The tenacity of the nature/nurture divide

Workshop

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ABSTRACT BOOKLET

Workshop description

For the last 140 years, the formula nature/nurture (Na-Nu) has captured a very basic split in the causal structure we assign to the constitution of the human. The divide determines explanatory strategies in scientific and non-scientific arenas. We capture what human beings (as individuals and as groups) are like by seeing them from the viewpoint of the capacities with which they are thrown into the world (nature, biology, heredity, genes etc.), as well as what the world does to them (nurture, "epi-biology", culture, environment etc.). The Na-Nu distinction is of course one version of a broader complex made up of a set of analogous binary distinctions that for different purposes have been drawn in multiple settings, e.g. nature/culture, natural/artificial, innate/acquired, race/ethnicity, savage/civilized, sex/gender, animal/human etc. All of these have undergone multiple incarnations and have been subject to criticism and constant historical change. During the 20th century and these first years of the 21st, historians and philosophers of biology have been interpreting and problematizing the Na-Nu complex of world making dichotomies. Notwithstanding this longstanding and strenuous critique, the divide has been so entrenched that it always seems to re-emerge at the center of ongoing scientific and cultural debates, and has become one of the central motifs around which the ideological and political clashes of the life sciences has formed. Given the tenacity of the Na-Nu complex, its roots and underpinnings merit a closer look.

To gain a deeper understanding of the tenacity of this binary, we need to contextualize it within a larger time scale, and through different cultures. In the West, the cultural matrixes that define nature in distinction from culture (or the spiritual) reach back before the early Modern era. Comparative work in other non-Western traditions, both ancient and contemporary has pointed to alternative ways of situating and understanding life and bodies in the world.

In a small workshop, which will bring together scientists, historians and philosophers, we intend to revisit the Na-Nu complex from different and complementary angles and to collectively face the questions of where we are standing now and how we got here. Is there something inevitable about our dramatic dichotomous structure? Why does it seem to recur, under ever new shapes, with every new shift in the life and social sciences? Has it progressively weakened under the strain of criticism and alternative frames? Are we witnessing its last incarnations? What would a future conceptual field of humanities and the life sciences look like without such a conceptual and ontological divide?

We will concentrate on five main themes:

(1) Western dichotomous Na-Nu thinking: The history of the nature-nurture distinction can be traced back to Greek philosophy, which contained, in contrast to other cultures, the principle of polarity. What was the function of polarity in its Greek context? What broad effect has this had on our times?

(2) Non-Western alternatives: The contexts of Western science should not occlude the alternatives to that tradition. Are there cultures of knowledge which conceptualise life without using the Na-Nu divide, or used it in a different manner than the Western tradition? While Levi-Strauss has insisted on the universality of the Na-Nu divide, contemporary anthropologists and historians have developed very different views.

(3) Origin and articulation of the Na-Nu complex in the 19th century: Within the local trajectories of Western science, post-Foucaldian histories point to a watershed occurring in the mid-19th century: the construction of a strong meaning for the Na-Nu distinction that fragmented the human field and allowed the conceptualisation of traits in terms of two radically different causal inputs. Twin studies, for example, could be construed as natural experiments that helped sort out the Na-Nu question after an adequate conceptual frame was in place. But was such a break real, or is it a historiographical artifact that hides continuities? In any case, what are the conceptual and cultural factors that moved naturalists, anthropologists, philosophers and others to increasingly believe in the "naturality" of the Na-Nu split? What is the state of the art in historiographical terms, and what are the new directions in the historical perspectives on the origins of nature/nurture as a dichotomy?

(4) The trajectories of the Na-Nu complex in the 20th century: In the early 20th century, different guises and degrees of the nature/nurture dichotomy can be distinguished. What are these degrees and guises of the Na-Nu divide and in which contexts do they appear? Important keywords are, for instance, heritability measures, the concept of the norm of reaction, gene-environment interaction studies. What exactly were the changes in the meaning of the Na-Nu divide, as they were initiated in the 20th century, i.e. in classical genetics, in the modern synthesis, in molecular biology, in our postgenomic period? How have the programs of socio-biology and behavioral genetics, as well as the possibilities of biotechnology, changed the picture?

(5) What does the Na-Nu complex do for us today? Finally, we intend to address contemporary debates and also ask a philosophical question: Should (and *could*) we get rid of the distinction or not? Some contemporary thinkers (e.g. developmental systems theorists) wish to eliminate the distinction, since they claim that it stands in the way of establishing a complexity-oriented and systemic understanding of biological and human realities. Or shall we regard the distinction to be in reality a cluster of useful distinctions that can be further analysed (and not kept lumped together) in order to be replaced, eventually, with more precise analytic ones? Is the issue a methodological one? A metaphysical one? An ideological one? What and where is the negotiating table on which it should be sorted out?

Organizers: Carlos López-Beltrán, Maria Kronfeldner

Abstracts

(Alphabetic list)

Elsdon-Baker, Fern

Weismann's Barrier Revisited: The Role of the Environment in Late Ninetienth Century Thought

Summary:

The term 'inheritance of acquired characters' was used as an umbrella term for much of the 19th century, and into the early 20th century. The term has been used to encompass a number of theoretical mechanisms that included, among other things, the 'effects of external conditions' and the internally driven mechanism of use and disuse. Far from being an idea that was rejected by 'Darwinism', there was considerable debate on all sides about the implications of any potentially heritable effect of the environment for our understanding of inheritance and evolutionary mechanisms. These are debates that were framed by the late nineteenth century interpretation of Darwin's work on heredity – Pangenesis. The response of the early Neo-Darwinians, for example Galton, Poulton and Wallace, to Darwinian Pangenesis has influenced the reception of the 'inheritance of acquired characters', the understanding of Weismann's barrier and the representation of Darwinism to the present day.

Gannett, Lisa

Ontologies of Race and Ethnicity: Intersections of the Biological and the Social

Summary:

From an epistemological perspective, there is an interplay of biological and social assumptions in the construction of racial and ethnic categories of classification, whereas from an ontological perspective, biological and social factors interact in the construction of the racially and ethnically classified things themselves. We can understand this latter process in a couple of ways. First, social factors – differences in language, religion, nationality, etc. – structure the distribution of genes and phenotypes in space and time. Second, biological factors – differences in genes, physiologies, morphologies, etc. – provide materials used to construct social reality.

Scientists and philosophers of science have traditionally dichotomised biological and social causation, associating the biological realm with what is real, autonomous, and irreducible and the social realm with what is ideal, epiphenomenal, and reducible. As a result, in ontological debates about race and ethnicity, there is a failure to theorize the interaction of biological and social factors in any systematic way. There are numerous consequences: race gets defined as biological and ethnicity gets defined as social; a separation is drawn between human and nonhuman realms; bizarre causal explanations are advanced; racially defined social groups are treated as proxies in biomedical research for real but inaccessible biological groups; the "race debate" becomes structured in ways that oppose the biological reality of race to the social reality of race; etc.

In this paper, I compare alternative understandings of the biological, social, and bio-social dimensions of ontologies of race and ethnicity held by those scientists whose contributions served to undermine the sway of 19th-century racial typologies during the 1930s-50: e.g., Hogben, Huxley and Haddon, Montagu, Dobzhansky, Dunn, Penrose, and Boyd.

Hammerstein, Peter

Robustness of Living Systems: A Key to Overcoming the 'Nature-Nurture' Debate

Summary:

Robustness is the ability of a system to maintain functionality across a wide range of operational conditions. Organisms master the delicate control of their development in such a robust way that engineers could only dream of ever designing something like a living system from scratch. This robustness of development makes it possible to conceive of 'nature' despite the fact that many factors other than the genes come into play when organisms develop and perform. In my talk I will elaborate on this basic idea and argue that the concept of robustness also helps us understand the biology of 'nurture'.

Ingold, Tim

Nature-Nurture, Nature-Culture and Culture-Nurture: A Closed Circle and How to Escape From It

Summary:

According to what many students are told is the 'first law of biology', every living organism is a product of an interaction between genes and environment, in which the genes are supposed to furnish the rudiments of organic form, and the environment the material conditions for its realisation. Conventionally, the former comprise the organism's 'nature'; the latter its 'nurture'. Students of anthropology, however, are told that people are distinguished by the superimposition of diverse cultural forms upon the universal bedrock of human nature. Rather than contributing form to the material substance of the environment, nature now reappears as a material substrate for the realisation of ideal form. Advocates of so-called 'dual inheritance' models have sought to resolve the dilemma by drawing analogies between genetic and cultural transmission, thus distinguishing between the informational content of transmitted culture and its material expression in a way that parallels the classic biological distinction between genotype and phenotype. In these models, the two dyads, nature-nurture and nature-culture, are replaced by a triad, nature-culture-nurture. The entailed distinction between culture and nurture is premised on one that is commonly invoked by developmental

psychologists, between social and individual learning. I show that in any real-world context of learning, this distinction is untenable. Learned cultural forms cannot be acquired in advance of the processes leading to their realisation. Exactly the same argument, however, can be applied to the growth of organic form, thus invalidating the notion of the gene as an information carrier. To escape the dilemmas of nature-culture, nature-nurture, and culture-nurture thinking, I argue, it is necessary to abandon the logic of hylomorphism that has been with us since Aristotle, and that imagines every process of development to start with form on the one hand, and matter on the other, and ends in their having been brought together. Whether speaking of humans or non-humans, we have rather to understand form as emergent within processes of growth and development, involving flows of materials and fields of force that cut across any boundary between 'organism' and 'environment'.

Keller, Evelyn Fox

The Mirage of a Space Between Nature and Nurture

Summary:

My focus in this talk is on the particular – and, I claim, fundamentally incoherent – idea that the causes of trait development can be parsed into two categories: nature and nurture. I argue that this notion, persisting in both the popular and technical imagination to this very day, was in fact new to Galton. I further argue that it was spurred in part by particulate theories of inheritance, and attempt to show how it is sustained, again in part, by chronic slippages in the language of genetics.

Klein, Ursula

Nature and Art in History

Summary:

My paper addresses a perennial theme in the history of Western culture, namely the understanding of the relation between nature and art and the ways in which it has affected the sciences and natural philosophy. In today's biotechnology, computer science or synthetic chemistry questions concerning the nature-art distinction would be formulated, for example, in the following way: Was the first sequencing of the genome of, say, yeast a discovery or an invention to be patented? Clearly, such kinds of questions are far from being entirely new; certain aspects of them can rather be traced back to antiquity. Hence, some historians have recently claimed that we are confronted here with a kind of cultural a priori that has affected all forms of Western culture and society on the same fundamental, ontological and epistemological level at all times and places. Alternatively, I argue that the cultural importance and the meaning of the nature-art distinction changed substantially and irreversibly in modernity, compared to the medieval and early modern periods. My argument is evinced by examples from the

history of chemistry, a science that has long been practiced at the borderline of nature and art, or discovery and invention.

Kronfeldner, Maria

Not Dead Yet: The Nature/Nurture Divide Has Survived the Latest Attacks

Summary:

The nature/nurture divide is the hydra of the life sciences. It has many faces and whenever one head is cut off, other heads grow back. In an introductory paper to our workshop, I shall portray the plurality and tenacity of the nature/nurture divide. The aim is not a review of the long history of this grand dichotomy with its many variants. The focus is rather on contemporary science, which provides evidence that the nature/nurture divide is not dead yet. In its latest form, the gene/environment divide, it has survived, for instance, the so-called interactionist consensus, which says that it is always nature and nurture interacting in complex ways to generate specific traits of organisms. It has also survived calls for parity, i.e. that we should give causal parity to all developmental factors. Historically, it even gave rise to a specific form of parity. I shall locate the nature/nurture divide in the midst of a landscape of dualisms, summarize the critique of it, illustrate in which way the nature/nurture divide has survived, and briefly point to some of the reasons why it could do so.

Lloyd, Geoffrey

Nature and Nurture in Greek and Chinese Antiquity

Summary:

I aim to provide some historical background first on how the (multiple) polarities between nature and nurture were used in ancient Greek thought, and secondly to consider the very different ancient Chinese understandings of the important issues. Although there are similarities between the two ancient civilisations (both are very much aware of the diversity of customs among the peoples with whom they were acquainted) the conceptual frameworks within which the Chinese deal with the cosmological, physical, and ethical issues were distinctive, most notably in that – in the absence (as I argue) of an explicit concept corresponding to 'nature', physis or natura as such – they were far less inclined to run those issues together. I hope to show that study of the ancient materials can serve to clarify some aspects of the problems that we continue to face today.

López-Beltrán, Carlos

Galton's Heritage

Summary:

I will in this talk follow the metaphoric drive that lead British 19th century thinkers towards a reductionistic elitist rearrangement of causal dependencies for mental and psychological features, finally establishing, in Francis Galton's hereditarian notions very strict limits for equalitarian educational programs and hygienist environmental views on bettering human beings. Within the wide frame of anthropological, medical and psychological discussions I will show how Galton's convictions were sustained in the fixing of a few simplistic and powerful metaphors in which complex causation was redescribed in a simple dualistic fashion. The appearance of objectivity through statistically founded arguments followed. I will finally make some points about the long durée site of this development and its consequences for genetics.

Navarrete, Federico

Beyond Nature and Nurture: Amerindian Perspectives and Relations

Summary:

This paper seeks to explore the way in which the distinction between culture and nature has been applied in key junctures in the social, ecological and political interactions between Amerindian and European societies in the past five centuries. My aim will be to propose a new way of understanding the interactions between these groups, and the interethnic relations built upon them, that takes into account their different, and often conflicting definitions, of the boundary of their communities, and of the existence, or not, of a natural realm beyond such boundaries.

My contention will be that from the Western point of view, the naturalization of key aspects of Amerindian communities has been a highly successful tool for the imposition of different kinds of domination by European and later national agents. On the other hand, Amerindian groups have often interacted with European "others" utilizing concepts, and techniques, that were originally used to interact with non-human agents. Therefore, the definition of "nature" has been a highly charged political and historical construct, resulting from the complex and conflictive interaction between these groups and their perspectives.

In this exploration I will utilize both historical material, regarding the evolution of interethnic relations in the continent and of the conceptions of nature, from Pre-Columbian times to the present, and anthropological information and theory, since the most innovative reflection on these matters has been carried out in that field.

Turkheimer, Eric

The Gloomy Prospect Wins: Statistical Significance and Population Stratification in Genome Wide Association Studies

Summary:

The contemporary era has seen a convergence of genomic technology and traditional social scientific concerns with complex human individual differences. Rather than finally turning social science into a replicable hard-scientific enterprise, genomics has gotten bogged down in the long-standing frustrations of social science. A recent report of an extensive genome wide association study of human height demonstrates the profound difficulties of explaining uncontrolled human variation at a genomic level. The statistical technologies that have been brought to bear on the problem of genomic association are simply modifications of similar methods that have been used by social scientists for decades, with little success. The motivation for the statistical methods in genomics is the same as it is in traditional social science: An attempt to discern linear causation in complex systems when experimental control is not possible.

Williams, Elizabeth

Appetite, Innate or Learned? The Nature-Nurture Divide in the Science of Appetite, 1850-1950

Summary:

From the late Enlightenment onward students of human physiology frequently observed that few functions were more obscure and resistant to understanding than ingestion and digestion. In company with efforts to illuminate those functions investigators in a range of fields undertook inquiries intended to explain the nature and working of appetite, either independently or as a weaker version of the "strong" phenomenon of hunger. This paper focuses on work undertaken between roughly 1850 and 1950 within physiology, psychology, and general biology to define and explicate the appetite for food. In the same period appetite came to be the central element of new disease entities marked by under-eating, over-eating, and other aberrant patterns of ingestion, some of which stabilized in time as the "eating disorders" of modern medicine. Having surveyed successive scientific constructs of appetite, I then trace changing medical views of appetite elaborated amid clinical study and treatment of the new disease anorexia nervosa.

In the conclusion I explore the ways in which the Nature-Nurture dichotomy functioned throughout this period as a more or less inescapable determinant of medical investigation and practice, one that encouraged physicians to approach anorexia within compartmentalized theoretical frameworks that, each in its time, enjoyed the prestige of state-of-the-art scientific inquiry but that tended to devalue and undercut the peculiar insights of clinical medicine.