biosemiotic model of the Umwelt, an organism's lived, perceptual world arising via the functional circle of the body and the environment, by proposing a triadic Umwelt model in which technics, alongside body and environment, forms a foundational element of human evolution and perceptual experience. Drawing on the primary ethology of Jakob von Uexküll, and the later work on technical and human evolution by Ernst Kapp, Ernst Cassirer, and Gilbert Simondon, it explores how humans and technical objects have coevolved in ways that shape perception, cognition, and cultural expression. Uexküll's biosemiotic Umwelt theory is modified through a number of historical contributions to the philosophy of technology that are still of great importance today, including Kapp's organ-projection model and Cassirer's view of technics as a symbolic form that mediates how humans relate to the external world and one another. Simondon's theory of individuation further reveals how technologies are not static instruments but evolving entities that shape and are shaped by human environments. In a world increasingly structured by digital and algorithmic systems, this article argues that technics is a constitutive element of how humans understand and inhabit different environments, whether physical or virtual. This shift carries various ethical implications, particularly as digital infrastructures mould, influence and even govern human perception, agency, and autonomy. By modifying the Umwelt through viewing technics as a fundamental component of its structure, this article proposes a framework for digital ethics rooted in relational, embodied, and coevolutionary understandings of human-technical entanglement.
https://www.nature.com/articles/s41599-025-05579-0

YITONG HUANG, QIXUAN HE & BENQIAN LI – Cultural participation and psychological wellbeing: the mediating role of transcendence

The psychological benefits of engaging in cultural and artistic activities are increasingly recognized, yet the mechanisms remain underexplored – a gap that prevents the development of evidence-based cultural programs for optimal wellbeing outcomes. This research addresses this gap by identifying the underlying psychological mediators linking cultural participation to wellbeing. Drawing on survey data from 1516 Chinese youths and structural equation modeling, we demonstrate that cultural participation enhances wellbeing through the serial mediation of four transcendent character strengths: trait appreciation of beauty (AoB), gratitude, hope and nonattachment; moreover, active participation differs slightly from passive and hybrid forms of participation in that it has both mediated and direct effects. This study advances cultural participation research by theorizing a novel psychological pathway within China's unique cultural-technological contexts whilst extending the positive psychology literature with a secularized Buddhist concept (i.e., nonattachment). For practitioners, the findings support integrating art participation into mental health interventions. For policymakers, the study highlights the importance of structuring and evaluating cultural programs with strength-focused frameworks rather than generic participation metrics. By bridging theoretical and practical domains, this research paves the way for interdisciplinary and cross-sectoral collaborations to leverage cultural engagement as a tool for improving youth mental health.
https://www.nature.com/articles/s41599-025-05691-1

New Scientist

NEWS

Ancient tools on Sulawesi may be clue to origins of 'hobbit' hominins

The Indonesian island of Sulawesi was a likely stepping stone for ancient hominins to reach nearby Flores, the home of the mysterious Homo floresiensis.
https://www.newscientist.com/article/2491366-ancient-tools-on-sulawesi-may-be-clue-to-origins-of-hobbit-hominins/

Cockatoos have an impressively wide repertoire of dance moves

A proclivity for dancing seems to be found in at least 10 species of cockatoo, and the birds will even jive to white noise or a financial podcast.
https://www.newscientist.com/article/2491289-cockatoos-have-an-impressively-wide-repertoire-of-dance-moves/

Laughter therapy really could boost your emotional well-being

Structured interventions that encourage a good giggle, whether they are laughter yoga or clown visits, could have health benefits.
https://www.newscientist.com/article/2491277-laughter-therapy-really-could-boost-your-emotional-well-being/

Human eggs don't accumulate as many mutations with age as we thought

Mitochondrial mutations don't seem to build up in women's eggs as they age, which suggests they may have evolved a mechanism to avoid this.
https://www.newscientist.com/article/2491490-human-eggs-dont-accumulate-as-many-mutations-with-age-as-we-thought/

Human bones found in Spanish cave show signs of ancient cannibalism

Hundreds of pieces of bone dating from 5700 years ago carry evidence of being processed and eaten by other humans, bolstering the idea that cannibalism was common in the Neolithic period.
https://www.newscientist.com/article/2491651-human-bones-found-in-spanish-cave-show-signs-of-ancient-cannibalism/

Philosophical Transactions of the Royal Society B

PAPERS

ANNA PAPAFRAGOU & MYRTO GRIGOROGLOU – Pragmatic communication and Theory of Mind

A foundational assumption in theoretical models of communication is that the derivation of pragmatic meaning involves the calculation of speaker intention and hence relies on a form of Theory of Mind (ToM). Recent theorizing, however, has challenged the conclusion that ToM is required for all types of pragmatic processing. Here, we provide a theoretical synthesis of a wide-ranging but seemingly conflicting set of empirical findings on the role of ToM in pragmatic processing in children and adults, focusing on two key phenomena, reference and implicature. We argue that the state of the art offers no reason to abandon the hypothesis that both adults and children rely on ToM for the computation of pragmatic meanings. We propose that, across these and other pragmatic phenomena, apparent differences in ToM involvement can be attributed to principled and predictable outcomes based on how ToM is applied to the context in hand. We conclude by outlining new ways of studying the contributions of ToM to pragmatic interpretation.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0502

NAPOLEON KATSOS & MIKHAIL KISSINE – No one-to-one mapping between typologies of pragmatic relations and models of pragmatic processing: a case study with mentalizing

In this article, we argue that the growth of research in cognitively and experimentally oriented pragmatics in the last two decades has rested on two epistemological assumptions: that theoretical-pragmatic notions such as 'implicature', 'metaphor' and 'irony' correspond to distinct types of pragmatic inferences, and that each theoretical-pragmatic characterization of a certain type of inference corresponds to one and only one cognitive model of processing in the mind. We review the foundations of these assumptions and we problematize them based on (i) a conceptual argument that notions such as 'implicature' and 'irony' are originally meant as relations between propositions rather than types of inferences, and (ii) on recent experimental evidence which suggests that whether mentalizing is employed in pragmatic processing or not is not a function of the type of pragmatic relation, but rather it depends on situation-specific considerations and characteristics of the interlocutor, such as age and neurotype. These considerations call for a new understanding of the role of experimental evidence in the evaluation of pragmatic theories.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2023.0501

MELE TAUMOEPEAU – Pragmatics and Theory of Mind across cultures

In this article, I present a cultural framing of pragmatic communication for understanding children's developing understanding of their own and others' minds. Taking a social constructivist approach, I reexamine evidence for the socialization of mental state understanding from a pragmatic standpoint. I pay particular attention to how cultural variation in caregivers' use of mental state language may reflect variation in pragmatic intentions that correspond with culturally framed socialization practices. I then consider how variation in the socialization of pragmatic intentions informs our understanding of culture-specific differences in theory of mind development. I conclude by suggesting that in diversifying the ways in which we think about communication and its role in making sense of the social world, we can begin to better understand the significance of children's cultural context in this development.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2023.0500

DAPHNA HELLER & SARAH BROWN-SCHMIDT – Mental states are the essence of pragmatics: questions, answers and the Multiple Perspectives Theory of communication

The Multiple Perspectives Theory (MPT) is a cognitive architecture that aims to provide a mechanistic account of the ways in which mental states are represented and used in communication. The theory posits a cognitive architecture with two representations: a representation of self and a representation of the other, as well as a cognitive process that compares these representations to identify epistemic (a)symmetries. We illustrate how this theory can explain some of the most basic linguistic constructions and commonplace conversational moves, namely standard questions used to request information. We present examples of wh-questions (e.g. When is the train coming?), polar (yes–no) questions (e.g. Is the train coming?) and rising declaratives (e.g. The train is coming?) and argue that these conversational moves cannot be modelled by appealing to just one perspective. Instead, this requires considering the perspectives of both conversational partners, and computing their relative epistemic status. The fact that this ubiquitous, literal conversational move cannot be modelled without appealing to mental states provides strong evidence to the position that mental states are routinely used in communication. Thus, in this paper, we not only consider when mental states are used in communication—our answer is always–but also present an account of how they are used, specifically to model questions.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0503

FRANCESCA ERVAS & ROBERTA FADDA – Affective Theory of Mind and linguistic intimacy in irony production: a developmental perspective

Irony is challenging for school-aged children. It involves various processes, including advanced pragmatic and Theory of Mind (ToM) abilities. While there is extensive research on irony comprehension in children, less is known about irony production. This article discusses the possible role of linguistic intimacy and ToM in irony production in children. In irony production, positive linguistic intimacy is elicited to deliver a negative critical remark. Specifically, we will explore how linguistic intimacy, i.e. the feeling of being part of a community via implicit language, might mediate the production of irony versus sarcasm. Familiar contexts enhance both linguistic intimacy and ToM, making irony and sarcasm easier to produce. The article also addresses why irony, and especially sarcasm, is difficult for children to master. In childhood, the affective component of ToM is crucial for community building and belonging. As a result, children may suppress ironic and sarcastic comments to prevent negative social consequences. Specifically, sarcasm produces affective incoherence by targeting a person rather than a situation. For this reason, it might be less likely to be used due to its potential harm to linguistic intimacy. This perspective helps explain the developmental challenges of producing irony versus sarcasm, emphasizing the role of ToM and linguistic intimacy. Future research might test the hypothesis we propose.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0488

GIDEON SALTER et al – Learning mechanisms influencing infants' early socio-pragmatic abilities

Advanced pragmatic skills are hypothesized to depend on early experience of interaction. However, we do not yet fully understand the causal pathways involved. In the current study, we explored one potential early learning mechanism by

assessing whether increasing caregiver responsiveness to infant communication in turn promotes infants' pre-linguistic communicative acts. In the first wave of a larger randomized controlled trial study, when their infants were around six months old, carers were randomly assigned to either a communication intervention or an active control intervention focused on physical health. When infants turned 12 months, home videos (N = 125, 64 active control intervention, 61 communication intervention) were analysed for infant pre-linguistic acts, and caregiver responses to infant pre-linguistic communication. We also examined whether these variables varied by socio-economic circumstances. Pre-registered analyses indicated that the intervention led to increases in infant communicative acts and caregiver semantically contingent responses to infant communicative behaviours. This indicates that the experience of communicating with a responsive caregiver has a causal effect on the development of the infant's pre-linguistic pragmatic skills that are thought to provide the basis for later language, pragmatics and Theory of Mind.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2023.0487

ILARIA GABBATORE et al – Pragmatic comprehension and inferential ability: interplay with executive functions and Theory of Mind

Certain aspects of human cognition, such as pragmatic ability, Theory of Mind and executive functions, develop during childhood. This is the first study to apply comprehensive empirical analysis to investigate the relationship between these variables and the role of inferential ability in the communicative-pragmatic performance of pre-school and school-age children. The sample was composed of 104 children aged 3–8 years. Pragmatic tasks addressed the comprehension of sincere, deceitful and ironic communicative acts. Inferential ability was assessed using scalar implicatures: the quantifiers Some, All, None. Theory of Mind and executive functions were assessed using specific items from standardized assessment batteries. The children's performance on all tasks was found to increase with age, suggesting gradation of difficulty from easier to more difficult pragmatic tasks, and comprehension of sincere, deceitful and ironic communicative acts, respectively. Regression analysis revealed that age, intelligence quotient and executive functions (particularly inhibition and working memory) predicted pragmatic performance. After controlling for this effect, we noted that inferential ability remained a critical predictor, whereas Theory of Mind did not emerge as a predictor for any communicative act, suggesting that pragmatic ability involves multiple cognitive processes beyond Theory of Mind.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0491

CAMILO R. RONDEROS et al – The social dimension of mindreading: developmental evidence for the role of social categorization during utterance interpretation

Work in developmental pragmatics has shown that even though infants display refined mindreading abilities, older children struggle to understand language phenomena that rely on mindreading. This apparent mismatch might be partially explained by considering children's growing sensitivity to social categories such as their interlocutor's age. Based on recent work in philosophy of mind, we investigated how social categorization relates to children's developing mindreading abilities during language comprehension. We tested the hypothesis that social-category-based reasoning follows a similar developmental trajectory to that typically described for children's mindreading skills. In a picture-selection task, Norwegian participants (ages 3–9 years, N = 119) made decisions regarding a speaker's (child or adult) preferences by choosing between images showing stereotypically child-coded and adult-coded items. Young children preferentially selected the child-coded image regardless of the speaker's age, while older children selected the stereotypically adult-coded image when they heard the adult speaker. Additionally, we found no evidence that participants' performance in the picture-selection task was causally predicted by their scores on a standard false-belief task. We interpret these results as suggesting that the use of social categorization skills during utterance interpretation describes a similar developmental trajectory to that typically described for mindreading abilities, but is likely independent from false-belief reasoning. We argue that future studies in developmental pragmatics should consider social category differences between participants and speakers when drawing conclusions about children's mindreading abilities and how these are reflected in their interpretation of verbal utterances.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2023.0493

VALENTINA BAMBINI et al – On the inherent yet dynamic link between metaphor and Theory of Mind in middle childhood: meta-analytic evidence from a research programme bridging experimental pragmatics and developmental psychology

We present the outcome of a decade-long research programme targeting the relationship between individual differences in metaphor skills and Theory of Mind (ToM), based on the use of the Physical and Mental Metaphors (PMM) task alongside the Strange Stories task in neurotypical children throughout middle childhood. A meta-analysis conducted on our published and unpublished articles, including 500 children aged 8–12 years, showed that metaphor and ToM are significantly associated, even when controlling for vocabulary. This association peaks around the age of 9 years and fades away with increasing age. A critical review of our longitudinal and training studies evidenced that it is especially metaphor understanding that benefits ToM, rather than vice versa. Overall, the results of our research programme confirm the inherent mindreading component of pragmatic operations as postulated by post-Gricean pragmatics, highlighting also that ToM involvement in metaphor varies dynamically depending on age and possibly other factors such as the type of metaphor. Furthermore, we argue that pragmatics should not be seen as ancillary to ToM but rather as a driving factor for socio-cognitive development. We

conclude that integrating experimental pragmatics and insights from developmental psychology, such as the attention to individual differences, brings new opportunities for metaphor research.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0489

INGE-MARIE EIGSTI, CAROLINE LARSON & LETITIA NAIGLES – Associations between pragmatic language and Theory of Mind in individuals with a history of autism and those who have lost the autism diagnosis
Although Theory of Mind (ToM) is seen as a primary contributor to pragmatic language use in autistic individuals, less work has considered the influence of structural language. This study examines grammaticality judgements, ToM (Reading the Eyes in the Mind task, Social Attribution test) and pragmatic language (a de novo measure based on Pragmatic Language Scales)—and their associations—in three groups with heterogenous abilities: current autism (n = 36); those with a history of autism spectrum disorder, who no longer display symptoms ('loss of autism diagnosis', LAD; n = 32) and non-autistic (n = 36) adolescents and adults with fluent verbal skills. 'Results showed that autistic individuals experience pragmatic difficulties and difficulties in affective ToM relative to both other groups, and difficulties in structural language relative to neurotypical controls; LAD individuals showed no impairments. While pairwise associations of structural language and Matrix Reasoning with pragmatic language were observed, ToM was the only unique predictor of pragmatic language when all measures were included in the models. Results suggest complex interactions among pragmatic and structural language, and ToM, and that pragmatic language improves meaningfully with broad changes in broad aspects of autism when individuals lose the autism diagnosis.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2023.0504

AUDREY CAYOUETTE et al – Being well understood and generating interest during verbal interactions: the role of Theory of Mind and clinical symptoms in people with schizophrenia spectrum disorders
People with schizophrenia spectrum disorders (SSD) present with communication impairments. This study aimed to determine whether individuals with SSD make it less easy or interesting to perform a joint task with them relative to community controls (CO), and to examine the link between clinical symptoms and theory of mind (ToM). Fifty-one outpatients with SSD and 68 CO performed the storytelling in sequence task (STST) with an interaction partner. Four raters subsequently listened to the STST audio recordings and scored how easily they could place the images of the narrated stories in the correct order (Facility ratings), how interesting they found the stories (Interest ratings) and how expressive they found the voice (Expressivity ratings). Symptoms were assessed using the Positive and Negative Syndrome Scale and ToM using the Combined Stories Test. The Facility, Interest and Expressivity ratings were lower in SSD than in CO. In SSD, the Facility ratings were positively associated with ToM and negatively associated with several symptom dimensions. The Interest and Expressivity ratings were strongly linked together and negatively associated with Negative symptoms. ToM deficits in SSD may contribute to difficulties communicating clearly. The strong association between Expressivity and Interesting ratings raises important questions regarding the real-life impacts of reduced expressivity.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0506

FEDERICO FRAU et al – Ten years of using the APACS test: a multistudy cross-diagnostic analysis of pragmatic profiles and their relationship with Theory of Mind
Pragmatic impairments are largely documented, yet rarely considered in clinical practice, also owing to a poor characterization of pragmatic profiles across conditions, as well as some overlap with theory of mind (ToM) in the conceptualization of pragmatics. Here, we present the outcome of a 10-year programme that started with creating a novel test, the Assessment of Pragmatic Abilities and Cognitive Substrates (APACS)–which we evolved by its application alongside ToM assessment in seven clinical groups (i.e. amyotrophic lateral sclerosis, multiple sclerosis, right-hemisphere stroke, Parkinson's disease, traumatic brain injury, schizophrenia and dyslexia). The multistudy cross-diagnostic analysis of 454 participants revealed that receptive pragmatic skills were impaired in all clinical groups compared with controls, with schizophrenia showing the most severely impaired profile, whereas expressive pragmatic skills were impaired in four neurological conditions (i.e. Parkinson's disease, amyotrophic lateral sclerosis, right-hemisphere stroke and traumatic brain injury). The association with ToM was limited to receptive pragmatics and was moderate in the whole sample. Overall, pragmatic impairment emerged as a diffuse feature of neurological and psychiatric illnesses, which contributes to defining complex socio-communicative phenotypes but cannot be equated to a social cognition deficit and should hence be the target of specific assessment and intervention.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0495

OLGA IVANOVA – Understanding Theory of Mind–pragmatics relationship through the spectrum of neurodegenerative diseases
Our understanding of how pragmatic skills change in ageing is not systematic. Even less is known about the effects of pathological ageing—particularly in the context of neurodegenerative diseases—on pragmatic competence, changes in Theory of Mind and the potential inter-relationship between these domains. Given that pragmatic competence relies on a wide range of cognitive functions, examining pragmatic changes in speakers with neurodegenerative diseases may clarify whether these alterations are inherently pragmatic or arise from deficits in other cognitive domains, such as impairments in

Theory of Mind. In this work, I inquire into how eight neurodegenerative conditions (behavioural variant frontotemporal dementia, semantic dementia, Alzheimer's disease, amnesic mild cognitive impairment, Parkinson's disease, Lewy body dementia, cerebellar neurodegenerative disorders and right temporal degeneration) compromise pragmatic abilities and explore whether such impairments are linked to changes in Theory of Mind. Based on a narrative review of available experimental evidence, I come to several conclusions. First, only one neurodegenerative disease (behavioural variant frontotemporal dementia) shows up with pragmatic deficits directly linked to impairment in Theory of Mind. In the rest of the conditions, pragmatic deficits, although linked to Theory of Mind, derive from impairments in other cognitive functions (such as working memory or executive functions). Overall, pragmatic abilities are better predicted by their internal gradation (which abilities impose more cognitive load) than by the neural pathways of the diseases.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0494

ROBERT D. HAWKINS et al – Relevant answers to polar questions

People often provide answers that go beyond what a question literally asks, but it has been difficult to pin down what makes some answers more relevant than others. Here, we introduce Pragmatic Reasoning In Overinformative Responses to Polar Questions (PRIOR-PQ), a probabilistic cognitive model formalizing how people use theory of mind (ToM) to produce and interpret relevantly overinformative answers to yes–no questions. Specifically, PRIOR-PQ grounds the pragmatics of question answering in inferences about the underlying goal that motivated the questioner to ask the given question as opposed to a different question. We evaluate our probabilistic model against human answering behaviour elicited in three case studies of increasing complexity, demonstrating its ability to predict nuanced patterns of relevance better than existing models, including state-of-the-art large language models. We also show how the goal-sensitive reasoning instantiated in our probabilistic model motivates a novel chain-of-thought prompting method allowing language models to approach more human-like performance. This work illuminates the mechanistic role of ToM in the pragmatics of question–answer exchanges, bridging formal semantics, cognitive science and artificial intelligence. Our findings have implications for developing more socially grounded dialogue systems and highlight the importance of integrating explanatory cognitive models with machine learning approaches.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0505

JENNIFER HU, FELIX SOSA & TOMER ULLMAN – Re-evaluating Theory of Mind evaluation in large language models

The question of whether large language models (LLMs) possess Theory of Mind (ToM)—often defined as the ability to reason about others' mental states—has sparked significant scientific and public interest. However, the evidence as to whether LLMs possess ToM is mixed, and the recent growth in evaluations has not resulted in a convergence. Here, we take inspiration from cognitive science to re-evaluate the state of ToM evaluation in LLMs. We argue that a major reason for the disagreement on whether LLMs have ToM is a lack of clarity on whether models should be expected to match human behaviours, or the computations underlying those behaviours. We also highlight ways in which current evaluations may be deviating from 'pure' measurements of ToM abilities, which also contributes to the confusion. We conclude by discussing several directions for future research, including the relationship between ToM and pragmatic communication, which could advance our understanding of artificial systems as well as human cognition.
https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2023.0499

TAL TEHAN & EINAT SHETREET – What a picture selection task can tell us about scalar implicature processing? A neuroimaging investigation

Pragmatic inferences beyond the literal meaning of utterances occur with weak scalar expressions, such as 'some', which has a logical meaning of 'some and possibly all' and a pragmatic meaning of 'some but not all', derived through a scalar implicature (SI). Such processing is assumed to involve linguistic and extra-linguistic processes, including Theory of Mind and executive functions. Previous neuroimaging studies used truth value evaluation tasks to study SI processing, showing involvement of the left inferior frontal gyrus (IFG), left anterior middle frontal gyrus (MFG) and medial frontal gyrus (MeFG)/anterior cingulate cortex (ACC). This study used a picture selection task to better understand the role of these regions in SI processing. A region of interest analysis showed differences between a condition that promoted an implicature (with a weak scalar expression) and a condition that did not (with a strong scalar expression) only in the MeFG/ACC, also identified in a complementary whole-brain analysis (together with posterior activations). Based on the differences between processes related to truth value evaluation tasks and picture selection tasks, we propose that the IFG is linked to access to alternatives, the anterior MFG is associated with response-related processing, and the MeFG/ACC is associated with Theory of Mind.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2023.0496

ROSARIO TOMASELLO, ISABELLA BOUX & FRIEDEMANN PULVERMÜLLER – Theory of Mind and the brain substrates of direct and indirect communicative action understanding

Grasping the speaker's communicative intention based on the verbal utterance and its context is one of the key aspects of human interaction. This ability relies on theory of mind (ToM), that is, the cognitive processing of mental states, beliefs and desires of others. We review evidence showing that brain regions ypically engaged in ToM processing, particularly the medial

prefrontal cortex and bilateral temporo-parietal junction, are activated when listeners interpret indirect speech acts. However, other studies show a degree of variability of these 'ToM area activations' during indirect communication, while yet others demonstrate that the same areas are activated for specific communicative functions, such as requests, promises or questions per se, even when expressed directly. Furthermore, we show that studies on indirectness of communication raise questions about the role of different communicative function types in drawing upon 'ToM regions'. We attempt to relate cortical area activations to the commitments, assumptions and intentions that the interlocutors commit to when processing specific communicative function types. In essence, all communicative actions, including both direct and indirect ones, have in common that relevant knowledge about others' intentions and beliefs needs to be processed by the interlocutors.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2023.0497

CHRISTOFFER FORBES SCHIECHE et al – Pragmatics partially segregated from Theory of Mind: evidence from resting-state functional connectivity

Pragmatics and Theory of Mind (ToM) are at play during conversational interaction, but the relationship between the two is a matter of debate. Using resting-state fMRI data, we investigate a potential segregation of the two domains by considering functional connectivity within and between the ToM and language networks, and their relation to pragmatic behavioural measures. We also study the connectivity of two cortical clusters, one in the left intraparietal sulcus and one in the bilateral dorsal precuneus. These clusters are located outside both the ToM and language networks and were previously found to covary with individual pragmatic variability. The results show that these two clusters are functionally connected at rest and that their degree of connectivity is related to pragmatic behaviour. On the other hand, there was no relation between pragmatic behaviour and degrees of connectivity involving the ToM and language networks. Furthermore, the two clusters were not connected to either the ToM or language networks. In conclusion, we suggest that the domain of pragmatics is partially segregated from ToM, and provide further support that the two clusters outside the ToM and language networks are pragmatically relevant.
https://royalsocietypublishing.org/doi/full/10.1098/rstb.2023.0498

PLoS One

PAPERS

SAMUEL AESCHBACH, RUI MATA & DIRK U. WULFF – Measuring individual semantic networks: A simulation study

Accurately capturing individual differences in semantic networks is fundamental to advancing our mechanistic understanding of semantic memory. Past empirical attempts to construct individual-level semantic networks from behavioral paradigms may be limited by data constraints. To assess these limitations and propose improved designs for the measurement of individual semantic networks, we conducted a recovery simulation investigating the psychometric properties underlying estimates of individual semantic networks obtained from two different behavioral paradigms: free associations and relatedness judgment tasks. Our results show that successful inference of semantic networks is achievable, but they also highlight critical challenges. Estimates of absolute network characteristics are severely biased, such that comparisons between behavioral paradigms and different design configurations are often not meaningful. However, comparisons within a given paradigm and design configuration can be accurate and generalizable when based on designs with moderate numbers of cues, moderate numbers of responses, and cue sets including diverse words. Ultimately, our results provide insights that help evaluate past findings on the structure of semantic networks and design new studies capable of more reliably revealing individual differences in semantic networks.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0328712

KATHERINE ROWLEY et al – Reading with deaf eyes: Automatic activation of speech-based phonology during word recognition is task dependent

Literacy levels are highly variable within the deaf population and, compared to the general population, on average, reading levels are lower. As speech-based phonological coding is a known predictor of reading success in hearing individuals, much research has focussed on deaf readers' processing of speech-based phonological codes during word recognition and reading as a possible explanation for the widespread reading difficulties in the deaf population. Although results are mixed, there is recent growing evidence that deaf and hearing readers process speech-based phonological codes differently. Furthermore, some studies indicate that phonological ability may not be a strong correlate of literacy skills in deaf, adult readers. Here, we investigate orthographic, semantic, and phonological processing during single word reading in deaf (N = 20) and hearing (N = 20) adult readers, who were matched on reading level. Specifically, we tracked deaf and hearing readers' eye-movements using an adaptation of the visual world paradigm using written words and pictures. We found that deaf and hearing readers activate orthographic and semantic information following a similar time-course. However, there were differences in the way the groups processed phonology, with deaf readers making less use of phonological information. Crucially, as both groups were matched for reading level, reduced phonological processing did not appear to impact reading skill in deaf readers.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0327142

HUGUES PLISSON et al – Arrow heads at Obi-Rakhmat (Uzbekistan) 80 ka ago?

Lithic weapon points occasionally found in Middle Palaeolithic Neanderthal sites are large and do not differ in size, shape or type from those used in other activities such as butchering or plant gathering. The presence in a same assemblage of various types of projectile armatures, some of which are microlithic and designed for this purpose, has only been documented in Modern Humans sites. Recent studies indicate that light projectile points, which would become a key element in Upper Palaeolithic lithic industries, were already present in its formative stages. However, they remain marginal in debates regarding the Middle to Upper Paleolithic transition. We present the initial findings of a traceological search for weapon heads in the oldest layers of the Obi-Rakhmat rock shelter in Uzbekistan, dating back around 80 ka. The lithic industry of this settlement is forming part of the Levantine Early Middle Paleolithic continuity but with several innovative traits. This site, located in the western foothills of the Tian Shan Mountains, northeastern Uzbekistan, has yielded throughout 10 meters of Pleistocene deposits covering 40,000 years a lithic industry characterized by the systematic production of blades (regular thick narrow blades from unipolar and bipolar sub-prismatic and narrow-faced cores, thin and wide blades from flat-faced Levallois-like cores) along with shorter pieces from convergent or centripetal Levallois cores, and bladelets from burin-cores and other small cores. Three types of projectile armature are identified over a selection of 20: retouched points, bladelets and more particularly unretouched triangular micropoints which had previously gone unoticed due to their fragmentary state. According to the fundamental principles of hunting weapon design these micropoints are too narrow for having been fitted to anything other than arrow-like shafts. They resemble the armatures described in a pioneer settlement by Sapiens in the Rhône Valley, France, 25,000 years later.
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0328390

Proceedings of the Royal Society B

PAPERS

IGOR GROSSMANN et mul – Decision-making preferences for intuition, deliberation, friends or crowds in independent and interdependent societies

When multiple ways of deciding are laid out side-by-side, which does one favour? We conducted experiments in 12 countries (n = 3517 individuals; 13 languages; two Indigenous communities), with adults choosing among four decision strategies—personal intuition, private deliberation, friends' advice or crowd wisdom—when working through six everyday dilemmas. In every society, self-reliant decisions (intuition or deliberation) were most commonly preferred and considered the wisest. Expectations for fellow citizens, however, were mixed: advice from friends was expected about as often as self-reliant routes. The self-reliance tilt was strongest in cultures and individuals high in independent self-construal and need for cognition, and weakest where interdependence and self-transcendent reflection were salient. The same patterns emerged when examining ratings of each strategy's utility and oral protocols with Indigenous groups. Self-reliance appears the modal preference across cultures, but its strength is predictably tempered when cultures, and individuals within them, construe the self in relational rather than autonomous terms.
https://royalsocietypublishing.org/doi/10.1098/rspb.2025.1355

Science Advances

PAPERS

KUN TAN et al – An ancient enhancer rapidly evolving in the human lineage promotes neural development and cognitive flexibility

The genetic changes driving the evolution of humans since the human-chimpanzee split have been elusive. Here, we report a promising candidate in a chromosomal region linked with neurological defects—17p13.3. We show that this 442-nucleotide sequence—human-accelerated region (HAR) 123—is a conserved neural enhancer that promotes neural progenitor cell (NPC) formation. While present in all mammals, HAR123 has rapidly evolved since humans diverged from chimpanzees. The human and chimpanzee HAR123 orthologs exhibit subtle differences in their neural developmental effects, and the human HAR123 ortholog uniquely regulates many genes involved in neural differentiation. We identified direct targets of the HAR123 enhancer and showed that HIC1 acts downstream of HAR123 to promote human NPC formation. HAR123-knockout mice exhibit a defect in cognitive flexibility and a shift in neural-glia ratio in specific regions of the hippocampus. Our study has implications for neurodevelopmental disorders, which are often accompanied by altered neural-glia ratio and have been linked with HARs.
https://www.science.org/doi/10.1126/sciadv.adt0534

EMMA M. FINESTONE et al with MICHAEL D. PETRAGLIA – Selective use of distant stone resources by the earliest Oldowan toolmakers

The adaptive shift that favored stone tool–assisted behavior in hominins began by 3.3 million years ago. However, evidence from early archaeological sites indicates relatively short-distance stone transport dynamics similar to behaviors observed in nonhuman primates. Here we report selective raw material transport over longer distances than expected at least 2.6 million years ago. Hominins at Nyayanga, Kenya, manufactured Oldowan tools primarily from diverse nonlocal stones, pushing back the date for expanded raw material transport by over half a million years. Nonlocal cobbles were transported up to 13 kilometers for on-site reduction, resulting in assemblage patterns inconsistent with accumulations formed by repeated short-

distance transport events. These findings demonstrate that early toolmakers moved stones over substantial distances, possibly in anticipation of food processing needs, representing the earliest archaeologically visible signal for the incorporation of lithic technology into landscape-scale foraging repertoires.
https://www.science.org/doi/10.1126/sciadv.adu5838

Trends in Cognitive Sciences

PAPERS

GABRIELE BELLUCCI et al – Neurocomputational mechanisms of maladaptive behaviors in loneliness

'Loneliness' refers to the perceived social isolation triggered by unsatisfying relationships. Most research and interventions have framed it as an individual problem rather than a broader social issue rooted in the (infra)structures of our societies. Here, we synthesize the neurocomputational evidence on the cognitive processes underpinning loneliness and the psychological and behavioral effects of the social environment and, in particular, community identification on feelings of loneliness. We propose that community-based interventions might effectively tackle loneliness by creating the preconditions that can prevent the emergence and reinforcement of the cognitive biases that foster maladaptive behavioral and reasoning patterns in lonely individuals. Finally, we discuss how future work can better design and tailor social interventions to reduce loneliness and improve mental health in general.
https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(25)00202-5

SUBSCRIBE to the EAORC Bulletin

If you would like to subscribe to this free weekly newsletter, please contact martin.edwardes@btopenworld.com.

UNSUBSCRIBE from the EAORC Bulletin

Send an email to martin.edwardes@btopenworld.com with the subject "EAORC unsubscribe".

PRODUCED BY AND FOR THE EAORC EMAIL GROUP

EAORC is a fee-free academic internet news service and has no commercial sponsorship or other commercial interests.
EAORC website information is at http://martinedwardes.me.uk/eaorc/
If you have received this bulletin, and are unhappy about receiving it, please contact martin.edwardes@btopenworld.com.