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[TITLE]

ABSTRACT

Is the mind naturally given and universally fixed, or culturally constituted and historically contingent? The question points up a hermeneutic catch-22: a fixed mind anchors reconstruction but flattens historical change, a contingent one adds interpretative depth but threatens the intelligibility of the past. Historians who did not pass over the question rarely looked to the sciences for answering it, the latter treated mind as unhistorical. Recent decades have seen them converge, a 'turn to science' in historiography is matched by a renewed attention to culture and development in the sciences of mind and life. In spite of a shared commitment to collaboration, the old fault line continues to cast a divisive shadow over attempts to map out the biosocial landscape. The current tension between two alternative visions of the raison d'être and future of Cognitive History serves as a case in point. A closer look at the 'extended evolutionary synthesis' suggests that cultivating this tension might be the only way of doing justice to both.

INTRODUCTION

Historians are not passive observers of a past 'as it really was'. They extract facts of 'history' from those of the 'past', balance causes, and make hypothesis. They fill gaps in the record, read between the lines, extract meaning against the grain of documentation, pick out unthinking reflexes, deliberate distortions, and asses the credibility of sources. Historians must enter the mental world of the past to reconstruct the thought behind the record. From innocuous ascriptions of minimal rationality (without which the actions of historical agents would remain unintelligible) to inferences about the interdependence of phenomenological, psychological, social, and material transformations: whether explicitly recognized or tacitly entailed, historical analysis necessarily relies on assumptions about the human mind, how it is constructed, how it works, how it changes. By the same token, the sciences of mind, in seeking the universal attributes of human thought and behavior, inevitably make unarticulated assumptions of their own: that their object of study, properly discerned, is not subject to historical change. In theory, therefore, history and the sciences of mind, irrespective of methodological and epistemological differences, are mutually accountable.

1. BIOLOGIZING HISTORY OR HISTORICIZING COGNITION?

In practice, accountability is construed as a one-way affair by those with a strong constructivist or nativist bent. Constructivists – 'culture and psyche make each other up' – defend the functional autonomy of human behavior from the species' phylogeny on grounds of personal agency, historical contingency, cultural variation and transmission. Save for the occasional cherry-picking (e.g. brain plasticity), its characteristic skepticism about the scientific study of human psychology on epistemological, ontological, and ethical grounds mutes attention to its results in favor of a critique of its culturally situated premises.[1]

[1] For a recent example of passionate critique of (neuro)scientific incursions into historical territory, see: Roger Cooter, "Neural Veils and the Will to Historical Critique: Why Historians of Science Need to Take the Neuro-Turn Seriously," *Isis* 105, no. 1 (March 1, 2014): 145–54.

'Nativists' – 'innate biology enables, constrains, and specifies psychological properties' – see culture as a byproduct of an evolved, genetically-transmitted architecture, to whose study its many manifestations act as noisy data: variation can be accounted for by non-cultural mechanisms (e.g. ecology and 'evoked' culture, causal reasoning, trial-and-error learning). Inquiry that disregards the material underpinnings of human thought and behavior is disqualified from the shared space of scientific reason. Though worn-out, the debate has not wound down.[2]

Research linking history to the sciences of mind, from psychology to neuroscience, has proliferated in the past three decades, but is characterized by great diversity with respect to the historical subject matter and scope (micro, macro, meso), as well as the scientific concepts, theories, frameworks, and methodologies drawn on in support.[3] This promiscuity and resulting tensions are nicely reflected in the debates around the proper relationship between history and cognitive science in a 'cognitive history'.[4] To the extent that the loosely-knit research program makes up a single category at all, it is by virtue of a motif prominent in all advocates: the perils of disciplinary division of labor and the palliative of mutual accountability.

The aim of this chapter is neither to describe all nor prescribe any one approach. Instead, I begin by showing how the dichotomous logic – culture/nature, history/science, external/internal – has, despite best intentions, carried over into the debate over the possibility and purpose of cognitive history. I go on to discuss some developments in the evolutionary life sciences (extended evolutionary synthesis, as a shorthand) that add welcome justification and resources for exploiting this variety to mutual benefit. Throughout, I am concerned with the roles history can and ought to play in an increasingly intimate relationship with the mind and life sciences. A central and versatile one, I conclude, provided it is willing to let the latter challenge the borders of historical imagination.

[2] Pointing out the institutional and affective dimension of this group identity-defining antagonism, anthropologist Maurice Bloch writes: "Social and natural scientists have come to hate each other. They cannot understand each other's purpose. They consider each other's methods either sloppy or dangerous. They are repulsed by each other's style and mode of presentation." Maurice Bloch, *Anthropology and the Cognitive Challenge* (Cambridge University Press, 2012), 1.

[3] The heuristic value of a neurological approach for instance has been invoked for histories 'from within', history of emotion, and metanarratives about the deep past and future of our species, among other. Daniel Lord Smail, *On Deep History and the Brain* (Berkeley: University of California Press, 2008); Lynn Hunt, *Inventing Human Rights: A History* (New York: W.W. Norton & Company, 2008); Jeremy Trevelyan Burman, "History from within? Contextualizing the New Neurohistory and Seeking Its Methods.," *History of Psychology* 15, no. 1 (2012): 84–99. By contrast, those seeking conversation with Psychology are much more hesitantly dipping their toes into interdisciplinary waters, problematizing rather than overcoming the delicate issue of 'psychologizing history' vs. 'historicizing psychology'. Cristian Tileagă and Jovan Byford, *Psychology and History: Interdisciplinary Explorations* (Cambridge University Press, 2014). This is part of a larger trend of putting evolution to work, both as a theoretical framework and a source of empirical methodologies, in the study of culture. Especially in the service of longue durée histories but also more generally as a way of rethinking of historical causality. Matthew H. Nitecki and Doris V. Nitecki, eds., *History and Evolution*, SUNY Series in Philosophy and Biology (Albany: State University of New York Press, 1992); Jared M. Diamond, *Guns, Germs, and Steel: The Fates of Human Societies*, 1st ed (New York: W.W. Norton & Co, 1997); Robert S. McElvaine, *Eve's Seed: Biology, the Sexes, and the Course of History* (New York: McGraw-Hill, 2002); Peter Turchin, *Historical Dynamics: Why States Rise and Fall*, Princeton Studies in Complexity (Princeton: Princeton University Press, 2003); Yuval Noaḥ Harari, *Sapiens: A Brief History of Humankind* (London: Harvill Secker, 2014). Even within this subset of linking history and evolutionary theory, the results are quite different depending on which framework is transposed, for a neat critical overview of the major recent currents applying evolutionary theory to the study of culture, see: Tim Lewens, *Cultural Evolution: Conceptual Challenges* (OUP Oxford, 2015).

[4] See a recently published edited volume on what most of its contributors call 'cognitive historiography' to get a sense of the possibilities and tensions; it contains both theoretical and case-study arguments for and against the use of specific frameworks such as evolutionary psychology, cultural epidemiology, and gene-culture co-evolution. Luther H. Martin and Jesper Sørensen, *Past Minds: Studies in Cognitive Historiography* (Routledge, 2016); Harvey Whitehouse, "Cognitive Historiography: When Science Meets Art," *Historical Reflections / Réflexions Historiques* 31, no. 2 (2005): 307–18.

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'ENVIRONMENTAL' COGNITIVE HISTORY

History and philosophy of science was an early site of self-styled cognitive histories, attempting, roughly, to infer cognitive processes and activities from historical records, and use cognitive concepts and theories (e.g. schemata, analogical thinking, heuristics, procedural knowledge) to frame their interpretations. Drawing attention away from the *results* to the *processes* of knowledge production allows cognitive histories of science to pick apart the nitty gritty of the investigative pathways through which scientists create and communicate knowledge (e.g. proximate cognitive mechanisms, thinking practices, representational systems, epistemic artefacts). This allows addressing with some nuance the relationship between scientific thought and the social and material contexts of its production, ask questions about the conditions and causes of conceptual change, and anchor rational reconstructions of scientific discovery.[5]

Pioneer of the field Nancy Nersessian sees such cognitive history as continuous with the history of mentalities, in that it tries occupy "a place between a traditional history of scientific ideas and a new sociological history of science that tends to marginalize the cognitive dimension of scientific practices."[6] As she repeatedly emphasizes, however, the relationship with cognitive science is not a one-way street of mere expedient borrowing from, or accountability to, its findings. The cognitive-historical method is fundamentally reflexive: the privileged status accorded to cognitive science-derived assumptions in order to anchor historical analysis is provisional and subject to critical scrutiny, which the historical record is in a position to provide. Cognitive science derives conclusions based on tasks designed to be testable in laboratories. Studying cognition 'in the wild' is the only way to test not only the ecological validity of individual findings, but the way they hang together and are manifested in non-experimental, socially-situated contexts. Historical case studies are thus a vital source of additional empirical data, validity tests, and new hypothesis – cognitive history as a virtuous circle.[7]

In his review of Reviel Netz' seminal study *The Shaping of Deduction in Greek Mathematics*, Bruno Latour, spokesman for the new sociological history of science, lavishes praise on Netz' self-styled

[5] Ronald N. Giere, ed., *Cognitive Models of Science*, Minnesota Studies in the Philosophy of Science, v. 15 (Minneapolis: University of Minnesota Press, 1992); Nancy J. Nersessian, "Opening the Black Box: Cognitive Science and History of Science," *Osiris* 10 (1995): 194–211; Hanne Andersen, Peter Barker, and Xiang Chen, *The Cognitive Structure of Scientific Revolutions* (Cambridge; New York: Cambridge University Press, 2006); Ryan D. Tweney, "Toward a Cognitive-Historical Understanding of Michael Faraday's Research: Editor's Introduction," *Perspectives on Science* 14, no. 1 (March 2006): 1–6.

[6] Nersessian, "Opening the Black Box," 202. Why do we need a history of mentalities? According to Peter Burke's passage quoted by Nersessian, "we very much need something to occupy the conceptual space between the history of ideas, defined more narrowly, and social history, in order to avoid having to choose between an intellectual history with the society left out and a social history with the thought left out." Peter Burke, "Strengths and Weaknesses of the History of Mentalities," *History of European Ideas* 7, no. 5 (January 1, 1986): 440.

[7] "[T]he cognitive–historical method needs to be reflexive in application. Cognitive theories and methods are drawn upon insofar as they help interpret the historical and contemporary practices, while at the same time cognitive theories are evaluated as to the extent to which they can be applied to scientific practices. The assumptions, methods and results from both sides are subjected to critical evaluation, with corrective insights moving in both directions. Practices uncovered in cognitive–historical investigations can provide a focal point for observational studies and for designing experiments. The point is that all three kinds of investigation are needed to develop an understanding of this complex phenomenon." Nancy J. Nersessian, "The Cognitive Basis of Model-Based Reasoning in Science," in *The Cognitive Basis of Science*, ed. Peter Carruthers, Stephen Stich, and Michael Siegal (Cambridge: Cambridge University Press, 2002), 136. "Corrective insights should come from both directions: from cognitive science to cognitive history and the reverse." John Sutton and Nicholas Keene, "Cognitive Theory, History, and Material Culture," *The Routledge Handbook of Material Culture in Early Modern Europe*, 2016.

cognitive history. Is this a change of heart in the co-author of the infamous 'ten-year moratorium on cognitive explanations,' with death overdue and not in sight?[8]

Hardly. Latour endorses Netz' branch of cognitive history because he takes it to be indistinguishable from science studies: "namely an obsessive attention to the material, historical, and practical conditions necessary for the discovery of new cognitive skills."[9] The 'cognitive history' that Latour endorses is not so much a *cognitive history of science*, as a *history of cognition*, seen as a set of intellectual technologies that are invented and transmitted rather than innate. Latour's persuasion that these ought to be "taken as the *topics* of the historical inquiry instead of as the *resources* with which to write this history"[10] bears obvious affinity to the 'new history' of psychology, which defines itself against the perceived presentist tendencies of previous historiography and the ahistorical character of mainstream, psychological science: "psychology is the object to be historicized, not a resource to better understand historical change over time."[11] In both cases, embracing a historical perspective on the social construction of psychological processes is taken to necessitate and ratify transcendence from the sciences of mind.[12]

The challenge for those who beg to differ is to make a case for integration that accommodates both the conceptual critique of methodological individualism, as well as the historical demonstration that much of the specificity of (scientific) thinking cannot be attributed to the inner workings of the mind, and thus can neither exist nor be made sense of in isolation of specific social and material contexts. One major line of response is to point out that the cognitive sciences have, as a result of both external critique and internal reform, turned away from the strong internalism characterizing the field in its early days.[13] Since the 1980s, there has been a growing appreciation of the 'embodied, embedded, extended, and enactive' nature of cognition, the ways in which online cognition depends and off-loads on its materially, symbolically, and socially structured environment. [14]

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[8] "What I propose, here, as a seventh rule of method, is in effect a moratorium on cognitive explanations of science and technology! I'd be tempted to propose a ten-year moratorium. If those who believe in miracles were so sure of their position, they would accept the challenge." Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge, Mass: Harvard University Press, 1987), 247.

[9] Bruno Latour, "Review Essay: The Netz-Works of Greek Deductions. A Review of Reviel Netz (2003) The Shaping of Deduction in Greek Mathematics: A Study in Cognitive History.," *Social Studies of Science* 38, no. 3 (June 1, 2008): 441; Reviel Netz, *The Shaping of Deduction in Greek Mathematics: A Study in Cognitive History* (Cambridge University Press, 2003), 3.

[10] Latour, "Review Essay," 442.

[11] Michael Pettit and Ian Davidson, "Can the History of Psychology Have an Impact?," *Theory & Psychology* 24, no. 5 (October 1, 2014): 711.

[12] "Psychology is not there to describe events but precisely to cram cognition inside an individual mind. [...] To believe that a better cognitive science will simply takes over, is to miss the anthropology of the moderns and to underestimate the history that made the myth of internal state so essential to our Occidental life." Bruno Latour, "Cogito Ergo Sumus! Or Psychology Swept inside out by the Fresh Air of the Upper Deck...," *Mind, Culture, and Activity: An International Journal* 3, no. 1 (1995): 60. For an early problem-statement, see: Paul Forman, "Independence, Not Transcendence, for the Historian of Science," *Isis* 82, no. 1 (1991): 71–86.

[13] Precipitated and enabled as it was by the rise of the computer, standard cognitive science from the 'cognitive revolution' of the 1950' onwards was dominated by a computational theory of mind. This combination of a representational theory of mind with a computational account of reasoning furnished for more than three decades the conceptual toolbox, terminology and methodology, to the study of the mind. Because it is a formal system, it means that although representations have both semantic and syntactic properties, the computational processes are sensitive to the syntactic properties of the symbols. While productive in many ways, one of the consequences of limiting the cognitive to the symbolic and was the tacit assumption that the mind can be studied autonomously from the body, the physical and its social environment. Not everyone went as far as Jerry Fodor when he stated in his seminal 1975 *The Language of Thought* that "neurophysiology is irrelevant to psychology," and yet the assumption has quietly shaped much of empirical research in cognitive science especially during its first decades.

[14] See e.g. Richard Menary, "Introduction to the Special Issue on 4E Cognition," *Phenomenology and the Cognitive Sciences* 9, no. 4 (December 2010): 459–63.

Latour's premise, i.e. that the locus of the production and transformation of elements constitutive of cognition is to be sought in the environment rather than the individual mind, stands. But the conclusion that therefore nothing worth studying is left in the mind, relies on a false dichotomy between an insulated mind and a mind-independent environment which new models of cognition challenge:

> Environmental perspectives argue that the traditional symbol processing view has mistaken the properties of a complex, *cognitive system*, comprising both the individual and the environment, for the properties of an individual mind. They aim to develop an analytical framework in which cognitive processes are not separated from the contexts and activities in which cognition occurs.[15]

A powerful testimony to the limitations of standard computational cognitive science were the spectacularly inadequate 'minds' its models generated. As philosopher Andy Clark quips, "we model chess playing by programs as Deep Thought when we still can't get a real robot to successfully navigate a crowded room and we still can't fully model the adaptive success of a cockroach."[16] The reason for this failure is at least in part prosaic: if the spatio-temporally extended and opportunistic nature of real-world problem solving is a 'potential methodological nightmare,' as Clark has it, the traditional computational view is a methodological wet dream. From this perspective, initial success was courtesy of a highly selective, one-sided choice of problem domains. In line with traditional rationalist narrow views of intelligence, the task-domains chosen to model human intelligence were more often than not abstract, the input and output coded in highly artificial ways. It was presumed that the integration of other, more practical, areas – like perception, motion, and action – could be stalled until the basic mechanism of mind was more fully elaborated.

A devil's choice, in the eyes of critics. If the purpose is to illuminate actual human intelligence and biological cognition as it faces and solves ecologically realistic problems, cognitive science simply cannot afford to abstract away from perception and action, from our social and physical environment. Cognitive history launched on the basis of this critique thus sees the 'history of cognition' not as simply compatible with a 'cognitive science of history', but an indispensable methodological *complement* to an overly disembodied cognitive science. Assuming, contra Latour, that such environmental cognitive history does more than merely rehash the insights achieved by practice-oriented (anti-cognitivist) science studies in the technical vocabulary of cognitive science[17] – one reservation remains, and it exceeds the concerns of the history of science proper:

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[15] Nancy J. Nersessian, "Interpreting Scientific and Engineering Practices: Integrating the Cognitive, Social, and Cultural Dimensions," *Scientific and Technological Thinking*, 2005, 18. In his seminal cognitive ethnography, Edward Hutchins documents the 'distributed cognitive ecology' on which collective complex problem solving like navigation relies. Hutchins, Edward. *Cognition in the Wild*. (Cambridge, MA: MIT Press, 1995). No one denies that cognitive processes such as remembering, planning, and reasoning rely on information located outside the skull. Contentious remains whether objects, places, and people ought to count as literal components of these cognitive processes, rather than simply sources of informational input. Critics think this framework loose and overly inclusive.

[16] Essentially, things that are hard for humans (say financial market strategy or calculus) are mind-numbingly easy for computers, who struggle instead with things like common sense, vision, motion, and perception. Andy Clark, *Being There: Putting Brain, Body, and World Together Again* (MIT Press, 1998), xii.

[17] Socio-historians clearly didn't wait for fancy cognitive science terminology to study the ways in which technology affects how humans reason. Cognitive historical methods can help illuminate how precisely it does so, by affecting the choice of sources and enrich analysis, render explicit new layers of meaning. However, they act in complement, not as an alternative, to rhetorical analysis. Real integration is about establishing theoretical relations between arbitrarily distinct fields, not by way of ad hoc borrowings or redescription, but by demonstrating the mutual relevance of cognitive and social studies of science, among other. That the revisionist movement in cognitive science has benefited from the existence of sophisticated historical accounts of the materiality of cognitive practices is a case in point.

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Can cognitive history have its reciprocal cake and eat it, too? In other words, on what grounds can it be coherent to analyze historical phenomena "with reference to the cognitive structures of the human mind" while, in the same breath, operate on the "premise that cognitive frames, while deeply influencing the direction of a society, are not permanently fixed. When drastic change occurs to a given society, its cognitive structures—and, ultimately, its entire worldview—can change equally drastically within a generation or two"?[18] For Sutton and Keene, the distributed cognitive ecologies theoretical framework can do the trick:

> Of course changing technologies, practices, and norms can restructure mind and consciousness. But this is happening all the time, for cognitive artifacts are the medium or process of mental activity. It is not that a private, inner, subjective realm […] is suddenly transformed, freed, or constrained by novel external material resources. Rather, the history of the mind just is the array and trajectory of distributed, hybrid cognitive systems.[19]

We do not have to leave the ranks of cognitive history to find pushback.[20]

'NATIVIST' COGNITIVE HISTORY

Taking stock of the first volume of the *Journal of Cognitive Historiography*,[21] Dimitris Xygalatas laments what he takes to be the pervasive view "that the contribution of the cognitive sciences to Cognitive Historiography is limited to theorizing about past minds."[22] While equally adamant that 'interdisciplinarity and collaboration are a *sine qua non* for cognitive historiography', Xygalatas fears that invoking cognitive theoretical models serves more to support existing positions than tap into the real virtue of cognitive science: empiricism. The motivation behind cognitive historiography is precisely to correct for the biases and limitations associated with traditional, i.e. interpretative and theoretical, treatments of textual material, by harnessing the explanatory and methodological tools of empirical cognitive science.[23]

This can mean treating history as a 'natural experiment'. While it may not allow for random assignment, history charms the experimentalist with access to large and low-cost datasets, unfettered by ethical pitfalls that complicate, or render impossible, studies with human subjects.[24] For the majority of historical scholarship (which does not lend itself to mathematical formalization) collaboration means accountability: historians ought to test their ubiquitous but unarticulated assumptions about past minds, e.g. by designing experiments to test hypothesis derived from historical material, or, at the very least, by subjecting their assumptions to the scrutiny of state-of-the-art cognitive science consensus. Historians and cognitive scientists must exchange expertise to

[18] Jeremy R. Lent for example puts this principle at the service of cultural history. *The Patterning Instinct: A Cultural History of Humanity's Search for Meaning* (Amherst, New York: PB, Prometheus Books, 2017).
[19] Sutton and Keene, "Cognitive Theory, History, and Material Culture," 46.
[20] We are particularly likely to encounter opposing voices in the second domain to have attracted early and extensive interest in a cognitive historical alliance: "For largely serendipitous reasons," according to doyen Luther Martin, "much cognitive historiographical research has been pursued by those engaged in the study of Graeco-Roman religions."Luther Martin, "Introduction to the Issue," *Journal of Cognitive Historiography* 1, no. 1 (January 23, 2014): 10.
[21] Martin, "Introduction to the Issue."
[22] Dimitris Xygalatas, "On the Way Towards a Cognitive Historiography: Are We There Yet?," *Journal of Cognitive Historiography* 1, no. 2 (November 15, 2014): 197.
[23] "un- or undertheorised historical accounts are inadequate, because they depend on a set of implicit and problematic assumptions masquerading a 'common sense.'" Morley, Neville. *Theories, Models and Concepts in Ancient History*, (London: Routledge 2004, 1.)
[24] Jared M. Diamond and James A. Robinson, eds., *Natural Experiments of History* (Cambridge, Mass.: Belknap Press of Harvard Univ. Press, 2011).

prevent misconceptions: if the former lack the skills to confidently locate, interpret, and extrapolate from cognitive science, those coming from experimental traditions conversely want the sort of contextual knowledge and philological expertise that enables sophisticated readings of historical material.[25]

The theoretical pillar of this endeavor is the continuity of past and contemporary minds, and supporters claim it towers on solid empirical ground.[26] Thus, Xygalatas invokes the "uncontroversial assumption among cognitive scientists that the mental and behavioural architecture of anatomically modern humans has not undergone any significant changes in historical times (the last few millennia)."[27] Anders Lisdorf concurs that it is "almost unanimously agreed that no significant mutations have occurred in the human brain since around 100.000 years ago."[28] Luther Martin cites Lisdorf's paper to support the view that "[c]ognitive scientists, like evolutionary psychologists, now agree that the morphology of the human brain and the functions of that morphology have changed little, if at all, over the past 100,000 years."[29]

If the uncontroversial status of the assumption accounts for the sparsity of evidence adduced in its support, it is less clear what to make of the apparent lack of agreement on what exactly it is that has not changed. To equate 'mental and behavioural architecture', 'mutations in the brain (anatomy?)', and 'brain morphology and its functions' would be cavalier at best. To gain any real purchase on the argument that human mental and behavioral architecture is universal (across at least the last few millennia), requires agreement on (a) what exactly constitutes this architecture (perception? preferences?) (b) what is meant by universality, and (c) what sort of evidence counts in its support. These are actively contested questions.[30]

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[25] Edward Slingerland, "Who's Afraid of Reductionism? The Study of Religion in the Age of Cognitive Science," *Journal of the American Academy of Religion* 76, no. 2 (June 1, 2008): 375–411; Michael Pettit, "Historical Time in the Age of Big Data: Cultural Psychology, Historical Change, and the Google Books Ngram Viewer," *History of Psychology* 19, no. 2 (2016): 141–53.

[26] "if the psychic chasm is so great that the minds of modern people are not in principle as those of historical people, then how is it possible at all to say something about historical people's actions, motivations or thoughts? There has to be a basic similarity between historical and modern minds in order for us to understand them at all." Anders Lisdorf, "Towards a Cognitive Historiography - Frequently Posed Objections," in *Chasing down Religion: In the Sights of History and the Cognitive Sciences*, ed. Panayotis Pachis and Donald Wiebe (Sheffield, UK: Equinox Publishing, Ltd, 2015), 4.

[27] Xygalatas, "On the Way Towards a Cognitive Historiography," 197–98.

[28] Lisdorf, "Towards a Cognitive Historiography - Frequently Posed Objections," 3.

[29] Luther H Martin, "The Future of the Past: The History of Religions and Cognitive Historiography," *Religio* 20, no. 2 (2012): 163.

[30] To mention only a few points of empirical contention:

1. What *are* modern human-specific traits? The literature has described them "at many different levels of neural organization, including gross brain size, the relative extent of neocortical areas, asymmetry, developmental patterning, the distribution of cell types, histology, and gene expression." Chet C Sherwood, Francys Subiaul, and Tadeusz W Zawidzki, "A Natural History of the Human Mind: Tracing Evolutionary Changes in Brain and Cognition," *Journal of Anatomy* 212, no. 4 (April 2008): 427.

2. The 100,000 year-figure is frequently cited to mark the appearance of anatomically-modern Homo Sapiens. But in light of 1. continued debate about the empirical record itself and 2. the absence of a coherent theory to define 'modern human behavior' its usefulness is an open question, though probably not the most important one. The authors' concern here is not archeological but epistemological. Sally Mcbrearty and Alison S. Brooks, "The Revolution That Wasn't: A New Interpretation of the Origin of Modern Human Behavior," *Journal of Human Evolution* 39, no. 5 (November 2000): 453–563; Christopher S. Henshilwood and Curtis W. Marean, "The Origin of Modern Human Behavior: Critique of the Models and Their Test Implications," *Current Anthropology* 44, no. 5 (2003): 627–51.

3. Understanding of the respective relationships between genes as well as neuronal structure on the one hand, and cognitive function on the other, is in its infancy. Well-established findings, such as pleiotropy and polygenicity, reinforce the challenging nature of empirical research on these links. Yulia Kovas and Robert Plomin, "Generalist Genes: Implications for the Cognitive Sciences," *Trends in Cognitive Sciences* 10, no. 5 (May 2006): 198–203; Michael L. Anderson, "Mining the Brain for a New Taxonomy of the Mind," *Philosophy Compass* 10, no. 1 (January 1, 2015): 68–77.

4. Apart from semantic and taxonomic caveats, it remains empirically inconclusive how quickly genetic evolution can, in fact, build complex adaptations. With the proliferation of sophisticated methods to investigate it, comes new evidence, suggesting e.g. that some of the genes contributing to brain-development have been subject to recent selection. Nitzan Mekel-Bobrov et al., "Ongoing Adaptive Evolution of ASPM, a Brain Size Determinant in Homo Sapiens," *Science (New York, N.Y.)* 309, no. 5741 (September 9, 2005): 1720–

In consistency with their overall argument, the authors roughly align with a popular package deal for settling them: nativist evolutionary psychology. Leda Cosmides and John Tooby, doyens of the genre-defining Santa Barbara school, defend the 'psychic unity' of mankind on the grounds of an innate (i.e. evolved and genetically-specified) human nature that consists of a collection of complex psychological adaptations ('modules') ranging from language acquisition to the preference for sweet foods, which emerge early and reliably in the ontogenetic sequence.[31] Individual developmental plasticity, inter-cultural variation, and intra-species genetic diversity, while not denied, are taken to be strongly constrained by developmental programs and innate psychological mechanisms: "the underlying computational design of the human mind is genetically transmitted while cultural variation results from differential experiential inputs being processed through this common architecture."[32]

Equating the mind with genetically-specified, shielded neural systems, and conceiving of evolution as 'adaptation by natural selection' furnishes evidence for universality. Phylogenetic and archeological data suggest that neuro-anatomically modern humans emerged during the Pleistocene, when natural selection built a suite of cognitive adaptations on the basis of then available genetic variation. This architecture characterizes our species to this day, given that natural selection is too slow a process for significant genetic change (and thus change in our cognitive adaptations) to have occurred since this 'Environment of Evolutionary Adaptedness'. The heuristic cash-out of such mental unity is a realistic research program – separating the wheat (adaptations) from the chaff (manifest variation) – and a license for inferential leaps across ancestral and contemporary minds.

TWO VISIONS

Underneath a shared and vocal commitment to the overcoming of disciplinary and ontological divides, we appear confronted with two distinct visions of the raison d'être of cognitive history which reflect that very divide. The former emphasizes mutual correction and complementarity. It sees in cognitive science a valuable resource for both the subject matter and methods of historical study. Conversely, however, it construes history as an indispensable participant in cognitive science

22; Patrick D. Evans et al., "Microcephalin, a Gene Regulating Brain Size, Continues to Evolve Adaptively in Humans," *Science (New York, N.Y.)* 309, no. 5741 (September 9, 2005): 1717–20; Rasmus Nielsen et al., "Recent and Ongoing Selection in the Human Genome," *Nature Reviews. Genetics* 8, no. 11 (November 2007): 857–68; Stephen C. Stearns et al., "Measuring Selection in Contemporary Human Populations," *Nature Reviews. Genetics* 11, no. 9 (September 2010): 611–22.

5. Last and perhaps foremost, the central scientific objection to strong nativism rests on the evidence for high neuronal plasticity. The degree to which developmental programs are themselves constrained by genes, and cognitive structure is modular, remains contentious. A. H. Mohammed et al., "Environmental Enrichment and the Brain," *Progress in Brain Research* 138 (2002): 109–33; Shu-Chen Li, "Biocultural Orchestration of Developmental Plasticity across Levels: The Interplay of Biology and Culture in Shaping the Mind and Behavior across the Life Span," *Psychological Bulletin* 129, no. 2 (March 2003): 171–94.

[31] Steven Pinker and Paul Bloom, "Natural Language and Natural Selection," *Behavioral and Brain Sciences* 13, no. 4 (1990): 707–727.

[32] "If one believes in a universal human nature, as we do, one observes variable manifest psychologies, traits, or behaviors between individuals and across cultures, and views them as the product of a common, underlying evolved innate psychology, operating under different circumstances […]. The mapping between the innate and the manifest operates according to principles of expression that are specified in innate psychological mechanisms or in innate developmental programs that shape psychological characteristics, these expressions can differ between individuals when different environmental inputs are operated on by the same procedures to produce different manifest outputs […]. Individual differences that arise from exposing the same human nature to different environmental inputs relate the study of individual differences to human nature in a straightforward way." Leda Cosmides and John Tooby, "On the Universality of Human Nature and the Uniqueness of the Individual: The Role of Genetics and Adaptation," *Journal of Personality* 58, no. 1 (March 1990): 23.

proper, arguing that its objects and methods, in turn, can and ought to be historicized. A cognitive history planted on the soil of such environmentally-conscious cognitive science, could conceivably grow not to replace, but qualify, systematize and extend apparently contrasting frameworks that populate theory, from historical phenomenology to science studies.

In the latter, history appears more as a beneficiary of a science which progresses irrespectively.[33] Collaboration is mainly between the *subject matter* of history with the *methods* of science.[34] History is not quite reduced to a passive data bank, but its autonomy and authority with respect to cognitive science are circumscribed by the denial of the historicity of the subject matter, and muddled by a somewhat whiggish and dichotomous conception of their relationship and respective epistemologies.[35]

> For if the humanities are to survive in the modern academia, they need to keep up with theoretical and methodological developments in other disciplines, and certainly with scientific approaches to the study of human nature. Postmodernism has had its run, but in its obsessive focus on deconstruction it forgot to be constructive, failing to make any incremental contribution to our empirical knowledge of the world.[36]

The boo-word is not entirely without referent. In her overview of recent historiographical currents, Carolyne Bynum agrees with the reading of the 'turn to science' as a mode of retreat from, even a rejection of, the cultural turn.[37] But the cultural historian ends on a culturalist twist:

> [I]n the hands of most professional historians, even cognitive science […] tend[s] to be used analogously rather than reductively. […] Cognitive structures lie deep below and hence are accessed only through behaviors that differ culturally; analogies are exactly that: analogies not equations. Even 'deep history' at its best involves understanding that the physiological structures are always mediated through our ways of knowing them, and hence through culture.[38]

Luther Martin laments this as evidence of historians continuing to ignore panhuman cognitive capacities and constraints, thus missing out on the boons of evolutionary-cognitive approaches to historiography. "In this way, Bynum is able wistfully to reaffirm cultural studies as usual rather than

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[33] Martin's statement is indicative: "panhuman proclivities should […] be of central concern to historians – to the extent, of course, that we get the science right. (We must recognize that inquiries into the complexity of human minds and their functions are, after all, still new areas of scientific investigation.)" Martin, "The Future of the Past: The History of Religions and Cognitive Historiography," 166.
[34] "Cognitive Historiography thus becomes the latest addition to a number of inter-disciplinary areas which combine a subject matter from the humanities with methods and theories from the cognitive sciences." Xygalatas, "On the Way Towards a Cognitive Historiography," 193.
[35] E.g. "historians must begin seriously to embrace theoretical argument as a matter of ordinary practice rather than as an occasional gesture if they wish to have any critical relevance at all. […] the postmodern encounter frames very clearly the quandary that a largely-unexamined tradition of epistemological and ethical thinking has created for historians who want to justify doing history. Simply put, there is no way to rescue humanist ideals […] from the implications of the linguistic turn." (p.62) "if we do not soon make a 'biological turn' ourselves, in fact, we might find the relevant territory occupied before we arrive."(p.79) Michael L. Fitzhugh and Jr. Leckie William H., "Agency, Postmodernism, and the Causes of Change," *History and Theory* 40, no. 4 (December 1, 2001): 62.
[36] Xygalatas, "On the Way Towards a Cognitive Historiography," 193–94. Fueling a case for empiricism with anti-'post-modernism' polemics is a standard move, notoriously in Steven Pinker, *The Blank Slate: The Modern Denial of Human Nature* (London: Penguin Books, 2003). Herbert Gintis takes the ignorance of and contempt for traditional social science to be the most consequential critique of evolutionary approaches to culture. "Unless this is overcome, evolutionary social theory will remain marginalized for the foreseeable future." Herbert Gintis, "Sense & Nonsense: Evolutionary Perspectives on Human Behaviour (Review)," *Human Nature Review* 2 (2002): 209.
[37] "the renewed interest in material culture and physical objects […] deep structure […] perduring 'human nature' […] seems located at the opposite pole from the postmodern sense of history-writing as fragmentary, fragile, and, so to speak, under perpetual construction." Caroline W. Bynum, "Perspectives, Connections & Objects: What's Happening in History Now?," *Daedalus* 138, no. 1 (January 1, 2009): 77.
[38] Ibid., 78.

capturing recent scientific advances in historiographical method."[39] True, glossing the use of cognitive science by historians as 'analogizing' undermines the project – analogies are heuristic tools, useful but dispensable. And, true, a good deal of post-structurally inspired work is problematic. In writing off Bynum's remark as a 'nostalgic pronouncement,' however, Martin reaffirms the dichotomy as usual. Transcending it would require offering a convincing alternative, beyond the two unattractive ones – reductionism & analogizing – from which Bynum feels compelled to choose. It is one thing to take interpretative practices to task for their implicit or explicit dualism in treating the mind as un- or trivially constrained by the brain. It is quite another to tout scientific consensus on the ahistorical nature of mind as a viable and desirable alternative.

2. SOCIALIZING BIOLOGY

This style of advocacy for 'biologizing the social' might be doing the larger project a disservice. Not simply by advertising it badly, but by selling the wrong product. Champions of bringing the study of humanity within the ambit of science emphasize the cohesion and firm empirical basis of modern science as a palliative to the various afflictions – stagnation, fragmentation, 'postmodernism' – bogging down the 'soft' disciplines.

> If the social sciences are ill, biology looks like the therapy; if sociological investigations are thin and fragmented, biological knowledge is solid and cohesive; finally, if the social is an erratic, ephemeral entity, lacking firmer ground, what is required is to anchor it onto the firmer basis of evolutionary thinking and neurobiological facts.[40]

But the monistic rhetoric rests on a vision of biology that is out of touch with the increasingly *social* direction taken by the life sciences over the past three decades. Empirical discoveries of new phenomena (e.g. epigenetics), methodological innovations (e.g. game-theory), and the elaboration of new concepts (e.g. evolvability) are animating a substantial renegotiation of the bio-social terrain, and chipping away at the artificial boundary between them. This process might dampen antagonism towards the social sciences, as well as ease prejudice about biological interpretation of human behavior. "In future," Jablonka and Laor envisage, "a biologist will need to be more of a social scientist, and a social scientist will need to be more of a biologist."[41] Geneticist and philosopher Eva Jablonka is a prominent voice for the extension of the evolutionary synthesis (EES). In this flagship case of biology 'turning social', researchers from a variety of fields (including developmental biology, genomics, epigenetics, ecology and social science) advocate for a reconceptualization of evolutionary theory, such that extra-genetic factors are acknowledged as causal, co-constructive agents in the evolutionary process, on par with genes.[42]

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[39] Luther H. Martin, "Evolution, Cognition, and History," in *Past Minds: Studies in Cognitive Historiography*, ed. Luther H. Martin and Jesper Sørensen (Routledge, 2016), 7.
[40] Maurizio Meloni, "Biology without Biologism: Social Theory in a Postgenomic Age," *Sociology* 48, no. 4 (August 1, 2014): 733.
[41] Eva Jablonka and Marion J. Lamb, "Précis of Evolution in Four Dimensions," *The Behavioral and Brain Sciences* 30, no. 4 (August 2007): 364–65.
[42] Eva Jablonka and Marion J. Lamb, *Evolution in Four Dimensions: Genetic, Epigenetic, Behavioral, and Symbolic Variation in the History of Life* (Cambridge: The MIT Press, 2005); Massimo Pigliucci, Gerd Müller, and Konrad Lorenz Institute for Evolution and Cognition Research, eds., *Evolution, the Extended Synthesis* (Cambridge, Mass: MIT Press, 2010); Kevin N. Laland et al., "The Extended Evolutionary Synthesis: Its Structure, Assumptions and Predictions," *Proceedings of the Royal Society B: Biological Sciences* 282, no. 1813 (August 22, 2015): 20151019.

The EES movement defines itself in counter-point to the Modern Evolutionary Synthesis (MS), i.e. the reconciliation in the 1930s of Darwinian selection and Mendelian heredity, initially perceived as rivals.[43]

The MS catalyzed modern evolutionary biology, by furnishing a mathematical treatment of evolution (change of frequencies of genetic variants in a population over time) and a set of mechanisms (natural selection, drift, mutation, recombination, and gene flow) which proved to be "powerfully predictive, broadly applicable and empirically validated."[44] The MS achievement was specifying the micro-evolutionary details of the general processes that had been laid out by Darwin, but this neo-Darwinian specification also constituted a narrowing of his more pluralist theory.[45] For one, whereas Darwin did not exclude the possibility of Lamarckian evolution, the 'central dogma' of the MS seemed to pose an impermeable theoretical barrier to the very possibility of the inheritance of acquired traits.[46]

The promise of the MS was in explaining evolution at all levels by causation at the genetic. To its architects, the question of what *drives* gene frequency changes was an open one.[47] Yet by the end of the 1940s, according to Gould and Lewontin, the synthesis had 'hardened' around an adaptationist view whereby natural selection is the only cause of evolutionary change.[48] The identification of heredity with genetics promoted relative neglect of other evolutionary forces. Because they are the only thing that organisms inherit, genes are privileged as the causally primary store of all relevant information, an idea reflected in tenacious metaphors of genetic 'programs' or 'blueprints'.[49] Since culture per se is in no straightforward way genetically stored, it is precluded from playing any direct causal role in evolution, and, by extension, deeper structures of cognition.

The claim 'it's not nature or nurture, it's both' isn't new. In fact, the entire nature-nurture debate has been characterized by a paradoxical tenacity, of claims that it is resolved – and further debate. Scarcely surprising given the complexity of the subject matter, its pregnant political stakes, the burden of historical baggage, and deep semantic quagmires.[50]

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[43] Michael Ruse, "Is Darwinism Past Its 'Sell-by' Date? The Origin of Species at 150," *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, Defining Darwinism: One Hundred and Fifty Years of Debate, 42, no. 1 (March 1, 2011): 317.

[44] Hopi E. Hoekstra and Gregory A. Wray, "Does Evolutionary Theory Need a Rethink?: No All Is Well," *Nature* 514, no. 7521 (October 9, 2014): 163.

[45] Stephen Jay Gould, "The Hardening of the Modern Synthesis," in *Dimensions of Darwinism*, ed. M. Grene (Cambridge: Cambridge University Press, 1983), 71–93.

[46] "Changed habits produce an inherited effect […] In animals the increased use or disuse of parts has had a more marked influence; thus I find in the domestic duck that the bones of the wing weigh less and the bones of the leg more, in proportion to the whole skeleton, than do the same bones in the wild-duck; and this change may be safely attributed to the domestic duck flying much less and walking more than its wild parents." Charles Darwin, *The Origin of Species*, 6th ed. (London: John Murray, Albemarle Street, 1872), 8.

[47] Key figures were Fisher, E.B. Ford in Britain (where it was known as neo-Darwinism); Theodosius Dobzhansky, Ernst Mayr, George Gaylord Simpson, G. Ledyard Stebbins in the USA (where it was known as the synthetic theory of evolution)

[48] S. J. Gould and R. C. Lewontin, "The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme," *Proceedings of the Royal Society of London B: Biological Sciences* 205, no. 1161 (September 21, 1979): 581–98.

[49] Not that the program metaphor is *intrinsically* gene-centric. "The metaphor of a *program,* borrowed directly from computer science, entered the biological literature in the 1960s […] in at least two distinctly different registers. In its first […], the locus of the program was explicitly identified as the genome, but, over the course of that decade, another notion of program, a *developmental program,* also surfaced, and repeatedly so. This program was not located in the genome, but instead, distributed throughout the fertilized egg. By the 1970s, however, the program for development had effectively collapsed into a genetic program, with the alternative, distributed sense of a developmental program all but forgotten." Evelyn Fox Keller, "Decoding the Genetic Program: Or, Some Circular Logic in the Logic of Circularity," in *The Concept of the Gene in Development and Evolution*, Cambridge Studies in Philosophy and Biology (Cambridge University Press, 2000), 162.

[50] Evelyn Fox Keller, *The Mirage of a Space between Nature and Nurture* (Durham, NC: Duke University Press, 2010).

Excavating the marginal, forgotten, heterodox antecedents of purported novelties and breakthroughs is the bread and butter of historical scholarship, and it doesn't take much digging to reveal that the plurality of explanatory levels and concepts existed before, during, as well as after the 'hardening' of the MS.[51] There are sound historical reasons, in other words, to avoid relying too heavily on 'revolutionary' rhetoric. There are pragmatic reasons, too. Historical complexity is an effective retort to those who invoke purported unification in biology to argue that making any real progress in the social sciences requires for them to be subsumed under a common (evolutionary) framework.[52]

It is in recognition of this fact, that I invoke the EES, in spite of the disputed status of the project. Crucially, critics of the EES (primarily population geneticists) disagree not with the relevant findings as such, but with the research value of what they perceive to be a purely semantic distinction: all the novelties are continuous with the MS, and do not warrant the re-description.[53] Most proponents of the EES are happy to admit that its ideas aren't new, in fact more consistent with Darwinian than neo-Darwinian evolution. But semantics matter. Many issues in biology pivot on an 'empirical–theoretical–conceptual triumvirate.'[54] There is good reason why the philosophy of biology has been one of the most successful branches in philosophy of science – if success is measured by the influence exercised on empirical research.[55] The upshot: because 'nature/nurture' debates are not the sort of thing that can be resolved by empirical and conceptual advances alone, the future imagined by Jablonka and Laor – should it become reality – will mark as much a sociological, as a conceptual or empirical shift. The strongest evidence for such a shift taking shape, therefore, lies not so much in radical discontinuity of empirical findings, or novel plurality of approaches, as in the simultaneous *convergence* on an emphasis of the irreducibly social nature of phenomena studied by a variety of relatively autonomous research fields.[56]

[51] Richard G. Delisle proposes that "[t]he historiographical notion of a hardened synthesis is entirely a by-product of an etiological view of science in which causes or mechanisms are believed to be central." Richard G. Delisle, "From Charles Darwin to the Evolutionary Synthesis: Weak and Diffused Connections Only," in *The Darwinian Tradition in Context* (Springer, Cham, 2017), 160; Joe Cain, "Rethinking the Synthesis Period in Evolutionary Studies," *Journal of the History of Biology* 42, no. 4 (November 1, 2009): 621–48.

[52] "An adequate understanding of culture is also hindered by the fragmentary structure of the social sciences. There is little exchange of theories and findings between economists, sociologists, linguists, historians, psychologists, anthropologists, and archaeologists. In many cases these disciplines hold mutually incompatible assumptions. In other cases, different disciplines end up reinventing concepts from scratch that other disciplines have known about for years, because of the lack of communication. This should not be the case, if every social science discipline is supposed to be studying the same phenomenon—culture—and it is certainly not conducive to scientific understanding. Compare this situation to that of the biological sciences, which for decades have been unified under a single theoretical framework: Darwinian evolutionary theory." Alex Mesoudi, *Cultural Evolution: How Darwinian Theory Can Explain Human Culture and Synthesize the Social Sciences* (University of Chicago Press, 2011), 21–22.

[53] John Whitfield, "Biological Theory: Postmodern Evolution?," *Nature* 455, no. 7211 (September 18, 2008): 281–84; Jerry Coyne, "Are We Ready for an 'Extended Evolutionary Synthesis'?," *Why Evolution Is True*, February 16, 2009; Hoekstra and Wray, "Does Evolutionary Theory Need a Rethink?: No All Is Well."

[54] "[S]ome of the crucial issues are conceptual (i.e., philosophical) in nature and hinge on not just matters of definition (what, exactly, counts as a *paradigm*?) but also on the entire framework that biologists use to understand what it is that they are doing (e.g., what is the relationship between systems of inheritance and natural selection, or, in multilevel selection theory, what counts as a *level* and why?)." M. Pigliucci and L. Finkelman, "The Extended (Evolutionary) Synthesis Debate: Where Science Meets Philosophy," *BioScience* 64, no. 6 (2014): 2.

[55] Peter Godfrey-Smith, "Three Kinds of Adaptationism," *Adaptationism and Optimality*, 2001, 335–357.

[56] Maurizio Meloni, "How Biology Became Social, and What It Means for Social Theory," *The Sociological Review* 62, no. 3 (August 1, 2014): 593–614.

ADDING INTERACTION

The basic principle that phenotypes result from the interaction between genes and intrinsic and environmental conditions was never in doubt, but, as developmental biologists are prone to point out, often insufficiently appreciated. The black-boxing of interaction contributed to the neoclassical status of the gene as an 'unmoved mover', autonomous master of development and evolution – a status from which it is increasingly dethroned in favor of a far more open and complex view of the gene and its function.[57] The completion in 2003 of the three-billion-dollar human genome project has, among other, underlined the naivety of the more hyperbolic expectations it had inspired: the mere map of the genome is a paltry guide for navigating the human condition.[58] Humans turn out to have far fewer genes than most scientists had predicted.[59] Only around 1.2 percent of the human genome corresponds to the neo-classical definition of a gene, as a protein-coding sequence. Conversely, *more* of this non-coding DNA plays a role in gene-regulation than originally predicted.

The relative importance of gene regulation is particularly salient in the case of homo sapiens. Consider that we share 98.8% of our DNA with chimpanzees.[60] The 1.2% genetic difference corresponds to extensive differences in cognition, behavior and morphology. Small genetic differences do not typically correspond to substantial phenotypic difference in other species.[61] Understanding the basis of this discrepancy – between the near-identity of human and chimpanzee DNA sequences and their phenotypic difference – is one of the great new challenges of biology, and the accomplishments so far have been both exciting and sobering. Many phenotypic peculiarities appear to be due to patterns and timings of gene regulation, rather than changes to the sequences themselves.[62] The fact that human and chimpanzee DNA sequences are near identical cannot be made sense of unless seen in the context of the ontogeny of the organism, as well as the phylogeny of the species.[63]

Introduced by British developmental biologist Conrad Waddington in 1956, it is in recent decades that epigenetics – the study of molecular events that govern the ways in which the environment regulates the expression of genomes – has exploded into "one of the most promising

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[57] "Starting from the early 1970s, DNA technologies have led to the modern period of gene conceptualization, wherein none of the classical or neoclassical criteria are sufficient to define a gene. Modern discoveries include those of repeated genes, split genes and alternative splicing, assembled genes, overlapping genes, transposable genes, complex promoters, multiple polyadenylation sites, polyprotein genes, editing of the primary transcript, and nested genes. We are currently left with a rather abstract, open, and generalized concept of the gene, even though our comprehension of the structure and organization of the genetic material has greatly increased." P. Portin, "The Concept of the Gene: Short History and Present Status," *The Quarterly Review of Biology* 68, no. 2 (June 1993): 173–223.

[58] Hilary Rose and Steven Rose, *Genes, Cells and Brains: The Promethean Promises of the New Biology* (Verso Books, 2013).

[59] Humans share the same basic set of ca. 32,000–35,000 genes (similar to mice). Early estimates were in the ranges of 200,000, at the start of the HGP, 100,000.

[60] Chimpanzee Sequencing and Analysis Consortium, "Initial Sequence of the Chimpanzee Genome and Comparison with the Human Genome," *Nature* 437, no. 7055 (September 1, 2005): 69–87.

[61] different species of mice with 98% identical genomes have highly similar phenotypes. Wolfgang Enard et al., "Intra- and Interspecific Variation in Primate Gene Expression Patterns," *Science (New York, N.Y.)* 296, no. 5566 (April 12, 2002): 340–43.

[62] For example: "Our results indicate that the human brain displays a distinctive pattern of gene expression relative to non-human primates, with higher expression levels for many genes belonging to a wide variety of functional classes. The increased expression of these genes could provide the basis for extensive modifications of cerebral physiology and function in humans and suggests that the human brain is characterized by elevated levels of neuronal activity." Mario Cáceres et al., "Elevated Gene Expression Levels Distinguish Human from Non-Human Primate Brains," *Proceedings of the National Academy of Sciences of the United States of America* 100, no. 22 (October 28, 2003): 13030–35. See also: Brenda J Bradley, "Reconstructing Phylogenies and Phenotypes: A Molecular View of Human Evolution," *Journal of Anatomy* 212, no. 4 (April 2008): 337–53.

[63] Mary-Claire King and A. C. Wilson, "Evolution at Two Levels in Humans and Chimpanzees," *Science* 188, no. 4184 (1975): 107–16.

and expanding fields in the current biomedical research landscape,"[64] characterized by hype and hope in equal measure.[65] Partly responsible for its high public profile the fact that the epigenome dynamically regulates gene transcription throughout life, and does so in response to social experience, nutrition, toxicological exposures, hormones, and neuronal activation, among other. Its truly heretic appeal, however, lies the fact that some epigenetic markers also appear to be transmitted through generations. By opening a channel of communication between biological heredity and social experience, potentially heritable acquired epigenetic markers raise a Lamarckian specter and challenge our understanding of 'inheritance'. The extent of inter-generational stability of such epi-mutations is a matter of controversy and warrants caution about more radical claims.[66]

The EES, however, does not rely on esoteric claims and spurious empiric evidence, and should not be mistaken for a nurturist in sheep's clothing. The public sex-appeal of epigenetics, the irresistibility of revolutionary rhetoric even to serious science writers, its co-option by constructivist narratives of biological transcendence, is not so much a response to, as mirror image of the trendy 'gene for' determinism of the '80s and '90s.[67] Both are biologically nonsensical: genetic factors cannot be studied independently of the environment, nor do environmental factors function independently of the genome. Epigenetics, while an important and novel phenomenon in genetics and development, cannot be 'the long-sought link through which the environment influences the hereditary material' because the principle has been found true all along. The failure to cross the chasm between nature and nurture is not due to, and thus not eliminable through, (lacking) technical prowess or empirical insight into the mechanisms of interaction, so much as the reliance on additive models to capture an *interactive* system:

[64] Manuel Rodríguez-Paredes and Manel Esteller, "Cancer Epigenetics Reaches Mainstream Oncology," *Nature Medicine* 17, no. 3 (March 2011): 330.

[65] Waddington's seminal paper demonstrated the inheritance of an acquired characteristic in a population in response to an environmental stimulus. He coined the term 'epigenetics' to demarcate "the branch of biology which studies the causal interactions between genes and their products which bring the phenotype into being," but the word has since undergone a shift of meaning, nowadays also used to refer to chemical modifications of DNA (methylation) and histones, its protein scaffold. C. H. Waddington, "Genetic Assimilation of the *Bithorax* Phenotype," *Evolution* 10, no. 1 (March 1956): 1–13. Mark Ptashne, "On the Use of the Word 'Epigenetic,'" Current Biology 17, no. 7 (April 3, 2007): R233–36; Florian Maderspacher, "Lysenko Rising," Current Biology 20, no. 19 (October 12, 2010): R835–37; Martyn Pickersgill et al., "Mapping the New Molecular Landscape: Social Dimensions of Epigenetics," New Genetics and Society 32, no. 4 (December 2013): 429–47.

[66] Nicole M. Cameron, Eric W. Fish, and Michael J. Meaney, "Maternal Influences on the Sexual Behavior and Reproductive Success of the Female Rat," *Hormones and Behavior* 54, no. 1 (June 1, 2008): 178–84; Maderspacher, "Lysenko Rising"; Lucia Daxinger and Emma Whitelaw, "Transgenerational Epigenetic Inheritance: More Questions than Answers," *Genome Research* 20, no. 12 (December 2010): 1623–28.

[67] For respective examples, see e.g. (1) a puff piece published in the Guardian: Oliver Burkeman, "Why Everything You've Been Told about Evolution Is Wrong," *The Guardian*, March 19, 2010, http://www.theguardian.com/science/2010/mar/19/evolution-darwin-natural-selection-genes-wrong. (2) "Psychologists, psychiatrists and neuroscientists have jousted for years over how much of our behavior is driven by our genes versus the environments in which we grow up and live. Arguments have persisted because there has been little hard evidence to answer basic questions […] a field called epigenetics has finally begun to address some of these issues." Douglas Steinberg, "Determining Nature vs. Nurture: Molecular Evidence Is Finally Emerging to Inform the Long-Standing Debate," *Scientific American*, 2006. (3) "Both evolutionary and genetic orientations are further unsettled by research on epigenesis […]. As myriad studies demonstrate, whether a given gene is activated depends importantly on environmental circumstances—intercellular, organic, and external to the body— and the time of life in which they occur. […] Any simple linking of the genome to brain functioning is thus precluded." (p. 780) Studies of brain plasticity "undermine the concept of behavior determined by a fixed architecture of the brain, they suggest once again that the brain absorbs or reflects its cultural surrounds and enables the individual to act more effectively within them." (p. 808) Kenneth J. Gergen, "The Acculturated Brain," *Theory & Psychology* 20, no. 6 (December 1, 2010): 795–816.

> [t]he technology of 2001 is employed in the service of questions that have been conceptually unchanged since the 19th century. Our technical brilliance is constructed on a conceptual scaffolding that, in many areas of biology, is little changed from the 1920s. […] the most troubling example remains that of the question of genetic versus environmental determinism […] and the theoretical divide that exists between researchers which fuels such fruitless controversy.[68]

Developing a conceptual framework that does more than pay lip service to 'interaction' is the central aim of EES.[69] This should make clear the way in which invoking epigenetics, developmental plasticity, niche construction, etc. as ways in which biology is 'becoming social' does not serve a 'nurturist' argument. Stressing the causal contribution of, say, niche construction to the evolutionary process does not, *cannot*, imply that 'genes aren't everything' or that a cumulative niche construction can somehow progressively liberate us from genetic constraints. That culture does not transcend nature, nor nature precede culture, is no less provocative for 'neo-Darwinians' than it is for 'constructivists'.

Instead, it is a way of embracing, and addressing, what behavior geneticists Plomin and Daniels have called the 'gloomy prospect': that the intricate, interactive, nonlinear developmental entanglement between 'genetic' and 'environmental' factors is a bottomless pit: their individual effects cannot be picked apart.[70] The stagnation of the nature/nurture debate reflects and affects real-world theoretical divides between researchers. The trouble with interactive systems is that one-sided inquiry is prone not simply to *incomplete*, but to *mis*understanding, as when it mistakes properties of the entire system for properties of one of its parts. Just as critics argue that the traditional symbol-processor view of cognition mistakenly locates the properties of a complex cognitive system co-constituted by the environment in individual minds, *presuming* cognitive universality, from an EES perspective, runs the risk of mistaking results of complex cultural histories for properties of stable, content-rich, genetically-specified modules.[71]

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[68] M. J. Meaney, "Nature, Nurture, and the Disunity of Knowledge," *Annals of the New York Academy of Sciences* 935 (May 2001): 51; W F Overton, "On the Assumptive Base of the Nature-Nurture Controversy: Additive versus Interactive Conceptions" Human Development, no. 16 (1973): 74–89.

[69] Even the notion of 'interaction' is misleading to the extent that it implies separable "causal elements interacting with one another. Indeed, the notion of interaction presupposes the existence of entities that are at least ideally separable—i.e., it presupposes an a priori space between component entities—and this is precisely what the character of developmental dynamics precludes. Everything we know about the processes of inheritance and development teaches us that the entanglement of developmental processes is not only immensely intricate, but it is there from the start." Keller, *The Mirage of a Space between Nature and Nurture*, 6.

[70] Plomin and Daniels took the gloomy prospect, if it was true, 'likely to prove a dead end for research' "Robert Plomin and Denise Daniels, "Why Are Children in the Same Family so Different from One Another?," *Behavioral and Brain Sciences* 10, no. 1 (March 1987): 1–16; Eric Turkheimer, "Three Laws of Behavior Genetics and What They Mean," *Current Directions in Psychological Science* 9, no. 5 (2000): 161. Turkheimer locates the reason why the debate nevertheless won't die down in the methodological problem characteristic not only of behavior genetics, but of contemporary social science: the disconnect between the *analysis of variance* and the *analysis of causes*. The ubiquitous fallacy of confounding statistics and mechanisms, and to move from correlational to causal claims is well-known, and Turkheimer is not the first nor the last to point out its centrality to the continued confusion. R. C. Lewontin, "The Analysis of Variance and the Analysis of Causes," *American Journal of Human Genetics* 26 (1974): 400–411; Keller, *The Mirage of a Space between Nature and Nurture*.

[71] There are clear structural parallels to the integration of the competing cognitivist and constructivist positions into two complementary and mutually corrective aspects of one extended model of mind. The parallel between EES and the extended mind is not accidental, and even clearer when the reliance of nativist EP on the computational theory of mind is taken into account. It hasn't received extensive treatment yet, but for a good start, see: Karola Stotz, "Extended Evolutionary Psychology: The Importance of Transgenerational Developmental Plasticity," *Frontiers in Psychology* 5 (August 20, 2014).

3. VARIETY WITHOUT PLURALITY

Universality, while it may provide prima facie support, is not sufficient to establish innateness. A psychological trait might be universal without being innate, for instance because it is a culturally-generated byproduct of naturally selected tendencies (e.g. religion), or thanks to the independent invention or widespread diffusion of useful learned responses to commonly faced problems (e.g. writing or counting systems).[72] A strong argument for innateness, therefore, cannot rely on a plausible story about its adaptive value in the Pleistocene, lack of substantial genetic change, and inferences from cross-cultural ubiquity.[73] It must also show that neither repeated, independent inventions nor their widespread cultural propagation are likely to have universalized any given psychological feature.

This is not a straightforward task. An alien anthropologist studying a fully literate future human society could conclude that reading and writing are genetically specified. One might object that literacy is acquired quite late and not without extensive instruction, but Cecilia Heyes extends the argument to features that robustly emerge early in the ontogenetic sequence, such as imitation or theory of mind.[74] Arguing from empirical evidence, Heyes conjectures that both capacities rely on socialization to such a degree that human cognitive adaptations can be assumed to have changed markedly with the cultural circumstances in which they matured. Whatever the fate of this particular argument, a growing number of evolutionary psychology research programs have moved from the idea that our modern skulls house Stone-Age minds to actively debating and testing hypothesis about universality and its boundary conditions.[75]

The current state of evidence does not give grounds to doubt substantive cognitive similarity across different historical and cultural contexts, and with it the intelligibility of other minds. But it does offer good reasons to see historical analysis not merely as a beneficiary to the theoretical deliveries of the cognitive sciences, but indispensable to their efforts of delineating the contours and conditions of such similarity. Lisdorf cites Pinker's admonition that the mind is not a blank slate but attempts to strike a conciliatory chord:

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[72] Levy offers a pithy overview of the debate, arguing that game-theoretical approaches can account for the evidence on universality and variation in patterns of gender difference better than nativist alternatives à la Buss (1994) *The Evolution of Desire: Strategies of Human Mating*. Neil Levy, "Evolutionary Psychology, Human Universals, and the Standard Social Science Model," *Biology and Philosophy* 19, no. 3 (June 1, 2004): 459–72.

[73] To be fair, Cosmides and Tooby do not argue that generating a plausible adaptive scenario is sufficient for a strong argument

[74] Cecilia Heyes, "Grist and Mills: On the Cultural Origins of Cultural Learning," *Philosophical Transactions of the Royal Society B: Biological Sciences* 367, no. 1599 (August 5, 2012): 2181–91; Cecilia M. Heyes and Chris D. Frith, "The Cultural Evolution of Mind Reading," *Science (New York, N.Y.)* 344, no. 6190 (June 20, 2014).

[75] "the various styles of evolutionary social science are historically distinct and have developed quite different research traditions [which] differ in important theoretical and substantive ways. Specifically, these differences involve: (1) the role of formal models and deductive theory; (2) the postulated specificity and rigidity of evolved psychological mechanisms; (3) assumptions regarding the prevalence of adaptive lag and the nature of adaptation to past environments; and (4) the theoretical and methodological relevance of fitness measures to analyses of contemporary behavior. These divergences have several major consequences for analyses of human behavior." E. A. Smith, M. B. Mulder, and K. Hill, "Controversies in the Evolutionary Social Sciences: A Guide for the Perplexed," *Trends in Ecology & Evolution* 16, no. 3 (March 1, 2001): 130; Paul E. Griffiths, "The Historical Turn in the Study of Adaptation," *The British Journal for the Philosophy of Science* 47, no. 4 (December 1, 1996): 511–32; Cecilia Heyes, "New Thinking: The Evolution of Human Cognition," *Philosophical Transactions of the Royal Society B: Biological Sciences* 367, no. 1599 (August 5, 2012): 2091–96; Douglas T. Kenrick, Norman P. Li, and Jonathan Butner, "Dynamical Evolutionary Psychology: Individual Decision Rules and Emergent Social Norms," *Psychological Review* 110, no. 1 (January 2003): 3–28; Steven J. Scher and Frederick Rauscher, eds., *Evolutionary Psychology: Alternative Approaches* (Boston: Kluwer Academic Publishers, 2003).

> [this] is not to say that culture is not important, just that the human mind of modern and historical people are sufficiently similar in general cognitive function to warrant a meaningful comparison. To put it differently: historical minds are not more different from modern minds than those of other cultures in our contemporary world.[76]

Maybe so, but how well do we know the minds of these other cultures? Psychology, cognitive- and neuroscience studies habitually draw general inferences about 'humans' – based on a notoriously narrow subject pool.[77] This sampling bias has multiple reasons, but a key factor of this deficit in epistemic vigilance is an implicit assumption of generalizability, a problem that has recently started to attract widespread attention from within.[78] Sustained and systematic attempts to rectify disproportionate reliance on WEIRD populations, still in their infancy, are documenting an uncomfortable amount of variation, even at 'basic' levels such as perception.[79] Cultural relativism is not the only strategy for coming to grips with it – but squaring variation with a commitment to a shared human psychology requires elaborating a much more sophisticated conceptual, interpretative, and methodological apparatus than currently available. The seminal work of Heine et al. goes some way towards illustrating the sorts of challenges involved in trying to infer rather than project universals. The set of universal processes that manifests in more or less uniform ways across contexts (e.g. the preference for sweet and fatty foods) is limited. Mostly, we encounter universals not in their abstract, but culturally instantiated, forms. Disentangling one from the other requires triangulating conceptual, comparative, and developmental methods.

A starting point is to address the current theoretical confusion that results from differing but unarticulated assumptions about the *levels* on which universals are thought to exist. A conceptual framework is needed that allows to distinguish levels, anchor findings, and sharpen the discussion. Norenzayan and Heine propose a taxonomy of four (continuous, interpenetrating) levels, each with a different degree of claim for universality, comprised of three universals and one non-universal. "An accessibility universal (a) is, in principle, cognitively available to most people in most cultures (it is an existential universal); (b) has the same use across cultures (it is also a functional universal); and (c) is accessible to the same degree across cultures."[80] Accessibility universals are characterized by little or no cultural variation in availability or function, early and reliable ontogeny, and are likely to be shared by non-linguistic primates. They are found in primitive domains of cognition, and are

[76] Lisdorf, "Towards a Cognitive Historiography - Frequently Posed Objections," 3–4.
[77] 95% of psychological samples are from countries accounting for 12% of the world's population. Jeffrey J. Arnett, "The Neglected 95%: Why American Psychology Needs to Become Less American," *The American Psychologist* 63, no. 7 (October 2008): 602–14; Joan Y. Chiao, "Cultural Neuroscience: A Once and Future Discipline," *Progress in Brain Research* 178 (2009): 287–304.
[78] This is part of a larger replication 'crisis' concerning the reliability of research findings. Harold Pashler and Eric-Jan Wagenmakers, "Editors' Introduction to the Special Section on Replicability in Psychological Science: A Crisis of Confidence?," *Perspectives on Psychological Science: A Journal of the Association for Psychological Science* 7, no. 6 (November 2012): 528–30; John P. A. Ioannidis, "Why Most Published Research Findings Are False," *PLOS Medicine* 2, no. 8 (August 30, 2005): e124.
[79] For an overview, see: Joseph Henrich, Steven J. Heine, and Ara Norenzayan, "The Weirdest People in the World?," *Behavioral and Brain Sciences* 33, no. 2–3 (June 2010): 61–83.
[80] Ara Norenzayan and Steven J. Heine, "Psychological Universals: What Are They and How Can We Know?," *Psychological Bulletin* 131, no. 5 (2005): 772. "A psychological tendency is an **existential universal** if it is in principle cognitively available to normal adults in all cultures, even though the cultures may differ markedly in the ways or frequency with which the process is utilized in everyday life. Existential universals require a very minimal standard of evidence—they refer to psychological strategies that are cognitively latent, even if they are rarely accessed and deployed in practice. Existential universals presume that adult, non-brain-damaged human beings everywhere are capable of accessing and utilizing the same strategies, even if the conditions under which a given strategy is activated may vary dramatically and if the frequency and degree of strength with which a strategy is accessed may vary as well." (p.774) "When a psychological process shows cultural variability in accessibility, then the next step is to examine whether it is a **functional universal**. A functional universal (a) is, in principle, cognitively available to people in all cultures; (b) has functionally the same use across cultures; and (c) can vary across cultures in the extent to which it is accessible." (p. 773)

impervious to conscious reasoning, examples are the mere exposure effect (increased positive affect toward familiar objects relative to unfamiliar ones) or our analog number sense.[81]

Contra the implicit assumption that most psychological processes qualify as accessibility universals, the authors argue they constitute but a small subset. 'Existential' and 'functional' universals have lower thresholds for universality, are therefore more numerous, but also more difficult to pin down. While developmental studies can provide important evidence for accessibility universals, when it comes to the more common, lower-threshold universals, it is only by considering cultural diversity that we can identify where we might be conflating the particular with the universal. Here, different samples will yield different effect sizes, and interpretation is complicated by the fact that *similar traits need not have similar explanations, nor similar causes give rise to similar traits*. The former, because different conditions can produce similar responses. The latter, because many naturally-selected adaptations are best conceptualized as contingent rules: they will manifest in different form in different populations as a function of how they are enabled, modified, and suppressed by a multitude of environmental factors, including ecological, economic, demographic, and social ones.[82] Inferences of existential and functional universal from observed variation, moreover, must be sensitive to the other possible causal origins of variation. These can include differential distribution of genes, epigenetics, behavioral plasticity, domain-general learning mechanisms, and divergent trajectories of cultural transmission.

While anthropology and archeology have a secure place in cognitive science, the past, too, is a foreign country, and history has some unique contributions to make. Diachronic comparative study is required to distinguish between existential-, and non-universals: some cognitive strategies have become so ubiquitous, that we readily forget they started out as culturally-bound inventions (i.e. non-universals). Distinguishing between universals and non-universals is not an end but a means: the more complex the behavior under study, the more likely it recruits several cognitive strategies, issuing from different levels of universality. Even such seemingly basic processes as numerical thinking are composites.[83] More complex products of biocultural bootstrapping have genealogies: they cannot be understood in terms of phylogenetic or proximal psychological factors alone, nor in isolation from them.[84] Conversely, it is only by tracing genealogies of what transcends nature in the narrow sense (e.g. non-universals), that we can approximate an understanding of the diversity of contingent properties that characterize evolved biological phenomena.[85]

The urgency of diachronic studies in this domain is only accentuated by the homogenizing forces of globalization. Its methodological limitations, when compared to the research possibilities of anthropologists and experimental psychologists, are compensated for by their unique ability to

[81] Stanislas Dehaene, *The Number Sense: How the Mind Creates Mathematics* (New York: Oxford University Press, 1997).
[82] Dov Cohen, "Cultural Variation: Considerations and Implications," *Psychological Bulletin* 127, no. 4 (2001): 451–71.
[83] "Undoubtedly, numerical reasoning is rooted in human biology in that infants seem to be naturally endowed with a primitive number sense with an analog representational system of quantity, natural language quantifiers, and object representation. Nevertheless, these core competencies are the cognitive building blocks on which the edifice of human numerical thinking is gradually constructed and transmitted to future generations. Natural numerical competencies available to the human infant are capable of representing *one* and the difference between *one*, *some*, and *many*. However, the cognitive strategies that make possible the representation of, for example, the number '31' or the execution of complex mathematical operations are 'bootstrapped'. That is, they emerge as a result of the mutual exploitation of primitive representational systems that were initially independent." Norenzayan and Heine, "Psychological Universals," 776.
[84] Jesse J. Prinz, "Where Do Morals Come From?–A Plea for a Cultural Approach," in *Empirically Informed Ethics: Morality between Facts and Norms* (Springer, 2014), 99–116.
[85] Sandra D. Mitchell, "Integrative Pluralism," *Biology and Philosophy* 17, no. 1 (2002): 55–70.

track change over time, assess the impact of different environmental and social conditions on the salience and distribution, and recover some of the diversity lost or neglected.[86] Consider two examples of how 'traditional' narrative historical scholarship can benefit from and contribute to this endeavor.

LINKING HISTORY AND COGNITIVE SCIENCE

Comparison is as crucial a building block of historical method as of any other, and as elsewhere, parallels are found as a function of where similarity is sought. Because similarity is a matter of perspective, and given that similar causes can give rise to different traits, the appeal to universals can counteract, rather than perpetuate, presentist readings of historical material. An argument of this sort is presented by philosopher and classicist Peter T. Struck in his monograph *Divination and Human Nature: A Cognitive History of Intuition in Classical Antiquity*. Struck provides a novel reading of the most influential philosophical analyses of divination from the ancient world. Interpretations so far have fallen into two categories:

> The question of the logic that might lie behind [divination] is either not asked at all, since it is assumed not to have one, or it is deflected onto other, functionalist grounds. In place of a rational logic, the social historian explores the more comprehensible realm of social capital, while the historian of magic will tend toward the psychological, presenting an ancient mind-set, groping to find effective means of dealing with a sometimes brutal world.[87]

Both readings, argues Struck, betray our rationalist bias, and neither is able to convincingly account for why philosophers like Plato – who had no patience for magic – were compelled to elaborately speculate about divinatory insight. Struck's argument, by contrast, rests on an appeal to a universal cognitive phenomenon he calls 'surplus knowledge'.[88] The virtue of the contemporary category of cognition for Struck is precisely that it allows for a broader attention to activities of the mind, beyond volitional, self-conscious, discursive, inferential intellectual activity. That divinatory knowledge does not derive from such narrowly conceived 'rationality' does not mean it is unreasonable, illogical, or absurd. "Our ability to know exceeds our capacity to understand that ability," (p.15) and over the course of history, different cultures came up with different strategies of getting a grip on this prominent property of human phenomenology; in the sense of acculturating it and positioning it coherently in their larger worldview. For Struck, divination in the ancient world, rather than driven by exotic theological commitments, superstitious primitive minds, or political ambitions, is best understood as one such attempt.[89]

Of course, the institutionalization of divination could then serve to regulate it, make it socially useful. But in shifting the causal emphasis to underlying characteristics of human cognition, the

[86] "Because of globalization, it is especially important that we understand now the different worlds that humans have created – the physical worlds (e.g., cities, markets, architecture), the institutional worlds, the social alliances, and the mental maps of the world – before they become much more homogenized." Paul Rozin, "The Weirdest People in the World Are a Harbinger of the Future of the World," *Behavioral and Brain Sciences* 33, no. 2–3 (June 2010): 108–9. See also: Rumen I. Iliev and Bethany 1. Ojalehto, "Bringing History Back to Culture: On the Missing Diachronic Component in the Research on Culture and Cognition," *Frontiers in Psychology* 6 (May 27, 2015).

[87] Peter T. Struck, *Divination and Human Nature: A Cognitive History of Intuition in Classical Antiquity* (Princeton, NJ: Princeton University Press, 2016), 8–9.

[88] what we might nowadays call intuition, i.e. knowledge not obtained via conscious, discursive thought processes.

[89] For a similar perspective on Stoicism, see : Thomas Habinek, "Tentacular Mind: Stoicism, Neuroscience, and the Configurations of Physical Reality," in *A Field Guide to a New Meta-Field*, ed. Barbara Stafford (Chicago: University Of Chicago Press, 2011), 64–83.

socio-political and theological dimensions appear as epiphenomenon, and local language formalizing a durable human experience, respectively. The details of the argument are for his fellow classicists to judge. The example is simply meant to highlight how the appeal to universals, when understood at the right level, can be the opposite of reductive or flattening. Rather, it can serve to reveal surprising parallels, counteract presentist readings, help us "work through the powerful observation that rationality has a history, and [realize] a deeper understanding of cultures whose notions of it are not always isomorphic to our own."[90]

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Once a reliable consensus is reached on the existence of a universal, it ought to constrain any historical analysis in which it is implicated. Considerable scientific consensus surrounds two features of race. One, race is not a biologically significant category.[91] Two, we have an innate cognitive predisposition to essentialize, i.e. attribute species-like properties to, human subgroups.[92] Consider both, for the sake of argument, established. An upshot for historians most likely to be emphasized by critics of 'postmodernism': interpretations that hold 'race' to be a modern invention (prominent e.g. in post-colonial theory) are untenable, and ought to be dropped or revised. Failure to do so warrants a disqualification from the shared space of reason: "[t]hose who jettison the epistemological standards of science are no longer in a position to use their intellectual product to make any claims about what is true of the world or to dispute the others' claims about what is true."[93]

Must one choose between being unhistorical or unreasonable? Only when universality is targeted on the wrong level of analysis. Both extremes – 'we have all, always, already been racist' and 'racism is a modern Western invention' – are unhelpful, because unlikely. Psychologists studying categorization have tended to discount or ignore social or cultural factors in favor of two more straight-forward causes: the nature of human cognition, and the nature of the world. Machery and Faucher, like many advocates of cognitive-evolutionary approaches to the study of culture, do not espouse such a simplistic opposition, and instead promote aligning their approach with literature on social construction.[94] The motivation is not empty diplomacy, but empirical necessity. Only two things are clear: one, classification of humans on the basis of phenotypic properties is wide-spread all over the world to an extent that suggests the existence of a universal cognitive system. Two, intra- and inter-cultural variability suggests it is not, in the above terminology, an accessibility universal.

[90] Struck, *Divination and Human Nature*, 14.
[91] R. C. Lewontin, "The Apportionment of Human Diversity," in *Evolutionary Biology* (Springer, Boston, MA, 1972), 381–98.
[92] FranciscoJ GilWhite et al., "Are Ethnic Groups Biological 'Species' to the Human Brain? Essentialism in Our Cognition of Some Social Categories," *Current Anthropology* 42, no. 4 (2001): 515–553; Leda Cosmides, John Tooby, and Robert Kurzban, "Perceptions of Race," *Trends in Cognitive Sciences* 7, no. 4 (April 2003): 173–79.
[93] Jerome H. Barkow, Leda Cosmides, and John Tooby, eds., *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (New York: Oxford University Press, 1992), 22.
[94] "Many contemporary theories of racial categorization are encompassed by two research traditions — social constructionism and the cognitive cum evolutionary approach. Although both literatures have plausibly some empirical evidence and some theoretical insights to contribute to a full understanding of racial categorization, there has been little contact between their proponents." Edouard Machery and Luc Faucher, "Why Do We Think Racially? A Critical Journey in Culture and Evolution," 2004; David Sloan Wilson, "Evolutionary Social Constructivism," in *Literature and the Human Animal*, ed. J. Gottschall and D. S. Wilson, 2005; Bradley Franks, "Social Construction, Evolution and Cultural Universals," *Culture & Psychology* 20, no. 3 (September 1, 2014): 416–39.

The relevant questions are not 'does a racial module exist?' but 'what are its building blocks, what mechanisms underlie it, what are the associated patterns of reasoning, which variables affect its development?' On all of these there is controversy in the cognitive science community.

To contribute to the debate, historians must be willing to draw explicit distinctions between *concepts* of race, on the one hand, and *content and origin* of a racial 'module', on the other.[95] Historical, like other comparative, studies can serve as legitimate tests of universality hypothesis only to the extent that variation in (or even the absence of) explicit racial *concepts* is not interpreted as counter-evidence to racial *cognition*. A crucial insight of evolutionary cognitive science is that *bad* folk science may in fact be *good* epistemology.[96] Even if something does not exist as a feature of the real world (i.e. biological race), there might still be evolutionary reasons why it exists as a feature of our cognition, in such a way as to underlie the manifest variety of conceptualizations, and persist despite our deliberate interventions. Justin Smith's two-dimensional historical analysis of Blumenbach's racial theory corroborates this evolutionary-cognitive hypothesis:

> at the height of the modern taxonomic project, he continues the taxonomic project at the subspecies level in the case of human beings, thereby implying that there are real or natural boundaries between subspecies kinds, even as he denies that the sort of features that make inter-species boundaries real arise at the subspecies level. Blumenbach picks out, and names, the races of men, even as he deprives them of the features that he explicitly cites as making species real.[97]

Such a reading contradicts the social-constructionist supposition that what exists as feature only of the human, not the physical, world must have been (deliberately) 'invented'. The fear of reductionism and historical flattening can be mitigated by taking to heart the above distinction: conceptualizations are multi-dimensional formations and are *not* exhausted by a single cognitive system. As Struck's take on divination goes some way to illustrating, anchoring historical analysis to an evolutionary-cognitive argument serves to rule out rival hypothesis and reveal the continuity underlying manifest variation, not replace all meaningful questions about the contingent aspects of historic change. So far, this dovetails quite neatly with the nativist vision of cognitive history. But to think it sufficiently addresses the constructivist argument is to squarely miss its concern. To be a social constructionist about *X* is to hold that: "*X* need not have existed, or need not be at all as it is. *X,* or *X* as it is at present, is not determined by the nature of things; it is not inevitable."[98] Such an evolutionary cognitive argument still reeks of determinism.

Advocates of nativist cognitive history reach for two conciliatory strategies. While, yes, more of history is amenable to science than meets the traditional historian's eye, much will remain safely outside its scope, e.g. by virtue of sheer complexity or the role of accident.[99] Moreover,

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[95] The degree to which supposedly empirical disagreement between evolutionary psychology and social constructionism on universality vs. locality is generated by an unarticulated difference in the theories of meaning and reference adopted should not be underestimated, though Mallon and Stich might be overestimating it when they argue that resolving it will dispense with the entire debate. Ron Mallon and Stephen P. Stich, "The Odd Couple: The Compatibility of Social Construction and Evolutionary Psychology," *Philosophy of Science* 67, no. 1 (2000): 133–54.

[96] Edouard Machery and Luc Faucher, "Social Construction and the Concept of Race," *Philosophy of Science* 72, no. 5 (2005): 1214.

[97] Justin E. H. Smith, "'Curious Kinks of the Human Mind': Cognition, Natural History, and the Concept of Race," *Perspectives on Science* 20, no. 4 (October 15, 2012): 525.

[98] Ian Hacking, *The Social Construction of What?*, 8. printing (Cambridge, Mass: Harvard Univ. Press, 2001), 6.

[99] "I, in no way, mean to suggest that cognitive historicizing can or should replace traditional historical methods." (p.168) and "explanations for historical events and change cannot, of course, ever be reconstructed with certainty from among the range of possibilities these sets of variables allow. This is not only because of the complexity of these variables and the number of their possible

> [i]n addition to employing cognitive insights and models in their historiographical work, historians of religion can productively participate in the cognitive project generally, by assessing the 'real-life' validity of cognitive models. After all, if behavioral and cognitive defaults identified by evolutionary psychologists and cognitive scientists are, in fact, panhuman proclivities, then their effects should be readily documented from what is known from the entire deep history of *Homo sapiens*.[100]

These strategies rely on at least three assumptions that I have sought to problematize.[101]

(1) *The demarcation of science (universal laws) from history (contingent circumstances*). Evolution introduces a historical element into biology such that contingencies are *part of* evolutionary explanans.[102] The unparalleled complexity of human developmental processes does not free us from genetic constraint, but does give rise to the 'gloomy prospect' – a methodological nightmare ripe for cognitive historical exploration.

(2) *The independence of theory and observation*. Finding historical evidence consistent with a theory does not allow assessing its validity unless it simultaneously tests the fit with competing models. As a result, cognitive history faces a trade-off: it can opt for the high heuristic cash-out of anchoring historical analysis in nativist models but resolve to a largely derivative role with respect to cognitive science. Conversely, contributing a truly historical perspective to the cognitive scientific project comes at the cost of hermeneutic ambivalence. Where the distributed cognitive ecologies framework is of limited appeal outside work on online cognition, EES picks up the thread.

(3) *A one-dimensional understanding of psychological universals.* A layered taxonomy of universals holds promise as a productive platform on which to integrate and counter-balance the empirical and theoretical claims of conflicting research traditions. The assumption of an evolved cognitive disposition may often be the more plausible and parsimonious, but the presumption of universality, innateness, phylogenetic constraint comes with characteristic limitations: postulated modules are underspecified, theories underdetermined by empirical evidence, and minority answers neglected as noise. Individual, i.e. intra-cultural, differences can cast crucial light on which inputs affect development, inter-cultural difference on variables affecting salience and distribution.

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relationships, but also because much history is a consequence of accident." (p.167) Martin, "The Future of the Past: The History of Religions and Cognitive Historiography," 168.

[100] Ibid., 167.

[101] There are grounds for optimism about these critiques penetrating the discourse of those at whom they are directed. Edward Slingerland cites the inadequate appreciation of these staples of philosophy of science by working scientists and 'first-generation' proponents of consilience as a major motivation for a second wave. "[O]ne of the more puzzling features of the modern academy is that philosophy of science is pursued almost exclusively in humanities disciplines, with most working scientists pursuing their research in blithe unawareness of the developments in philosophy of science in the past several decades that has fundamentally questioned old-fashioned, positivistic models of scientific inquiry. For instance, since at least the early 1970s it has become widely recognized that scientific theory and observation are inextricably intertwined, and that the positivistic ideal of a perfectly corroborated theory is a chimera. Too many working scientists today nonetheless continue to evince an overoptimistic faith in the scientific method as an infallible and direct route to 'truth,' an attitude that can blind them to problematical assumptions or culturally specific elements that may be distorting their results." Edward Slingerland, "Toward a Second Wave of Consilience in the Cognitive Scientific Study of Religion," *Journal of Cognitive Historiography* 1, no. 1 (January 23, 2014): 31.

[102] Griffiths, "The Historical Turn in the Study of Adaptation"; Mitchell, "Integrative Pluralism."

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CONCLUSION

Historical judgment and practice is caught squarely between the competing implications of constructivist and nativist views of the constitution of mind. The appeal to a trans-historical and uniform human mind, such as at the heart of 18th century conjectural history and nativist schools in 20th century sciences of mind, pays clear interpretative dividends.[103] It provides principles with which to interpret, explain, compare, and judge the variety and changes in individual behaviors, social structures and cultural products. It licenses conjecture, i.e. rational reconstruction of the likely state of human institutions or activities in the absence of documentation, and potentially even the derivation of general laws of political and social life from an observation of the variety of human experience. The psychic chasm opened by a radical historicization of the human mind, conversely, destabilizes the very intelligibility of the historical past. Past minds are obscured by the absence and indeterminacy of primary documentation, and even those traces reconstructed by ingenious historical inquiry prove at best equivocal, at worst inscrutable, to modern minds.

I have expressed a number of empirical and conceptual reservations about grounding the cognitive historical research program in purported cognitive universality. None of these caveats where meant to, nor *do*, undermine the possibility of universals, or the promise of aligning textual historical methods with the experimental approaches of cognitive science. They do suggest, however, that a prioritizing cognitive uniformity is to beg the very questions that cognitive history could make vital contributions to addressing, questions about what exactly constitutes our mental and behavioral architecture and how, under what conditions, and to what extent it is historically variable.

[103] Donald Brown goes as far as to argue that the belief in a single human nature was pivotal to the development of a historical consciousness in the first place. History writing thus emerged in Ionian Greece and China, whereas mythical views prevailed in those societies which denied human unity. Donald E. Brown, *Hierarchy, History, and Human Nature: The Social Origins of Historical Consciousness* (Tucson: University of Arizona Press, 1988).

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