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## NOTICES

### PUBLICATION ALERTS

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

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

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

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### ACADEMIA.EDU – First Neanderthal remains from an open-air Middle Palaeolithic site

*In Nature Scientific Reports 7, 2958 (2017).*

#### **ELLA BEEN et al with ERELLA HOVERS – The First Neanderthal remains from an open-air Middle Palaeolithic site in the Levant**

The late Middle Palaeolithic (MP) settlement patterns in the Levant included the repeated use of caves and open landscape sites. The fossil record shows that two types of hominins occupied the region during this period—Neandertals and *Homo sapiens*. Until recently, diagnostic fossil remains were found only at cave sites. Because the two populations in this region left similar material cultural remains, it was impossible to attribute any open-air site to either species. In this study, we present newly discovered fossil remains from intact archaeological layers of the open-air site 'Ein Qashish, in northern Israel. The hominin remains represent three individuals: EQH1, a nondiagnostic skull fragment; EQH2, an upper right third molar (RM3); and EQH3, lower limb bones of a young Neandertal male. EQH2 and EQH3 constitute the first diagnostic anatomical remains of Neandertals at an open-air site in the Levant. The optically stimulated luminescence ages suggest that Neandertals repeatedly visited 'Ein Qashish between 70 and 60 ka. The discovery of Neandertals at open-air sites during the late MP reinforces the view that Neandertals were a resilient population in the Levant shortly before Upper Palaeolithic *Homo sapiens* populated the region.

[https://www.academia.edu/33361529/Been\\_E\\_Hovers\\_E\\_Ekshtain\\_R\\_Malinsky\\_Buller\\_A\\_et\\_al\\_2017\\_The\\_first\\_Neanderthal\\_remains\\_from\\_an\\_open\\_air\\_Middle\\_Paleolithic\\_site\\_in\\_the\\_Levant\\_Scientific\\_Reports\\_Doi\\_10\\_1038\\_s41598\\_017\\_03025\\_z](https://www.academia.edu/33361529/Been_E_Hovers_E_Ekshtain_R_Malinsky_Buller_A_et_al_2017_The_first_Neanderthal_remains_from_an_open_air_Middle_Paleolithic_site_in_the_Levant_Scientific_Reports_Doi_10_1038_s41598_017_03025_z)

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### ACADEMIA.EDU – Categories, cognitive models and ideologies

*In René Dirven, Roslyn M. Frank & Martin Pütz (eds.), Cognitive Models in Language and Thought : Ideology, Metaphors and Meanings, De Gruyter (2003).*

#### **RENÉ DIRVEN, ROSLYN M. FRANK & MARTIN PÜTZ – Categories, cognitive models and ideologies**

On the one hand, this collective volume is an attempt to investigate empirically what cognitive linguistics has to offer as research tools for the definition, detection, analysis and interpretation of language-based societal systems such as ideology. Both in its neutral and in its "loaded" senses, ideology is a system of beliefs and values based on a set of cognitive models, i.e. mental representations - partly linguistic, partly non-linguistic - of recurrent phenomena and their interpretations in culture and society. As such, the volume is an invitation to all scholars in neighboring fields, such as functionalism, pragmatics and critical linguistics or critical discourse analysis, to take cognizance of the instrumental repertoire developed within cognitive linguistics and its ability to address symbolization of overt and covert conceptualizations of belief and value systems and their expression in language.

On the other hand, this volume is also an invitation to cognitive linguists, and to all linguists of whatever orientation, to put their analytical tools to work, not only on the system-internal areas of conceptualization and linguistic structure, but also on the crucial areas of socio-political thought, organization and communication. To be more concrete, this volume acts as an incentive to further develop and expand cognitive linguistics in the direction of a cognitive sociolinguistics, i.e. towards investigations encompassing cognitive views of language politics and language attitudes, cognitive discourse analysis, cognitive stylistics and cognitive rhetoric. Functioning together in one broad theoretical framework, these various sub-disciplines will be far better equipped to develop large-scale ideology research programs. In this way, cognitive linguistics is heading for its own built-in final destination, that of cognitive semiotics.

[https://www.academia.edu/75278066/Introduction\\_Categories\\_cognitive\\_models\\_and\\_ideologies](https://www.academia.edu/75278066/Introduction_Categories_cognitive_models_and_ideologies)

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### ACADEMIA.EDU – Double phenomenology

*In Études phénoménologiques – Phenomenological Studies 1, 29-44 (2017).*

#### **SHAUN GALLAGHER – Double phenomenology**

A discussion between phenomenologists and analytic philosophers of mind that took place in 1958 reveals some hidden connections between these two approaches to studying the mind. I argue that we can find two complementary phenomenological methods within this discussion – one that follows along the line of Husserl and Merleau-Ponty, the other that follows the kind of analysis of speech-acts, avowals and "unstudied speech," proposed by Ryle and Austin.

[https://www.academia.edu/87050533/Gallagher\\_S\\_2017\\_Double\\_phenomenology\\_%C3%89tudes\\_Ph%C3%A9nom%C3%A9nologiques\\_Phenomenological\\_Studies\\_1\\_29\\_44](https://www.academia.edu/87050533/Gallagher_S_2017_Double_phenomenology_%C3%89tudes_Ph%C3%A9nom%C3%A9nologiques_Phenomenological_Studies_1_29_44)

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## ACADEMIA.EDU – Early Palaeolithic Europe

*In Colin Renfrew & Paul Bahn (eds.), The Cambridge World Prehistory, Cambridge University Press, 1703-1746 (2014).*

### **OLAF JÖRIS – Early Palaeolithic Europe (from VIII: Europe and the Mediterranean)**

Life in Early Palaeolithic Europe was significantly different from that in the Upper Palaeolithic after the first Anatomically Modern Humans had entered the continent. For almost two million years the continent had been occupied by hominins different from us. These ancestral populations adapted to, and learned to cope with, entirely different climatic and environmental conditions within Europe's constantly changing geography. The hominins established culture and a way of life, both of which changed through time, increasing their own influence on the environment. They were highly knowledgeable and became skilled and experienced hunters, well equipped for life in Ice Age Europe. However, they also remained entirely different from Modern Humans.

[https://www.academia.edu/8492083/Early\\_Palaeolithic\\_Europe](https://www.academia.edu/8492083/Early_Palaeolithic_Europe)

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## ADAPTIVE HUMAN BEHAVIOR & PHYSIOLOGY ARCHIVE – The Functions of Social Eating

*In Adaptive Human Behavior & Physiology 3, 198-211 (2017).*

### **R.I.M. DUNBAR – Breaking Bread: The Functions of Social Eating**

Communal eating, whether in feasts or everyday meals with family or friends, is a human universal, yet it has attracted surprisingly little evolutionary attention. I use data from a UK national stratified survey to test the hypothesis that eating with others provides both social and individual benefits. I show that those who eat socially more often feel happier and are more satisfied with life, are more trusting of others, are more engaged with their local communities, and have more friends they can depend on for support. Evening meals that result in respondents feeling closer to those with whom they eat involve more people, more laughter and reminiscing, as well as alcohol. A path analysis suggests that the causal direction runs from eating together to bondedness rather than the other way around. I suggest that social eating may have evolved as a mechanism for facilitating social bonding.

<https://link.springer.com/article/10.1007/s40750-017-0061-4>

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## ADAPTIVE HUMAN BEHAVIOR & PHYSIOLOGY ARCHIVE – Smiling as a Costly Signal of Cooperation

*In Adaptive Human Behavior & Physiology 1, 325-340 (2015).*

### **SAMUELE CENTORRINO et al – A Model of Smiling as a Costly Signal of Cooperation Opportunities**

We develop a theoretical model under which “genuine” or “convincing” smiling is a costly signal that has evolved to induce cooperation in situations requiring mutual trust. Prior to a trust interaction involving a decision by a sender to send money to a recipient, the recipient can emit a signal to induce the sender to trust them. The signal takes the form of a smile that may be perceived as more or less convincing, and that can be made more convincing with the investment of greater effort.

Individuals differ in their degree of altruism and in their tendency to display reciprocity. The model generates three testable predictions. First, the perceived quality of the recipient's smile is increasing in the size of the stake. Secondly, the amount sent by the sender is increasing in the perceived quality of the recipient's smile. Thirdly, the expected gain to senders from sending money to the recipient is increasing in the perceived quality of the recipient's smile.

<https://link.springer.com/article/10.1007/s40750-015-0026-4>

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## CONFERENCE ALERT – Second Global Animal Behaviour Twitter Conference

The Global Animal Behaviour Twitter Conference is back! Following the success of the First Global Animal Behaviour Twitter Conference in 2021, ABS and ASAB (Association for the Study of Animal Behaviour), and the ASAB Education Committee are co-hosting the Second Global Animal Behaviour Twitter Conference #AnimBehav2023, which will take place January 18-19, 2023. In addition to learning about animal behavior research across continents, this year our Twitter Conference has an education theme. We encourage abstract submissions describing pedagogical methods that incorporate animal behavior research and will provide resources for instructors at all levels with strategies for incorporating the Twitter conference in teaching/lessons.

Details on this conference are available here: <https://www.animbehav2023.com>

This is a low-carbon, free registration, and inclusive conference that will allow us to learn more about animal behavior research taking place across continents. Anybody can attend the Twitter conference by following the conference hashtag #AnimBehav2023 on Twitter. Most importantly, you do not need to have a Twitter account to attend the conference. If you would like to learn more about how to attend, please, check this link: <https://www.animbehav2023.com/attendance-guidance>

Unlike the usual virtual conferences, Twitter conferences consist of scheduled presentations in the form of a series of connected tweets (known as threads) that are uploaded on Twitter and directly followed by Q&A sessions. This format will provide the opportunity to explore new ways of communicating research. The limited number of characters allowed in each tweet (280) will encourage presenters to explore succinct ways of making the main points via a combination of short sentences, videos, figures, animations, graphical abstracts, etc. We believe this format will enhance the interest of attendees and promote conversation with the presenters. If you would like to learn more about how to present in this Twitter conference and see some examples, please, check this link: <https://www.animbehav2023.com/talk-guidance>

The abstract submission is now open until October 1, 2022. To submit an abstract, check out this link:

<https://www.animbehav2023.com/submit-abstract>

Please consider submitting an abstract and encourage others to do so!

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## NEWS

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### GUARDIAN SCIENCE – Talking to whales: AI & the chasm between our consciousness and other animals

Speaking to animals has long been a fantasy. But now a dizzyingly ambitious project is harnessing all the power of modern science in an attempt to understand what whales say – and then hold conversations with them.

<https://www.theguardian.com/environment/2022/sep/18/talking-to-whales-with-artificial-enterprise-it-may-soon-be-possible>

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### JOHN TEMPLETON FOUNDATION – The Many Lessons Nomads Can Teach Settled Society

When journalist Anthony Sattin first arrived in Egypt in the 1980s, the country still had a number of sizable nomadic communities traveling within and beyond its borders. But over the years, one after the other of those groups became settled, either by choice or state coercion; they are seen as the antithesis to settled, “civilized” populations—an idea that stretches back millennia.

But for all the struggles between nomadic and sedentary populations, Sattin and many scholars point out that there’s more to the story than mutual antagonism. Not only did nomads play an important role historically in spreading goods and ideas, but they offer a similar sense of renewal today, as nations grapple with border conflicts and refugee crises.

<https://www.templeton.org/news/not-all-who-wander-are-lost>

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### JOHN TEMPLETON FOUNDATION – These Psychologists Are Making Gratitude Science Less WEIRD

Dr. Michael McCullough is out to prove himself wrong. Or rather, he’s out to test whether his long-held claims about gratitude are right.

<https://www.templeton.org/news/these-psychologists-are-making-gratitude-science-less-weird>

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### JOHN TEMPLETON FOUNDATION – Charting a Global Map of Gratitude

Dr. Amrisha Vaish, an associate professor of psychology at the University of Virginia, says that knowledge gaps in gratitude research are symptomatic of the larger problem of psychological research’s WEIRD-centric nature.

<https://www.templeton.org/news/charting-a-global-map-of-gratitude>

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### SAPIENS – What Can Vampire Bats Teach Us About Friendship?

Friendship is complicated. But bats and their companions may offer us a window into how humans form—and keep—relationships.

<https://www.sapiens.org/culture/can-vampire-bats-teach-us-friendship/>

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### SAPIENS – How Austerity Unravels Social Ties

The experiences of tight-knit neighborhoods in Mozambique suggest that strict belt-tightening often frays a nation's social fabric.

<https://www.sapiens.org/culture/mozambique-austerity/>

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### SCIENCE NEWS – How many ants live on Earth? Scientists finally have an answer

Counting ants is a bit like counting grains of sand on a beach. But six researchers have proved they were up for the task. They’ve come up with the latest—and most comprehensive—estimate of the number of ants in the world: 20 quadrillion. That’s 12 megatons of biomass—more than all the wild birds and mammals taken together.

<https://www.science.org/content/article/how-many-ants-live-earth>

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### SCIENCE NEWS – Natural Inspiration

Martha Muñoz has shown that organisms can influence their own evolution—a lesson she’s passing on to her students.

***{So some individuals adopt a particular behaviour and others don’t; and those who adopt contextually successful behaviours get more genes into the future; and the reason why this creates a ratchet effect is because the successful behaviours are generated by genetic predispositions. I don’t see how this is different from normal evolution: genes affect behaviour, behaviour affects survival, survival affects genetic framing, genetic framing affects speciation.}***

<https://www.science.org/content/article/biologist-discovered-lizards-and-other-organisms-can-influence-their-own-evolution>



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## SCIENCEOPEN – Scholars' views on Open Peer Review – Presenting Survey Results

Since its inception, ScienceOpen has actively been facilitating the open peer reviewing process, not only within its network but also across the digital publishing landscape. We have continuously been focusing on ways to promote a more open scholarly environment for reviewers, and a few weeks ago, we launched a survey to help us with that. Today, we have some results to share with all of our readers as part of Peer Review Week 2022.

<https://blog.scienceopen.com/2022/09/scholars-views-on-open-peer-review/>

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## SOCIETY FOR SCIENCE – Drumming woodpeckers use similar brain regions as songbirds

Woodpeckers drum on trees and other objects using brain regions similar to those that songbirds use to sing, suggesting a common evolutionary origin for the complex behaviors.

<http://click.societyforscience-email.com/?qs=cdf70a8d22b000ce21106ca5d21b99047901eefea2debc0a04945eb94574e7c7c6abf1f1a9a788470f45a264b5e4bdbd2d7ee601ffe73c91c4385ac00ce8b9e6>

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## THE CONVERSATION – How did the patriarchy start – and will evolution get rid of it?

**READER QUESTION: Many people assume the patriarchy has always been there, but surely this isn't the case? How did it really originate? Matt, 48, London.**

The patriarchy, having been somewhat in retreat in parts of the world, is back in our faces. In Afghanistan, the Taliban once again prowl the streets more concerned with keeping women at home and in strict dress code than with the impending collapse of the country into famine. And on another continent, parts of the US are legislating to ensure that women can no longer have a legal abortion. In both cases, lurking patriarchal beliefs were allowed to reemerge when political leadership failed. We have an eerie feeling of travelling back through time. But how long has patriarchy dominated our societies? The status of women has been a long-standing point of interest in anthropology. Contrary to common belief, research shows that the patriarchy isn't some kind of "natural order of things" – it hasn't always been prevalent and may in fact disappear eventually. Hunter-gatherer communities may have been relatively egalitarian, at least compared to some of the regimes that followed. And female leaders and matriarchal societies have always existed.

<https://theconversation.com/how-did-the-patriarchy-start-and-will-evolution-get-rid-of-it-189648>

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## THE CONVERSATION – Six recent discoveries that have changed how we think about human origins

You may have heard science has reconsidered its view of Neanderthals but did you know human hybrid species played a key role in our evolution?

<https://theconversation.com/six-recent-discoveries-that-have-changed-how-we-think-about-human-origins-190274>

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## THE CONVERSATION – Why do we laugh?

New study considers possible evolutionary reasons behind this very human behaviour. Could laughter be a survival mechanism?

<https://theconversationuk.cmail20.com/t/r-l-tjpujo-khhilillah-g/>

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## PUBLICATIONS

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### American Journal of Biological Anthropology

#### PAPERS

#### MARY E. LEWIS – Exploring adolescence as a key life history stage in bioarchaeology

Adolescence is a unique period in the life history of an individual. It is characterized by a myriad of changes that bioarchaeologists are only just coming to appreciate, related to sexual maturation, linear growth, immunological transformation, and emotional and cognitive development. New methods allow us to measure this age of transition through the stages of the adolescent growth, as a proxy for the physical development associated with sexual maturation (puberty). This review outlines ways bioarchaeologists may draw on research developments from the fields of human biology, evolutionary theory and neurobiology to advance a more holistic approach to the study of adolescence in the past. It considers current theoretical and analytical approaches to highlight the research potential of this critical stage of life history. This synthesis integrates the most recent research in the medical sciences concerned with body and brain development, and outlines the biological processes involved with sexual and physical maturation of the adolescent. The goal of this review is to help inform potentially rewarding areas of research that bioarchaeologists can contribute to and draw from, as well as the challenges and limitations, theoretical and methodological questions, and ways in which we can develop the study of adolescence in the discipline going forward.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ajpa.24615>

**Is It a stick or a snake?**

A new model breaks down the process of thinking about our own thoughts.

Related to Reverse engineering of metacognition by Matthias Guggenmos.

<https://elifesciences.org/digests/75420/is-it-a-stick-or-a-snake>

PAPERS

**MATTHIAS GUGGENMOS – Reverse engineering of metacognition**

The human ability to introspect on thoughts, perceptions or actions – metacognitive ability – has become a focal topic of both cognitive basic and clinical research. At the same time it has become increasingly clear that currently available quantitative tools are limited in their ability to make unconfounded inferences about metacognition. As a step forward, the present work introduces a comprehensive modeling framework of metacognition that allows for inferences about metacognitive noise and metacognitive biases during the readout of decision values or at the confidence reporting stage. The model assumes that confidence results from a continuous but noisy and potentially biased transformation of decision values, described by a confidence link function. A canonical set of metacognitive noise distributions is introduced which differ, amongst others, in their predictions about metacognitive sign flips of decision values. Successful recovery of model parameters is demonstrated, and the model is validated on an empirical data set. In particular, it is shown that metacognitive noise and bias parameters correlate with conventional behavioral measures. Crucially, in contrast to these conventional measures, metacognitive noise parameters inferred from the model are shown to be independent of performance. This work is accompanied by a toolbox (ReMeta) that allows researchers to estimate key parameters of metacognition in confidence datasets.

<https://elifesciences.org/articles/75420>

**JAMES N MCGREGOR et al – Shared mechanisms of auditory and non-auditory vocal learning in the songbird brain**

Songbirds and humans share the ability to adaptively modify their vocalizations based on sensory feedback. Prior studies have focused primarily on the role that auditory feedback plays in shaping vocal output throughout life. In contrast, it is unclear how non-auditory information drives vocal plasticity. Here, we first used a reinforcement learning paradigm to establish that somatosensory feedback (cutaneous electrical stimulation) can drive vocal learning in adult songbirds. We then assessed the role of a songbird basal ganglia thalamocortical pathway critical to auditory vocal learning in this novel form of vocal plasticity. We found that both this circuit and its dopaminergic inputs are necessary for non-auditory vocal learning, demonstrating that this pathway is critical for guiding adaptive vocal changes based on both auditory and somatosensory signals. The ability of this circuit to use both auditory and somatosensory information to guide vocal learning may reflect a general principle for the neural systems that support vocal plasticity across species.

<https://elifesciences.org/articles/75691>

**ALICE VIDAL, SALVADOR SOTO-FARACO & RUBEN MORENO BOTE – Balance between breadth and depth in human many-alternative decisions**

Many everyday life decisions require allocating finite resources, such as attention or time, to examine multiple available options, like choosing an online food supplier. In these cases, our search resources can be spread across many options (breadth) or focused on a few of them (depth). Whilst theoretical work has described how finite resources should be allocated to maximise utility in these problems, evidence about how humans balance breadth and depth is lacking. We introduce a novel experimental paradigm where humans make a many-alternative decision under finite resources. In an imaginary scenario, participants allocate a finite budget to sample amongst multiple apricot suppliers in order to estimate the quality of their fruits, and ultimately choose the best one. We found that at low budget capacity participants sample as many suppliers as possible, and thus prefer breadth, whereas at high capacities participants sample just a few chosen alternatives in depth, and intentionally ignore the rest. The number of alternatives sampled increases with capacity following a power law with an exponent close to 0.75. In richer environments, where good outcomes are more likely, humans further favour depth. Participants deviate from optimality and tend to allocate capacity amongst the selected alternatives more homogeneously than it would be optimal, but the impact on the outcome is small. Overall, our results undercover a rich phenomenology of close-to-optimal behaviour and biases in complex choices.

<https://elifesciences.org/articles/76985>

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Frontiers in Human Neuroscience

PAPERS

**JUAN ZHANG et al – Brain fingerprints along the language hierarchy**

Recent studies have shown that the brain functional connectome constitutes a unique fingerprint that allows the identification of individuals from a group. However, what information encoded in the brain that makes us unique remains elusive. Here, we addressed this issue by examining how individual identifiability changed along the language hierarchy. Subjects underwent fMRI scanning during rest and when listening to short stories played backward, scrambled at the sentence level, and played forward. Identification for individuals was performed between two scan sessions for each task as

well as between the rest and task sessions. We found that individual identifiability tends to increase along the language hierarchy: the more complex the task is, the better subjects can be distinguished from each other based on their whole-brain functional connectivity profiles. A similar principle is found at the functional network level: compared to the low-order network (the auditory network), the high-order network is more individualized (the frontoparietal network). Moreover, in both cases, the increase in individual identifiability is accompanied by the increase in inter-subject variability of functional connectivities. These findings advance the understanding of the source of brain individualization and have potential implications for developing robust connectivity-based biomarkers.

<https://www.frontiersin.org/articles/10.3389/fnhum.2022.982905/full>

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## Language

### PAPERS

#### **MARGARET CYCHOSZ – Language exposure predicts children’s phonetic patterning: Evidence from language shift**

Although understanding the role of the environment is central to language acquisition theory, rarely has this been studied for children’s phonetic development, and RECEPTIVE and EXPRESSIVE language experiences in the environment are not distinguished. This last distinction may be crucial for child speech production in particular, because production requires coordination of low-level speech-motor planning with high-level linguistic knowledge. In this study, the role of the environment is evaluated in a novel way—by studying phonetic development in a bilingual community undergoing rapid language shift. This sociolinguistic context provides a naturalistic gradient of the AMOUNT of children’s exposure to two languages and the RATIO of expressive to receptive experiences. A large-scale child language corpus encompassing over 500 hours of naturalistic South Bolivian Quechua and Spanish speech was efficiently annotated for children’s and their caregivers’ bilingual language use. These estimates were correlated with children’s patterns in a series of speech production tasks. The role of the environment varied by outcome: children’s expressive language experience best predicted their performance on a coarticulation-morphology measure, while their receptive experience predicted performance on a lower-level measure of vowel variability. Overall these bilingual exposure effects suggest a pathway for children’s role in language change whereby language shift can result in different learning outcomes within a single speech community. Appropriate ways to model language exposure in development are discussed.

<https://muse.jhu.edu/article/864633>

#### **JUDITH DEGEN & JUDITH TONHAUSER – Are there factive predicates? An empirical investigation**

Properties of the content of the clausal complement have long been assumed to distinguish factive predicates like know from nonfactive ones like think (Kiparsky & Kiparsky 1970, inter alia). There is, however, disagreement about which properties define factive predicates, as well as uncertainty about whether the content of the complement of particular predicates exhibits the properties attributed to the content of the complement of factive predicates. This has led to a lack of consensus about which predicates are factive, a troublesome situation given the central role that factivity plays in linguistic theorizing. This article reports six experiments designed to investigate two critical properties of the content of the complement of clause-embedding predicates, namely projection and entailment, with the goal of establishing whether these properties identify a class of factive predicates. We find that factive predicates are more heterogeneous than previously assumed and that there is little empirical support from these experiments for the assumed categorical distinction between factive and nonfactive predicates. We discuss implications of our results for formal analyses of presuppositions, one area where factivity has played a central role. We propose that projection is sensitive to meaning distinctions between clause-embedding predicates that are more fine-grained than factivity.

<https://muse.jhu.edu/article/864635>

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## Nature

### NEWS

#### **Did this gene give modern human brains their edge?**

A mutation present in modern humans seems to drive greater neuron growth than does an ancient hominin version.

<https://www.nature.com/articles/d41586-022-02895-2>

#### **‘Papermill alarm’ software flags potentially fake papers**

The text-analysis tool could be used to help detect bogus research submitted to journals.

<https://www.nature.com/articles/d41586-022-02997-x>

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## Nature Communications

### PAPERS

#### **TOSHITAKA N. SUZUKI & YUI K. MATSUMOTO – Experimental evidence for core-Merge in the vocal communication system of a wild passerine**

One of the cognitive capacities underlying language is core-Merge, which allows senders to combine two words into a sequence and receivers to recognize it as a single unit. Recent field studies suggest intriguing parallels in non-human animals, e.g., Japanese tits (*Parus minor*) combine two meaning-bearing calls into a sequence when prompting antipredator displays in other individuals. However, whether such examples represent core-Merge remains unclear; receivers may perceive a two-



call sequence as two individual calls that are arbitrarily produced in close time proximity, not as a single unit. If an animal species has evolved core-Merge, its receivers should treat a two-call sequence produced by a single individual differently from the same two calls produced by two individuals with the same timing. Here, we show that Japanese tit receivers exhibit antipredator displays when perceiving two-call sequences broadcast from a single source, but not from two sources, providing evidence for core-Merge in animals.

<https://www.nature.com/articles/s41467-022-33360-3>

#### **ELENA N. WAIDMANN et al – Local features drive identity responses in macaque anterior face patches**

Humans and other primates recognize one another in part based on unique structural details of the face, including both local features and their spatial configuration within the head and body. Visual analysis of the face is supported by specialized regions of the primate cerebral cortex, which in macaques are commonly known as face patches. Here we ask whether the responses of neurons in anterior face patches, thought to encode face identity, are more strongly driven by local or holistic facial structure. We created stimuli consisting of recombinant photorealistic images of macaques, where we interchanged the eyes, mouth, head, and body between individuals. Unexpectedly, neurons in the anterior medial (AM) and anterior fundus (AF) face patches were predominantly tuned to local facial features, with minimal neural selectivity for feature combinations. These findings indicate that the high-level structural encoding of face identity rests upon populations of neurons specialized for local features.

<https://www.nature.com/articles/s41467-022-33240-w>

#### **DAVID J. SCHAEFFER et al – Frontoparietal connectivity as a product of convergent evolution in rodents and primates: functional connectivity topologies in grey squirrels, rats, and marmosets**

Robust frontoparietal connectivity is a defining feature of primate cortical organization. Whether mammals outside the primate order, such as rodents, possess similar frontoparietal functional connectivity organization is a controversial topic. Previous work has primarily focused on comparing mice and rats to primates. However, as these rodents are nocturnal and terrestrial, they rely much less on visual input than primates. Here, we investigated the functional cortical organization of grey squirrels which are diurnal and arboreal, thereby better resembling primate ecology. We used ultra-high field resting-state fMRI data to compute and compare the functional connectivity patterns of frontal regions in grey squirrels (*Sciurus carolinensis*), rats (*Rattus norvegicus*), and marmosets (*Callithrix jacchus*). We utilized a fingerprinting analysis to compare interareal patterns of functional connectivity from seeds across frontal cortex in all three species. The results show that grey squirrels, but not rats, possess a frontoparietal connectivity organization that resembles the connectivity pattern of marmoset lateral prefrontal cortical areas. Since grey squirrels and marmosets have acquired an arboreal way of life but show no common arboreal ancestor, the expansion of the visual system and the formation of a frontoparietal connectivity architecture might reflect convergent evolution driven by similar ecological niches in primates and tree squirrels.

<https://www.nature.com/articles/s42003-022-03949-x>

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## Nature Human Behaviour

### PAPERS

#### **YASUHIRO KANAKOGI et al – Third-party punishment by preverbal infants**

Third-party punishment of antisocial others is unique to humans and seems to be universal across cultures. However, its emergence in ontogeny remains unknown. We developed a participatory cognitive paradigm using gaze-contingency techniques, in which infants can use their gaze to affect agents displayed on a monitor. In this paradigm, fixation on an agent triggers the event of a stone crushing the agent. Throughout five experiments (total N = 120), we show that eight-month-old infants punished antisocial others. Specifically, infants increased their selective looks at the aggressor after watching aggressive interactions. Additionally, three control experiments excluded alternative interpretations of their selective gaze, suggesting that punishment-related decision-making influenced looking behaviour. These findings indicate that a disposition for third-party punishment of antisocial others emerges in early infancy and emphasize the importance of third-party punishment for human cooperation. This behavioural tendency may be a human trait acquired over the course of evolution.

<https://www.nature.com/articles/s41562-022-01354-2>

#### **KENO JUECHEMS et al – Human value learning and representation reflect rational adaptation to task demands**

Humans and other animals routinely make choices between goods of different values. Choices are often made within identifiable contexts, such that an efficient learner may represent values relative to their local context. However, if goods occur across multiple contexts, a relative value code can lead to irrational choices. In this case, an absolute context-independent value is preferable to a relative code. Here we test the hypothesis that value representation is not fixed but rationally adapted to context expectations. In two experiments, we manipulated participants' expectations about whether item values learned within local contexts would need to be subsequently compared across contexts. Despite identical learning experiences, the group whose expectations included choices across local contexts went on to learn more absolute-like representation than the group whose expectations covered only fixed local contexts. Human value representation is thus neither relative nor absolute but efficiently and rationally tuned to task demands.

<https://www.nature.com/articles/s41562-022-01360-4>

**KELLY C. ROTH, KENNA R. H. CLAYTON & GREG D. REYNOLDS – Infant selective attention to native and non-native audiovisual speech**

The current study utilized eye-tracking to investigate the effects of intersensory redundancy and language on infant visual attention and detection of a change in prosody in audiovisual speech. Twelve-month-old monolingual English-learning infants viewed either synchronous (redundant) or asynchronous (non-redundant) presentations of a woman speaking in native or non-native speech. Halfway through each trial, the speaker changed prosody from infant-directed speech (IDS) to adult-directed speech (ADS) or vice versa. Infants focused more on the mouth of the speaker on IDS trials compared to ADS trials regardless of language or intersensory redundancy. Additionally, infants demonstrated greater detection of prosody changes from IDS speech to ADS speech in native speech. Planned comparisons indicated that infants detected prosody changes across a broader range of conditions during redundant stimulus presentations. These findings shed light on the influence of language and prosody on infant attention and highlight the complexity of audiovisual speech processing in infancy.

<https://www.nature.com/articles/s41598-022-19704-5>

**JOSÉ BRAGA et al – New fossils from Kromdraai and Drimolen, South Africa, and their distinctiveness among *Paranthropus robustus***

Most fossil hominin species are sampled with spatial, temporal or anatomical biases that can hinder assessments of their paleodiversity, and may not yield genuine evolutionary signals. We use new fossils from the Kromdraai (Unit P) and Drimolen sites (South Africa) to provide insights into the paleodiversity of the Lower Pleistocene robust australopith, *Paranthropus robustus*. Our focus is the morphology of the temporal bone and the relationships between size and shape (allometry) of the semi-circular canals (SCC), an aspect that has not yet been investigated among southern African australopiths. We find significant size and shape SCC differences between *P. robustus* from Kromdraai, Drimolen and Swartkrans. This site-related variation is consistent with other differences observed on the temporal bone. *P. robustus* from Kromdraai Unit P is distinctive because of its smaller temporal bone and SCC, and its proportionally less developed posterior SCC, independently of age and sex. We emphasize the importance of allometry to interpret paleodiversity in *P. robustus* as either the consequence of differences in body size, or as yet unknown factors. Some features of the inner ear of *P. robustus* represent directional selection soon after its origin, whereas the size and shape variations described here may result from evolutionary changes.

<https://www.nature.com/articles/s41598-022-18223-7>

**SANTIAGO SOSSA-RÍOS et al – Multidisciplinary evidence of an isolated Neanderthal occupation in Abric del Pastor (Alcoi, Iberian Peninsula)**

Testing Neanderthal behavioural hypotheses requires a spatial–temporal resolution to the level of a human single occupation episode. Yet, most of the behavioural data on Neanderthals has been obtained from coarsely dated, time-averaged contexts affected by the archaeological palimpsest effect and a diversity of postdepositional processes. This implies that time-resolved Neanderthal behaviour remains largely unknown. In this study, we performed archaeostratigraphic analysis on stratigraphic units IVe, IVf, IVg, Va, Vb and Vc from Abric del Pastor (Alcoi, Iberian Peninsula). Further, we isolated the archaeological remains associated with the resulting archaeostratigraphic unit and applied raw material, technological, use-wear, archaeozoological and spatial analyses. Our results show a low-density accumulation of remains from flintknapping, flint tool-use and animal processing around a hearth. These data provide a time-resolved human dimension to previous high-resolution environmental and pyrotechnological data on the same hearth, representing the first comprehensive characterisation of a Neanderthal single occupation episode. Our integrated, multidisciplinary method also contributes to advance our understanding of archaeological record formation processes.

<https://www.nature.com/articles/s41598-022-20200-z>

**Hunter-gatherers kept animals for food before they farmed crops**

Ancient dung hints that 12,000 years ago, a population of hunter-gatherers in what is now Syria kept animals like sheep or gazelles around – probably for food.

<https://www.newscientist.com/article/2337939-hunter-gatherers-kept-animals-for-food-before-they-farmed-crops/>

**CLARE WILSON – Nature, nurture, luck: Why you are more than just genes and upbringing**

Your genes and environment play a big part in forming you, but there is an unexplored third element at play too: luck. The chance events that shape your brain in the womb may influence who you become as much as your genetics, and perhaps even more than the effect of parenting.

<https://www.newscientist.com/article/mg25534050-900-nature-nurture-luck-why-you-are-more-than-just-genes-and-upbringing/>

#### **ELISABETTA PALAGI, FAUSTO CARUANA & FRANS B. M. DE WAAL – The naturalistic approach to laughter in humans and other animals: towards a unified theory**

This opinion piece aims to tackle the biological, psychological, neural and cultural underpinnings of laughter from a naturalistic and evolutionary perspective. A naturalistic account of laughter requires the reevaluation of two dogmas of a longstanding philosophical tradition, that is, the quintessential link between laughter and humour, and the uniquely human nature of this behaviour. In the spirit of Provine's and Panksepp's seminal studies, who firstly argued against the anti-naturalistic dogmas, here we review compelling evidence that (i) laughter is first and foremost a social behaviour aimed at regulating social relationships, easing social tensions and establishing social bonds, and that (ii) homologous and homoplastic behaviours of laughter exist in primates and rodents, who also share with humans the same underpinning neural circuitry. We make a case for the hypothesis that the contagiousness of laughter and its pervasive social infectiousness in everyday social interactions is mediated by a specific mirror mechanism. Finally, we argue that a naturalistic account of laughter should not be intended as an outright rejection of classic theories; rather, in the last part of the piece we argue that our perspective is potentially able to integrate previous viewpoints—including classic philosophical theories—ultimately providing a unified evolutionary explanation of laughter.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0175>

#### **R.I.M. DUNBAR – Laughter and its role in the evolution of human social bonding**

In anthropoid primates, social grooming is the principal mechanism (mediated by the central nervous system endorphin system) that underpins social bonding. However, the time available for social grooming is limited, and this imposes an upper limit on the size of group that can be bonded in this way. I suggest that, when hominins needed to increase the size of their groups beyond the limit that could be bonded by grooming, they co-opted laughter (a modified version of the play vocalization found widely among the catarrhine primates) as a form of chorusing to fill the gap. I show, first, that human laughter both upregulates the brain's endorphin system and increases the sense of bonding between those who laugh together. I then use a reverse engineering approach to model group sizes and grooming time requirements for fossil hominin species to search for pinch points where a phase shift in bonding mechanisms might have occurred. The results suggest that the most likely time for the origin of human-like laughter is the appearance of the genus *Homo* ca. 2.5 Ma.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0176>

#### **MARINA DAVILA-ROSS & ELISABETTA PALAGI – Laughter, play faces and mimicry in animals: evolution and social functions**

Human laughter and laugh faces show similarities in morphology and function with animal playful expressions. To better understand primordial uses and effects of human laughter and laugh faces, it is important to examine these positive expressions in animals from both homologous and analogous systems. Phylogenetic research on hominids provided empirical evidence on shared ancestry across these emotional expressions, including human laughter and laugh faces. In addition, playful expressions of animals, in general, arguably have a key role in the development of social cognitive skills, a role that may help explain their polyphyletic history. The present work examines the evolution and function of playful expressions in primates and other animals. As part of this effort, we also coded for muscle activations of six carnivore taxa with regard to their open-mouth faces of play; our findings provide evidence that these carnivore expressions are homologues of primate open-mouth faces of play. Furthermore, our work discusses how the expressions of animal play may communicate positive emotions to conspecifics and how the motor resonance of these expressions increases affiliation and bonding between the subjects, resembling in a number of ways the important social–emotional effects that laughter and laugh faces have in humans.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0177>

#### **SOPHIE K. SCOTT, CECI QING CAI & ADDISON BILLING – Robert Provine: the critical human importance of laughter, connections and contagion**

Robert Provine made several critically important contributions to science, and in this paper, we will elaborate some of his research into laughter and behavioural contagion. To do this, we will employ Provine's observational methods and use a recorded example of naturalistic laughter to frame our discussion of Provine's work. The laughter is from a cricket commentary broadcast by the British Broadcasting Corporation in 1991, in which Jonathan Agnew and Brian Johnston attempted to summarize that day's play, at one point becoming overwhelmed by laughter. We will use this laughter to demonstrate some of Provine's key points about laughter and contagious behaviour, and we will finish with some observations about the importance and implications of the differences between humans and other mammals in their use of contagious laughter.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0178>

#### **GREGORY A. BRYANT & CONSTANCE M. BAINBRIDGE – Laughter and culture**

Like most human non-verbal vocalizations, laughter is produced by speakers of all languages, across all known societies. But despite this obvious fact (or perhaps because of it), there is little comparative research examining the structural and

functional similarity of laughter across speakers from different cultures. Here, we describe existing research examining (i) the perception of laughter across disparate cultures, (ii) conversation analysis examining how laughter manifests itself during discourse across different languages, and (iii) computational methods developed for automatically detecting laughter in spoken language databases. Together, these three areas of investigation provide clues regarding universals and cultural variations in laughter production and perception, and offer methodological tools that can be useful for future large-scale cross-cultural studies. We conclude by providing suggestions for areas of research and predictions of what we should expect to discover. Overall, we highlight how important questions regarding human vocal communication across cultures can be addressed through the examination of spontaneous and volitional laughter.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0179>

#### **B. WESTERMANN et al – When laughter arrests speech: fMRI-based evidence**

Who has not experienced that sensation of losing the power of speech owing to an involuntary bout of laughter? An investigation of this phenomenon affords an insight into the neuronal processes that underlie laughter. In our functional magnetic resonance imaging study, participants were made to laugh by tickling in a first condition; in a second one they were requested to produce vocal utterances under the provocation of laughter by tickling. This investigation reveals increased neuronal activity in the sensorimotor cortex, the anterior cingulate gyrus, the insula, the nucleus accumbens, the hypothalamus and the periaqueductal grey for both conditions, thereby replicating the results of previous studies on ticklish laughter. However, further analysis indicates the activity in the emotion-associated regions to be lower when tickling is accompanied by voluntary vocalization. Here, a typical pattern of activation is identified, including the primary sensory cortex, a ventral area of the anterior insula and the ventral tegmental field, to which belongs to the nucleus ambiguus, namely, the common effector organ for voluntary and involuntary vocalizations. During the conflictual voluntary-vocalization versus laughter experience, the laughter-triggering network appears to rely heavily on a sensory and a deep interoceptive analysis, as well as on motor effectors in the brainstem.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0182>

#### **MICHEL BELYK & CAROLYN MCGETTIGAN – Real-time magnetic resonance imaging reveals distinct vocal tract configurations during spontaneous and volitional laughter**

A substantial body of acoustic and behavioural evidence points to the existence of two broad categories of laughter in humans: spontaneous laughter that is emotionally genuine and somewhat involuntary, and volitional laughter that is produced on demand. In this study, we tested the hypothesis that these are also physiologically distinct vocalizations, by measuring and comparing them using real-time magnetic resonance imaging (rtMRI) of the vocal tract. Following Ruch and Ekman (Ruch and Ekman 2001 In *Emotions, qualia, and consciousness* (ed. A Kaszniak), pp. 426–443), we further predicted that spontaneous laughter should be relatively less speech-like (i.e. less articulate) than volitional laughter. We collected rtMRI data from five adult human participants during spontaneous laughter, volitional laughter and spoken vowels. We report distinguishable vocal tract shapes during the vocalic portions of these three vocalization types, where volitional laughs were intermediate between spontaneous laughs and vowels. Inspection of local features within the vocal tract across the different vocalization types offers some additional support for Ruch and Ekman's predictions. We discuss our findings in light of a dual pathway hypothesis for the neural control of human volitional and spontaneous vocal behaviours, identifying tongue shape and velum lowering as potential biomarkers of spontaneous laughter to be investigated in future research.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0511>

#### **E. PROCHAZKOVA et al – Conscious awareness is necessary to assess trust and mimic facial expressions, while pupils impact trust unconsciously**

People make rapid inferences about others' thoughts and intentions. For example, they observe facial movements and pupil size of others and unwittingly make use of this information when deciding whether to trust someone or not. However, whether spontaneous mimicry depends on visual awareness of the stimulus and whether these processes underlie trust decisions is still unknown. To investigate whether visual awareness modulates the relationship between emotional expressions, mimicry and trust, participants played a series of trust games and saw either their partners' faces with a neutral, happy or fearful expression, or their partners' eyes in which the pupil size was large, medium or small. Subjects' trust investments, facial movements and pupil responses were measured. In half of the trials, the stimuli were rendered invisible by continuous flash suppression. Results showed that facial expressions were mimicked and influenced trust decisions during the conscious condition, but not during the unconscious (suppressed) condition. The opposite was found for pupil size, which influenced trust decisions during states of unawareness. These results suggest that the neurobiological pathway linking the observation of facial expressions to mimicry and trust is predominantly conscious, whereas partner pupil size influences trust primarily when presented unconsciously.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0183>

#### **SANDRA PROELSS et al – The human tickle response and mechanisms of self-tickle suppression**

A tickle is a complex sensation: it occurs in response to touch but not unequivocally so, and makes us laugh albeit not when we self-tickle. We quantified human ticklishness by means of physiological, visual and acoustic measures alongside subjective reports, and assessed mechanisms of self-tickle suppression. Tickle responses arose faster than previously reported as

changes in thoracic circumference and joyous facial expressions co-emerge approximately 300 ms after tickle onset and are followed by vocalizations starting after an additional 200 ms. The timing and acoustic properties of vocalizations tightly correlated with subjective reports: the faster, louder and higher-pitched participants laughed, the stronger they rated the experienced ticklishness. Externally evoked ticklishness is reduced by simultaneous self-tickling, whereby self-touch evokes stronger suppression than sole self-tickle movement without touch. We suggest that self-tickle suppression can be understood as broad attenuation of sensory temporally coincident inputs. Our study provides new insight on the nature of human ticklishness and the attenuating effects of self-tickling.

<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2021.0185>

### **HEIDI MAUERSBERGER et al – The different shades of laughter: when do we laugh and when do we mimic other's laughter?**

Laughter is an ambiguous phenomenon in response to both positive and negative events and a social signal that coordinates social interactions. We assessed (i) who laughs and why, and (ii) if the type of laughter and whether the observer approves of it impact on facial mimicry as a proxy for shared laughter. For this, 329 participants watched funny, schadenfreude and disgusting scenes and then saw individuals who purportedly reacted to each scene while participants' facial expressions were recorded and analysed. Participants laughed more in response to funny than in response to schadenfreude scenes and least in response to disgust scenes, and laughter within each scene could be explained both by situational perceptions of the scenes as well as by individual differences. Furthermore, others' laughter in response to funny scenes was perceived as more appropriate, elicited more closeness and more laughter mimicry than others' laughter in response to schadenfreude and especially in response to disgust scenes. Appropriateness and closeness as well as individual differences could explain laughter mimicry within each scene. This is in line with the notion that laughter is not per se an affiliative signal and that different types of laughter have distinct social implications.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0188>

### **ADRIENNE WOOD et al – Tendency to laugh is a stable trait: findings from a round-robin conversation study**

People often laugh during conversation. Who is more responsible for the laughter, the person laughing or their partner for eliciting it? We used a round-robin design where participants (N = 66) engaged in 10 different conversations with 10 same-gender strangers and counted the instances of laughter for each person in each conversation. After each conversation, participants rated their perceived similarity with their partner and how much they enjoyed the conversation. More than half the variability in the amount a person laughed was attributable to the person laughing—some people tend to laugh more than others. By contrast, less than 5% of the variability was attributable to the laugher's partner. We also found that the more a person laughed, the more their partners felt similar to them. Counterintuitively, laughter negatively predicted conversation enjoyment. These findings suggest that, in conversations between strangers, laughter may not be a straightforward signal of amusement, but rather a social tool. We did not find any personality predictors of how much a person laughs or elicits laughter. In summary, how much a person laughs in conversation appears to be a stable trait associated with being relatable, and is not necessarily reflective of enjoyment.

<https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2021.0187>

## **PLoS One**

### **PAPERS**

### **KRISZTINA LISZKAI-PERES ,DORA KAMPIS & ILDIKÓ KIRÁLY – 3-4-year-old children's memory flexibility allows adaptation to an altered context**

Imitation provides a reliable method to investigate the developing memory functions in childhood. The present study explored whether 3-4-year-old children are able to revise their previous experiences after a 1 week delay in order to adapt to an altered context. We used a combined short-term (Session 1) and delayed (Session 2) imitation paradigm based on a previous study with 2-year-olds. The constraints (target object close/far) and relatedly the relevance of using a tool in a goal attainment task (irrelevant/relevant, respectively) changed between the sessions. We found that children in Session 1 used the tool only when it was needed (relevant/object far context). After the 1 week delay when the tool was previously irrelevant and then became relevant, children remembered the irrelevant act and applied it in the altered context. When the tool lost its relevance after 1 week, children used the tool less than before, but did not fully omit it, despite its reduced efficiency. The present data with 3-year-olds was compared to a pattern of results with 2-year-olds (from a similar previous study), that allowed to discuss possible developmental transitions in memory and imitation. We propose that the flexible restoration of a formerly irrelevant act and the maintenance of a formerly successful solution indicate flexibility of preschooler's memory when guiding imitation. This flexibility, however, interacts with children's tendency to remain faithful to strategies that were previously ostensibly demonstrated to them.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0275071>



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## PNAS

### PAPERS

#### **DAISY YI DING et al – Cooperative learning for multiview analysis**

Multiview analysis with “-omics” data, such as genomics and proteomics, measured on a common set of samples represents an increasingly important challenge in biology and medicine. Commonly used approaches can be broadly categorized into early and late fusion, depending on when “fusion” occurs. We introduce a supervised learning algorithm—“cooperative learning”—that encompasses both early and late fusion and blended versions of these methods. This algorithm encourages the predictions from different views to agree and chooses the degree of agreement in a data-adaptive manner. By leveraging aligned signals in multiomics, it can yield better predictions on tasks such as disease classification and treatment response prediction and has implications for improving diagnostics and therapeutics.

<https://www.pnas.org/doi/10.1073/pnas.2202113119>

#### **KASIA HITCZENKO & NAOMI H. FELDMAN – Naturalistic speech supports distributional learning across contexts**

Languages differ in the speech sounds they use, and humans need to learn which sounds their language uses. This learning starts early. By age 1, infants have already tuned into their language(s): their ability to hear sound distinctions from their language(s) improves, while they often lose the ability to hear other sound distinctions. Understanding how this early learning proceeds is important as it serves as a foundation for later development; however, it has proven difficult to identify a learning mechanism that works on the true input infants hear. We present an account for how infants learn the speech contrasts of their language and show that the necessary signal is present in naturalistic speech, advancing our understanding of early language learning.

<https://www.pnas.org/doi/10.1073/pnas.2123230119>

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## Trends in Cognitive Sciences

### PAPERS

#### **THOMAS W. ELSTON & JONI D. WALLIS – Decoding cognition in real-time**

How can we study unobservable cognitive processes that cannot be measured directly? This has been an enduring challenge for cognitive scientists. In this essay we discuss advances in neurotechnology that could allow cognitive processes to be decoded in real-time and the implications that this may have for cognitive science and the treatment of neuropsychiatric disease.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00201-7](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00201-7)

#### **FLORIS P. DE LANGE, LEA-MARIA SCHMITT & MICHA HEILBRON – Reconstructing the predictive architecture of the mind and brain**

Predictive processing has become an influential framework in cognitive neuroscience. However, it often lacks specificity and direct empirical support. How can we probe the nature and limits of the predictive brain? We highlight the potential of recent advances in artificial intelligence (AI) for providing a richer and more computationally explicit test of this theory of cortical function.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00203-0](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00203-0)

#### **REBECCA SAXE – Perceiving and pursuing legitimate power**

How do people perceive and pursue legitimate power? For the social sciences, this question is venerable. Yet, for cognitive science, it offers fresh and generative opportunities to explore how adults evaluate legitimacy, how children learn to do so, and what difference legitimate power makes for people’s thoughts, feelings, and actions.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00204-2](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00204-2)

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## Trends in Ecology and Evolution

### PAPERS

#### **ANNA C. VINTON et al – Plasticity’s role in adaptive evolution depends on environmental change components**

To forecast extinction risks of natural populations under climate change and direct human impacts, an integrative understanding of both phenotypic plasticity and adaptive evolution is essential. To date, the evidence for whether, when, and how much plasticity facilitates adaptive responses in changing environments is contradictory. We argue that explicitly considering three key environmental change components – rate of change, variance, and temporal autocorrelation – affords a unifying framework of the impact of plasticity on adaptive evolution. These environmental components each distinctively effect evolutionary and ecological processes underpinning population viability. Using this framework, we develop expectations regarding the interplay between plasticity and adaptive evolution in natural populations. This framework has the potential to improve predictions of population viability in a changing world.

[https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347\(22\)00216-6](https://www.cell.com/trends/ecology-evolution/fulltext/S0169-5347(22)00216-6)

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## Trends in Neurosciences

### PAPERS

#### **GEORGE A. MASHOUR, DINESH PAL & EMERY N. BROWN – Prefrontal cortex as a key node in arousal circuitry**

The role of the prefrontal cortex (PFC) in the mechanism of consciousness is a matter of active debate. Most theoretical and empirical investigations have focused on whether the PFC is critical for the content of consciousness (i.e., the qualitative aspects of conscious experience). However, there is emerging evidence that, in addition to its well-established roles in cognition, the PFC is a key regulator of the level of consciousness (i.e., the global state of arousal). In this opinion article we review recent data supporting the hypothesis that the medial PFC is a critical node in arousal-promoting networks.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(22\)00144-8](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(22)00144-8)

#### **YE EMILY WU & WEIZHE HONG – Neural basis of prosocial behavior**

The ability to behave in ways that benefit other individuals' well-being is among the most celebrated human characteristics crucial for social cohesiveness. Across mammalian species, animals display various forms of prosocial behaviors – comforting, helping, and resource sharing – to support others' emotions, goals, and/or material needs. In this review, we provide a cross-species view of the behavioral manifestations, proximate and ultimate drives, and neural mechanisms of prosocial behaviors. We summarize key findings from recent studies in humans and rodents that have shed light on the neural mechanisms underlying different processes essential for prosocial interactions, from perception and empathic sharing of others' states to prosocial decisions and actions.

[https://www.cell.com/trends/neurosciences/fulltext/S0166-2236\(22\)00126-6](https://www.cell.com/trends/neurosciences/fulltext/S0166-2236(22)00126-6)

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