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NOTICES

PUBLICATION ALERTS

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

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

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

ACADEMIA.EDU – Large flake Acheulian

Quaternary International 223-224, 226-233 (2010).

GONEN SHARON – Large flake Acheulian

Acheulian biface industries based on the production of large flakes as the primary blank used for handaxe and cleaver manufacturing have long been acknowledged in the study of the African Acheulian. Nevertheless, this group of assemblages has not received its due attention in the study of the Acheulian techno-complex. The aim of this paper is to define the “Large Flake” stage of the Acheulian, based on the study of thousands of bifacial tools from almost all regions in which Acheulian assemblages have been reported. Once a definition is presented, the large flake Acheulian geographical distribution, chronological boundaries and, in particular, significance to the understanding of the Acheulian as the widest spread and longest existing techno-complex in human cultural evolution are discussed.

https://www.academia.edu/4752185/Large_flake_Acheulian

ACADEMIA.EDU – Acheulian Giant-Core Technology: A Worldwide Perspective

Quaternary International 223-224, 226-233 (2010).

GONEN SHARON – Acheulian Giant-Core Technology: A Worldwide Perspective

The ability to detach large (larger than 10 cm) flakes from giant cores and use them as blanks for the production of handaxes and cleavers is a technological hallmark distinguishing the Acheulian culture from its African predecessor, the Developed Oldowan, approximately 1.5 million years ago. Acheulian knappers applied a variety of fundamentally different, innovative, and sophisticated methods to large-flake production that were perfectly suited to the size and shape of the naturally available raw materials. Yet the end products of all these methods were astonishingly similar across the geographical and chronological distribution of the Acheulian techno-complex: large flakes that were suitable in size and morphology for the production of handaxes and cleavers.

https://www.academia.edu/4752184/Acheulian_Giant_Core_Technology_A_Worldwide_Perspective

ACADEMIA.EDU – Acheulean technology and landscape use at Dawadmi, central Arabia

PLoS ONE 13:7, e0200497 (2018).

CERI SHIPTON et al with JAMES BLINKHORN & MICHAEL D. PETRAGLIA – Acheulean technology and landscape use at Dawadmi, central Arabia

Despite occupying a central geographic position, investigations of hominin populations in the Arabian Peninsula during the Lower Palaeolithic period are rare. The colonization of Eurasia below 55 degrees latitude indicates the success of the genus *Homo* in the Early and Middle Pleistocene, but the extent to which these hominins were capable of innovative and novel behavioural adaptations to engage with mid-latitude environments is unclear. Here we describe new field investigations at the Saffaqah locality (206±76) near Dawadmi, in central Arabia that aim to establish how hominins adapted to this region. The site is located in the interior of Arabia over 500km from both the Red Sea and the Gulf, and at the headwaters of two major extinct river systems that were likely used by Acheulean hominins to cross the Peninsula. Saffaqah is one of the largest Acheulean sites in Arabia with nearly a million artefacts estimated to occur on the surface, and it is also the first to yield stratified deposits containing abundant artefacts. It is situated in the unusual setting of a dense and well-preserved landscape of Acheulean localities, with sites and isolated artefacts occurring regularly for tens of kilometres in every direction. We describe both previous and recent excavations at Saffaqah and its large lithic assemblage. We analyse thousands of artefacts from excavated and surface contexts, including giant andesite cores and flakes, smaller cores and retouched artefacts, as well as handaxes and cleavers. Technological assessment of stratified lithics and those from systematic survey, enable the reconstruction of stone tool life histories. The Acheulean hominins at Dawadmi were strong and skilful, with their adaptation evidently successful for some time. However, these biface-makers were also technologically conservative, and used least-

effort strategies of resource procurement and tool transport. Ultimately, central Arabia was depopulated, likely in the face of environmental deterioration in the form of increasing aridity.

https://www.academia.edu/42226044/Acheulean_technology_and_landscape_use_at_Dawadmi_central_Arabia

CONFERENCE ALERT – Being Human Festival 2022: call for applications

Being Human is the UK's national festival of the humanities. The 2022 festival will take place 10-19 November, with the theme 'Breakthroughs'. Humanities researchers and staff are invited to take part in this year's festival by organising a public engagement event, activity or project. There are four ways to take part:

*** Hub Award – apply for a larger institutional grant of £2,000–£5,000 to coordinate multiple activities

*** Small Award – apply for funding of up to £2,000

*** Open Call – organise an activity to be part of the festival that does not require funding

*** Being Human Café – a simple 'off-the-shelf' format

You can find out about the ways you can get involved on the Being Human website.

https://r20.rs6.net/tn.jsp?f=001_hKNoQaoBfiRyJoe6Ngmjyzwixpbl211cpCAGwXW2nYoTbFZu7zI260JrEPE1THTz6pzWWRKD47Rt8KNDpMrX9IO24TINFnUFrlatmLUuQRSn9UmLNYwWehddHNFoldhMKMjXRGgRPVJ_Z_OelpmTmPa5ue98cAskKKQ89dl9Go=&c=onN6j5OK9Yqn8qQcRV7aobwUjD5CJ0Aa9aiflw_O-mn3v-aOeSmP2g==&ch=hi_IWTCKu-tdKsKBBxn5thZFoa4QDYgS65Vs0zA7S877Pr40_rLNxg==

NEWS

BREAKING SCIENCE – New Study Offers Insight into Earliest Uses of Firewood in Australia

A team of scientists from the University of Western Australia and Curtin University has examined charcoal from ancient rock shelters to learn about the earliest uses of firewood in Australia. University of Western Australia researcher Chae Byrne and her colleagues found evidence for wattle and other acacias in charcoal from ancient campfires at Karnatukul (Serpents Glen) in Katjarra (Carnarvon Ranges), the land of the Martu, the Australian Western Desert.

http://www.sci-news.com/archaeology/earliest-firewood-australia-10632.html?utm_source=feedburner&utm_medium=email

SCIENCE DAILY – Endless forms most beautiful: Why evolution favors symmetry

An international team of researchers from biology, computer science and mathematics explains why evolution has a preference for symmetry.

<https://www.sciencedaily.com/releases/2022/03/220314095742.htm>

SCIENCE DAILY – Scientists find brain network that makes mice mingle

The difference between a social butterfly and a lone wolf is actually at least eight differences, according to new findings by a team of brain researchers. By simultaneously spying on the electrical activity of several brain regions, researchers can both identify how social or solitary an individual mouse is, and, by zapping nodes within this social brain network, can prompt mice to be even more gregarious.

<https://www.sciencedaily.com/releases/2022/03/220315112951.htm>

SCIENCE DAILY – Photo or the real thing? Mice can inherently recall and tell them apart

The ability to make perceptual and conceptual judgements such as knowing the difference between a picture of an object and the actual 3D object itself has been considered a defining capacity of primates, until now. A study provides the very first behavioral evidence that laboratory mice are capable of higher-order cognitive processes. Findings also provide strong support that the mouse's hippocampus, like that of humans, is required for this form of nonspatial visual recognition memory and picture-object equivalence.

<https://www.sciencedaily.com/releases/2022/03/220314095740.htm>

SCIENCE DAILY – New computer predictive model useful in identifying ancient hunter-gatherer sites

Researchers looking to identify some of the most difficult 'finds' in archaeology --including sites used by nomadic hunter-gatherer communities--are tapping technology to help in the search.

<https://www.sciencedaily.com/releases/2022/03/220317163625.htm>

SCIENCE DAILY – Aspects of Asian elephants' social life are related to their amount of stress hormones

An international team of scientists found that sociality is linked to stress in Asian elephants. For example, loneliness increased male elephants' level of stress, whereas having babies present reduced the stress level in female elephants.

<https://www.sciencedaily.com/releases/2022/03/220317111900.htm>

SCIENCE DAILY – Monkeys play to reduce group tension

New research has discovered that monkeys use play to avoid conflict and reduce group tension. The study found that adult howler monkeys spend more time playing with other adults, rather than juveniles. And rather than being associated with fun or education, play increases when howler monkeys are foraging for fruit, which is a highly prized resource that generates competition.

<https://www.sciencedaily.com/releases/2022/03/220317094737.htm>

SCIENCE DAILY – Neurons in the brain that drive competition & social behaviour in groups

In mice, social ranking in a group was linked to the results of competition, and certain neurons in the brain stored this social ranking information to inform decisions. Manipulating the activity of these neurons could increase or decrease an animal's competitive effort and therefore control their ability to successfully compete against others.

<https://www.sciencedaily.com/releases/2022/03/220316173259.htm>

SCIENCE NEWS – An archaeologist may have cracked how the Stonehenge calendar worked

Scientists have long thought the famous Neolithic monument Stonehenge was used as a calendar. Now, an archaeologist suggests each stone within the structure, erected in about 2500 B.C.E., represents 1 day within the month for a solar year of 365.25 days, *New Scientist* reports. The megalith stones were arranged to keep track of leap days every 4 years and highlighted the summer and winter solstices, according to research published this week in *Antiquity*. The potential time-keeping system followed a pattern like calendars in ancient Egypt, possibly indicating a long-distance exchange of ideas at the time. Some researchers not involved with the work told *New Scientist* the scheme is a sensible suggestion, whereas others asserted that the numbers used to describe the calendar are used selectively and unconvincingly.

<https://www.science.org/content/article/archaeologist-may-have-cracked-how-stonehenge-calendar-worked>

PUBLICATIONS

American Journal of Biological Anthropology

PAPERS

FRANÇOIS DRUELLE et al – Development of bipedal walking in olive baboons, *Papio anubis*: A kinematic analysis

Although extant nonhuman primates are not habitual bipeds, they are able to walk bipedally from an early age. In humans, children improve their walking skills through developmental processes and learning experience. In nonhuman primates, infants do not routinely experience bipedalism and their musculoskeletal system gradually specializes for other locomotor modes. The aim of this study is to explore the development of occasional bipedal walking in olive baboon and to test whether the postural adjustments change with age.

In a non-adapted biped, the postural adjustments of bipedal walking vary with age. In infant baboons, the balance requirements are likely to be higher and these are solved by adopting a “blocking strategy”. In older baboons, the postural adjustments are focused on the lower limb and the movements increase with speed. These results may echo, in some respects, the developmental sequence of the intersegmental coordination described in the ontogeny of human locomotion.

<https://onlinelibrary.wiley.com/doi/abs/10.1002/ajpa.24454?campaign=woletoc>

eLife

PAPERS

QIANLI YANG et al – Monkey plays Pac-Man with compositional strategies and hierarchical decision-making

Humans can often handle daunting tasks with ease by developing a set of strategies to reduce decision making into simpler problems. The ability to use heuristic strategies demands an advanced level of intelligence and has not been demonstrated in animals. Here, we trained macaque monkeys to play the classic video game Pac-Man. The monkeys' decision-making may be described with a strategy-based hierarchical decision-making model with over 90% accuracy. The model reveals that the monkeys adopted the take-the-best heuristic by using one dominating strategy for their decision-making at a time and formed compound strategies by assembling the basis strategies to handle particular game situations. With the model, the computationally complex but fully quantifiable Pac-Man behavior paradigm provides a new approach to understanding animals' advanced cognition.

<https://elifesciences.org/articles/74500>

KYRA SCHAPIRO et al – Strategy-dependent effects of working-memory limitations on human perceptual decision-making

Deliberative decisions based on an accumulation of evidence over time depend on working memory, and working memory has limitations, but how these limitations affect deliberative decision-making is not understood. We used human psychophysics to assess the impact of working-memory limitations on the fidelity of a continuous decision variable. Participants decided the average location of multiple visual targets. This computed, continuous decision variable degraded with time and capacity in a manner that depended critically on the strategy used to form the decision variable. This dependence reflected whether the decision variable was computed either: 1) immediately upon observing the evidence, and

thus stored as a single value in memory; or 2) at the time of the report, and thus stored as multiple values in memory. These results provide important constraints on how the brain computes and maintains temporally dynamic decision variables.

<https://elifesciences.org/articles/73610>

Evolutionary Human Sciences

PAPERS

KYLE H. ROSEN, CAROLINE E. JONES & JEREMY M. DESILVA – Bipedal locomotion in zoo apes: Revisiting the hylobatian model for bipedal origins

Bipedal locomotion is a hallmark of being human. Yet, the body form from which bipedalism evolved remains unclear. Specifically, the positional behavior (i.e., orthograde vs. pronograde) and the length of the lumbar spine (i.e., long and mobile vs. short and stiff) of the last common ancestor (LCA) of the African great apes and humans require further investigation. While fossil evidence would be the most conclusive, the paucity of hominid fossils from 5-10 million years ago makes this field of research challenging. In their absence, extant primate anatomy and behavior may offer some insight into the ancestral body form from which bipedalism could most easily evolve. Here, we quantify the frequency of bipedalism in a large sample (N=496) of zoo-housed hominoids and cercopithecines. Our results show that while each studied species of ape and monkey can move bipedally, hylobatids are significantly more bipedal and engage in bipedal locomotion more frequently and for greater distances than any other primate sampled. These data support hypotheses of an orthograde, long-backed, and arboreal LCA, which is consistent with hominoid fossils from the middle-to-late Miocene. If true, knuckle-walking evolved in parallel in Pan and Gorilla, and the human body form, particularly the long lower back and orthograde posture, is conserved.

<https://www.cambridge.org/core/journals/evolutionary-human-sciences/article/bipedal-locomotion-in-zoo-apes-revisiting-the-hylobatian-model-for-bipedal-origins/C1DC53BDC1F75F0627B9504A26388E72>

Nature Communications

PAPERS

ISABEL NOACHTAR et al – Sex and strategy effects on brain activation during a 3D-navigation task

Sex differences in navigation have often been attributed to the use of different navigation strategies in men and women. However, no study so far has investigated sex differences in the brain networks supporting different navigation strategies. To address this issue, we employed a 3D-navigation task during functional MRI in 36 men and 36 women, all scanned thrice, and modeled navigation strategies by instructions requiring an allocentric vs. egocentric reference frame on the one hand, as well as landmark-based vs. Euclidian strategies on the other hand. We found distinct brain networks supporting different perspectives/strategies. Men showed stronger activation of frontal areas, whereas women showed stronger activation of posterior brain regions. The left inferior frontal gyrus was more strongly recruited during landmark-based navigation in men. The hippocampus showed stronger connectivity with left-lateralized frontal areas in women and stronger connectivity with superior parietal areas in men. We discuss these findings in the light of a stronger recruitment of verbal networks supporting a more verbal strategy in women compared to a stronger recruitment of spatial networks supporting a more spatial strategy use in men. In summary, this study provides evidence that different navigation strategies activate different brain areas in men and women.

<https://www.nature.com/articles/s42003-022-03147-9>

Nature Humanities & Social Sciences Communications

PAPERS

CHAITANYA S. GOKHALE, JOSEPH BULBULIA & MARCUS FREAN – Collective narratives catalyse cooperation

Humans invest in fantastic stories—mythologies. Recent evolutionary theories suggest that cultural selection may favour moralising stories that motivate prosocial behaviours. A key challenge is to explain the emergence of mythologies that lack explicit moral exemplars or directives. Here, we resolve this puzzle with an evolutionary model in which arbitrary mythologies transform a collection of egoistic individuals into a cooperative. We show how these otherwise puzzling amoral, nonsensical, and fictional narratives act as exquisitely functional coordination devices and facilitate the emergence of trust and cooperativeness in both large and small populations. Especially, in small populations, reflecting earlier hunter-gatherers communities, relative to our contemporary community sizes, the model is robust to the cognitive costs in adopting fictions.

<https://www.nature.com/articles/s41599-022-01095-7>

Nature Scientific Reports

PAPERS

ANA FLÓ et al with GHISLAINE DEHAENE-LAMBERTZ – Sleeping neonates track transitional probabilities in speech but only retain the first syllable of words

Extracting statistical regularities from the environment is a primary learning mechanism that might support language acquisition. While it has been shown that infants are sensitive to transition probabilities between syllables in speech, it is still not known what information they encode. Here we used electrophysiology to study how full-term neonates process an artificial language constructed by randomly concatenating four pseudo-words and what information they retain after a few

minutes of exposure. Neural entrainment served as a marker of the regularities the brain was tracking during learning. Then in a post-learning phase, evoked-related potentials (ERP) to different triplets explored which information was retained. After two minutes of familiarization with the artificial language, neural entrainment at the word rate emerged, demonstrating rapid learning of the regularities. ERPs in the test phase significantly differed between triplets starting or not with the correct first syllables, but no difference was associated with subsequent violations in transition probabilities. Thus, our results revealed a two-step learning process: neonates segmented the stream based on its statistical regularities, but memory encoding targeted during the word recognition phase entangled the ordinal position of the syllables but was still incomplete at that age.

<https://www.nature.com/articles/s41598-022-08411-w>

ANNA MARIA KUBICKA et al – Variation in cross-sectional indicator of femoral robusticity in *Homo sapiens* and Neandertals

Variations in the cross-sectional properties of long bones are used to reconstruct the activity of human groups and differences in their respective habitual behaviors. Knowledge of what factors influence bone structure in *Homo sapiens* and Neandertals is still insufficient thus, this study investigated which biological and environmental variables influence variations in the femoral robusticity indicator of these two species. The sample consisted of 13 adult Neandertals from the Middle Paleolithic and 1959 adult individuals of *H. sapiens* ranging chronologically from the Upper Paleolithic to recent times. The femoral biomechanical properties were derived from the European data set, the subject literature, and new CT scans. The material was tested using a Mantel test and statistical models. In the models, the polar moment of area (J) was the dependent variable; sex, age, chronological period, type of lifestyle, percentage of the cortical area (%CA), the ratio of second moment areas of inertia about the X and Y axes (Ix/Iy), and maximum slope of the terrain were independent covariates. The Mantel tests revealed spatial autocorrelation of the femoral index in *H. sapiens* but not in Neandertals. A generalized additive mixed model showed that sex, %CA, Ix/Iy, chronological period, and terrain significantly influenced variation in the robusticity indicator of *H. sapiens* femora. A linear mixed model revealed that none of the analyzed variables correlated with the femoral robusticity indicator of Neandertals. We did not confirm that the gradual decline in the femoral robusticity indicator of *H. sapiens* from the Middle Paleolithic to recent times is related to the type of lifestyle; however, it may be associated with lower levels of mechanical loading during adolescence. The lack of correlation between the analysed variables and the indicator of femoral robusticity in Neandertals may suggest that they needed a different level of mechanical stimulus to produce a morphological response in the long bone than *H. sapiens*.

<https://www.nature.com/articles/s41598-022-08405-8>

EMANUELE CANCELLIERI et al – A late Middle Pleistocene Middle Stone Age sequence identified at Wadi Lazalim in southern Tunisia

The late Middle Pleistocene, starting at around 300 ka, witnessed large-scale biological and cultural dynamics in hominin evolution across Africa including the onset of the Middle Stone Age that is closely associated with the evolution of our species—*Homo sapiens*. However, archaeological and geochronological data of its earliest appearance are scarce. Here we report on the late Middle Pleistocene sequence of Wadi Lazalim, in the Sahara of Southern Tunisia, which has yielded evidence for human occupations bracketed between ca. 300–130 ka. Wadi Lazalim contributes valuable information on the spread of early MSA technocomplexes across North Africa, that likely were an expression of large-scale diffusion processes.

<https://www.nature.com/articles/s41598-022-07816-x>

JAMIE HODGKINS et al – An infant burial from Arma Veirana in northwestern Italy provides insights into funerary practices and female personhood in early Mesolithic Europe

The evolution and development of human mortuary behaviors is of enormous cultural significance. Here we report a richly-decorated young infant burial (AVH-1) from Arma Veirana (Liguria, northwestern Italy) that is directly dated to 10,211–9910 cal BP (95.4% probability), placing it within the early Holocene and therefore attributable to the early Mesolithic, a cultural period from which well-documented burials are exceedingly rare. Virtual dental histology, proteomics, and aDNA indicate that the infant was a 40–50 days old female. Associated artifacts indicate significant material and emotional investment in the child's interment. The detailed biological profile of AVH-1 establishes the child as the earliest European near-neonate documented to be female. The Arma Veirana burial thus provides insight into sex/gender-based social status, funerary treatment, and the attribution of personhood to the youngest individuals among prehistoric hunter-gatherer groups and adds substantially to the scant data on mortuary practices from an important period in prehistory shortly following the end of the last Ice Age.

<https://www.nature.com/articles/s41598-021-02804-z>

PLoS Biology

PAPERS

XINRAN WU et al – Dynamic changes in brain lateralization correlate with human cognitive performance

Hemispheric lateralization constitutes a core architectural principle of human brain organization underlying cognition, often argued to represent a stable, trait-like feature. However, emerging evidence underlines the inherently dynamic nature of brain networks, in which time-resolved alterations in functional lateralization remain uncharted. Integrating dynamic

network approaches with the concept of hemispheric laterality, we map the spatiotemporal architecture of whole-brain lateralization in a large sample of high-quality resting-state fMRI data (N = 991, Human Connectome Project). We reveal distinct laterality dynamics across lower-order sensorimotor systems and higher-order associative networks. Specifically, we expose 2 aspects of the laterality dynamics: laterality fluctuations (LF), defined as the standard deviation of laterality time series, and laterality reversal (LR), referring to the number of zero crossings in laterality time series. These 2 measures are associated with moderate and extreme changes in laterality over time, respectively. While LF depict positive association with language function and cognitive flexibility, LR shows a negative association with the same cognitive abilities. These opposing interactions indicate a dynamic balance between intra and interhemispheric communication, i.e., segregation and integration of information across hemispheres. Furthermore, in their time-resolved laterality index, the default mode and language networks correlate negatively with visual/sensorimotor and attention networks, which are linked to better cognitive abilities. Finally, the laterality dynamics are associated with functional connectivity changes of higher-order brain networks and correlate with regional metabolism and structural connectivity. Our results provide insights into the adaptive nature of the lateralized brain and new perspectives for future studies of human cognition, genetics, and brain disorders.

<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001560>

Science Advances

PAPERS

JORDY TASSERIE et al with STANISLAS DEHAENE – Deep brain stimulation of the thalamus restores signatures of consciousness in a nonhuman primate model

Loss of consciousness is associated with the disruption of long-range thalamocortical and corticocortical brain communication. We tested the hypothesis that deep brain stimulation (DBS) of central thalamus might restore both arousal and awareness following consciousness loss. We applied anesthesia to suppress consciousness in nonhuman primates. During anesthesia, central thalamic stimulation induced arousal in an on-off manner and increased functional magnetic resonance imaging activity in prefrontal, parietal, and cingulate cortices. Moreover, DBS restored a broad dynamic repertoire of spontaneous resting-state activity, previously described as a signature of consciousness. None of these effects were obtained during the stimulation of a control site in the ventrolateral thalamus. Last, DBS restored a broad hierarchical response to auditory violations that was disrupted under anesthesia. Thus, DBS restored the two dimensions of consciousness, arousal and conscious access, following consciousness loss, paving the way to its therapeutical translation in patients with disorders of consciousness.

<https://www.science.org/doi/full/10.1126/sciadv.abl5547>

Trends in Cognitive Sciences

PAPERS

ALEX R. DECASIEN, ROBERT A. BARTON & JAMES P. HIGHAM – Understanding the human brain: insights from comparative biology

Human brains are exceptionally large, support distinctive cognitive processes, and evolved by natural selection to mediate adaptive behavior. Comparative biology situates the human brain within an evolutionary context to illuminate how it has been shaped by selection and how its structure relates to evolutionary function, while identifying the developmental and molecular changes that were involved. Recent applications of powerful phylogenetic methods have uncovered new findings, some of which overturn conventional wisdom about how and why brains evolve. Here, we focus on four long-standing claims about brain evolution and discuss how new work has either contradicted these claims or shown the relevant phenomena to be more complicated than previously appreciated. Throughout, we emphasize studies of non-human primates and hominins, our close relatives and recent ancestors.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00039-0](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00039-0)

YUE DU, JOHN W. KRAKAUER & ADRIAN M. HAITH – The relationship between habits and motor skills in humans

How do habit and skill relate to one another? Among many traditions of habit research, we suggest that 'slip-of-action' habits are the type most likely to relate to motor skill. Habits are traditionally thought of as a property of behavior as a whole. We suggest, however, that habits are better understood at the level of intermediate computations and, at this level, habits can be considered to be equivalent to the phenomenon of automaticity in skill learning – improving speed of performance at the cost of flexibility. We also consider the importance of habits in learning complex tasks given limited cognitive resources, and suggest that deliberate practice can be viewed as an iterative process of breaking and restructuring habits to improve performance.

[https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613\(22\)00038-9](https://www.cell.com/trends/cognitive-sciences/fulltext/S1364-6613(22)00038-9)

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