

The next science of humankind

Myths and histories of the Neurosciences

Jean-Gaël Barbara & Fabio de Sio

5th Conference of the European Society for the History of Science
Athens, 1-3 November 2012

Session 25, The next science of humankind. Myths and histories of the Neurosciences,

According to the Oxford English Dictionary, the term “Neurosciences” made its appearance only fifty years ago, in the first issue of the “Neurosciences Research Program Bulletin”. Like other scientific revolutions of the XX Century (most notably cybernetics and molecular biology), the Neurosciences were born as a substantially interdisciplinary and international endeavour, through the cooperation of scholars of diverse origins (from zoology to computer science, from psychology to biochemistry) and provenance.

The early historical overviews of the field point at some main features of its development: the importance of technological advances; the role of simple models (conceptual, physical and animal) in bridging of gaps between previously unrelated phenomena and perspectives; the intrinsic interdisciplinary and variously reductionistic nature of the field and, finally, its cultural relevance as the possible cornerstone of a general unified science to come, a science attacking “the ultimate goal of all science and philosophy –how does the mind/brain work!”.

To a certain extent, the recent historiography of the neurosciences seems to have taken the bulk of those claims at face value, in diverging ways and with specific agendas, i.e., in order to substantiate them, sanctifying the stillborn science, or to disprove or contextualize them, showing how certain concerns, visions, ways of knowing and doing found their underpinnings at a deeper social, political or ideological level. With few meaningful exceptions, the present mainstream view of the neurosciences qua multidisciplinary approach to the mind/brain/behaviour has informed the relative historiography and philosophy, especially as regards the concern for a feared appropriation of the question of human nature, behaviour and values.

The papers in this session aim at questioning the neurosciences as a unified approach to the mind/brain historically, i.e. by contrasting the multi-faceted and diverging histories of the neurosciences with the myth of THE Neurosciences. A historical gaze on the contingency of the development and definition of the neurosciences may contribute to the appreciation of the actual heterogeneity of the field (in terms of practices, systems, rationalities, philosophical claims) and of its cultural value at large.

- 1 Anna Perlina “Deconstructing the Science of Mind: Interdisciplinary Roots of Neurosciences at the Example of Gestalt Psychology in the Weimar Academic Culture”
- 2 Fabio de Sio “Doctrinal disputations. Brain, the unicity of man and the origin of the neurosciences”
- 3 Marjorie Lorch “Glimpses of early cognitive neuroscience.”
- 4 Cornelius Borck “Local Currents in Transnational Mediation”
- 5 Max Stadler “Of Peripheral Things. Or: de-centring the brain in the story of neuroscience”
- 6 Marek Havlik “Paradigms” and “Too Soon Ideas” in the history of neuroscience.
- 7 Brian Casey “Promissory Materialism” and the Limits of the Neurosciences

Deconstructing the Science of Mind: Interdisciplinary Roots of Neurosciences at the Example of Gestalt Psychology in the Weimar Academic Culture

Nowadays, Neurosciences is a research domain laying at the intersection of a number of disciplines, including psychology, philosophy, neurobiology, computer science etc. Interdisciplinarity is probably the most obvious and striking characteristics of this field of research. Against this background, my contribution explores the roots of Neurosciences and traces them back to the constitution of the psychological discipline in Germany before World War II. In the Weimar academic culture, experimental Psychology was nourished not only by philosophical and physiological impact but also by the then-flourishing natural sciences, particularly physics. I demonstrate that interdisciplinarity was an inherent feature of Psychology, the “parent discipline“ of Neurosciences, as early as in the 1920s. Particular attention is paid to the Gestalt school of psychology that was one of the most successful and influential psychological schools of the Weimar period. Most importantly, however, the Gestalt psychologists – Max Wertheimer, Wolfgang Köhler, Kurt Koffka and Kurt Lewin – developed a holistic psychological agenda, which was eclectic in theory and experimental practice. I take a close look at the work of Kurt Lewin, tracing his concepts and research practices of the 1920s and 1930s up to its interdisciplinary origins. Eventually, my contribution treats the diversity of the “Science of Mind” at the level of its conceptual structure. Focusing upon the example of Lewin’s work, I show how interdisciplinary conceptual bricks were integrated into one sophisticated system of concepts and made instrumental for research on mind and behavior.

Anna Perlina

Doctrinal disputations. Brain, the unicity of man and the origin of the neurosciences

Doctrinal disputations. Brain, the unicity of man and the origin of the neurosciences.

Fabio De Sio

Institut für Geschichte der Medizin, Uniklinikum Dusseldorf

Despite their relatively young age, the modern Neurosciences have acquired in the past decades a central stand in contemporary biomedicine, branching out in innumerable fields (like economics, aesthetics, religious experience etc.) traditionally considered a reserve of the human sciences. This was perceived by some as a sort of cultural imperialism, an attempt at reducing the ineffable mystery of being human to a matter of neuronal connections and membrane potentials. The term “Brainhood” was coined to indicate the “anthropological figure” resulting from the reduction of the living subject to its brain. By exploring some of the early history (1940s-1960s) of modern Neuroscience in Great Britain and the USA, this paper aims at sketching a story parallel to that of the progressive neuralization/naturalization of behaviour. The paper will focus on some early controversies over the nature and causes of human behaviour, and especially on the question of the difference between humans and the rest of the animals, paying attention to the gradient of positions between the outspoken fideistic denial of the brain/self identity (e.g. JC Eccles, D.M. McKay) and the other extreme, the attempt at building mechanical models of the brain and of behaviour (e.g. J.Z. Young). Inbetween the extremes lie a series of ideological, epistemological and methodological stands (as expressed in the interest for the neurological correlates of religious experience or for ESP) that complicate the monolithic picture of the sciences of the brain, while showing all the complexities of their cultural descent.

Fabio De Sio

Glimpses of early cognitive neuroscience.

This paper will consider the interdisciplinary meetings of clinicians, experimentalists and theoreticians investigating the brain mechanisms underlying language which took place in the 1950s-1960s. There were a number of interdisciplinary meetings in this period which explored questions regarding the relation between developments in linguistics and language science to those in psychology and neurology. These were funded by and located in a number of universities and foundations, which linked people doing animal experiments and those working with neurological patients. The intention was to create and facilitate a network of people which converging interest in shared research questions but employing diverse methodologies. One outcome was the founding of the Academy of Aphasia which was a closed group made up of equal numbers of clinicians, therapists and scientists. Another was the establishment of new interdisciplinary research groups including those within the Veterans Administration Medical Centers in the USA to deal with the growing groups of patients with neurological disorders, notably the Aphasia Research Group in the Boston. At the same time several new journals were founded to provide publication outlets for this new community of research such as *Cortex* and *Neuropsychologia*. This period saw the creation of a diverse community of scholars with a new focus in cognitive neuroscience.

Marjorie Lorch

Local Currents in Transnational Mediation

The sciences are auto-critical practices that derive some of their productivity from divergent specializations and local specificities, allowing for ever new approaches and unexpected turns. This applies particularly to the neurosciences, a declaredly interdisciplinary field from the beginnings. Building on the historical case study of different lines of electrophysiological research that were united by the employment of a particular technology, electroencephalography, the paper addresses the more general question how instruments and media participate at the shaping of research objects and the generalizations derived thereby. This case study shall then serve as platform from where to investigate in a comparative fashion how current work in the neurosciences uses the singular of “the brain” as a unifying linguistic tool for, de facto, a diversification of research: Under the disguise of the singularity of “the brain,” the neurosciences dismantle a supposedly unified entity into a myriad of experimental objects, research targets, brain states, detection data, observed phenomena, etc. Finally, the question will be addressed whether internationalization and standardization do not generate a homogenization or unification of research in the neurosciences but participate at the rapid turnover of the entire field in an ongoing adaptation to ever new research opportunities under maintenance of a more and more fictitious entity, the brain.

Author(s)

Cornelius Borck

Of Peripheral Things. Or: de-centring the brain in the story of neuroscience

Historiographically speaking, histories of the neurosciences usually, typically, and at times very programmatically so, are stories of the brain: today, it is the brain (rather than any other old organ) that will serve to - whatever the case may be - celebrate, castigate, frame, or (at its best) historicize our own, contemporary condition: a condition that has everything, or at least a lot, to do with the brain – and its science. This at any rate is a notion that would appear quite inescapable for anyone drawn, in some capacity or another, to the multiplying discourses surrounding this (according to some) science of the 21st century. And certainly the histories of neuroscience that we tell, or that are being told, tend to suggest this much, whether your choice is academic or not-so-academic history, whether you turn to wikipedia or BBC 4: it's primarily the central nervous system that will be featured and, by implication, such grandiose topics as language, memory, mind and human nature. Indeed, while the genesis of the twentieth-century neurosciences remains a largely uncharted territory, when it comes to accounting for how we may have arrived here, in a world that so seemingly is, or will soon be replete with neuroscience's profoundly biological vision of human nature, not unlikely that the answer will be: we've been here before, we've already lived through so many cultures of the brain or "neuro-cultures". You name it: the heretic doctrines of a Descartes or de La Mettrie; the rise of the "double brain" in the Victorian era; the spread of biopsychiatry in Wilhelmine Germany; the origins of the EEG in the interwar period; the stories of lobotomy, of psychopharmaceuticals or of the confluence of computational machinery and minds in the 1940s and 50s. This paper, by way of highlighting the scientific, social and cultural significance of the peripheral nervous system in the interwar period, aims to press the point that thinkers of neuroscience might do well in thinking twice before entangling (the history of) neuroscience too emphatically and exclusively with the story of the brain, mind, human nature and, indeed, of 'culture'. Such framings, as I shall argue, all too easily become complicit with the neuro-scientific discourses they profess to critically engage, reproducing, rather than questioning, the dramatic (or anti-humanistic) categories prescribed by today's neuro-discourses themselves.

Max Stadler

“Paradigms” and “Too Soon Ideas” in the history of neuroscience

Paper focuses on the philosophy and history of neuroscience. It explores two important paradigms that ruled the neuroscience for many years and were recently disproved. And paper also explores thoughts that tried to disprove these paradigms in their own time. These “too soon ideas” were immediately disqualified and even ridiculed. Now these ideas are considered as ones of the main focuses in contemporary neuroscience.

Paper has two parts – each for one paradigm. Two pursued paradigms are – “No new neurons” and “Brain is reflexive instrument.”

First paradigm is focused on the creation of new neurons in the brain - neurogenesis.

Paradigm thought until 1990 was centrally that “no new neurons” can be added or created in the mammalian brain. Contemporary neuroscience now stands against these thoughts and accepts that brain has the ability to create new neurons. “Too soon idea” that disagreed with paradigm of “no new neurons” was brought by Joseph Altman but his results and theories were ignored under the pressure of textbooks and academic majority that supported “no new neurons” paradigm.

Second paradigm is focused on reflexive and responsive powers of the brain. This paradigm held until the year of 2001. Marcus Raichle discovered the Default mode of brain function, vastly known as Default mode network or DMN. This idea brings the new paradigm in the field of contemporary neuroscience and tells that brain is working all the time. “Reflexive instrument” paradigm thought that brain and its parts are activated mainly for reacting and responding to the environment. “Too soon idea” (1929) that disagreed with reflexive paradigm was brought by Hans Berger inventor of electroencephalogram. His idea was based on the readings of alpha waves that are present in the resting state (also as DMN activations). Berger’s ideas were also ignored and even ridiculed.

Marek Havlik

“Promissory Materialism” and the Limits of the Neurosciences

At the end of the twentieth century “consciousness” became a neuroscientific problem. Advances such as brain imaging technologies have blurred the lines between scientific investigation and philosophical inquiry. For many observers, cognitive science has raised profound questions about the nature of the human person, most fundamentally, whether belief in an immaterial, immortal soul is irrational in the wake of the progress of the neurosciences. Despite winning a Nobel Prize for elucidating mechanisms of neuronal communication, the Australian neurophysiologist John Carew Eccles (1903-1997), waged a public battle against what he referred to as “Promissory Materialism,” the belief that science would someday explain all there is to know about humanity. Eccles became a scientist to discredit the notion that the mind is reducible to brain anatomy and physiology, that “mind” is another term for what the brain does. Exploiting Karl Popper’s revolutionary ideas about the nature of science, insights he claimed helped guide him through a great scientific debate, Eccles shocked his colleagues by proposing (with the blessing and assistance of Popper) evolving neo-Cartesian dualist models of brain/mind interaction that incorporated the religious concept of a soul. In spite of — and, indeed because of — the disbelief of modern scientists and philosophers of mind, Eccles embarked on his mission to defend the notion of “the ghost in the machine.” Guided by Popper, Eccles challenged from within neuroscientists’ materialist presumptions and offered an understanding of science as open to metaphysical speculation. Eccles and Popper’s widely-disparaged work, *The Self and Its Brain* (1977), helped force a discussion among scientists and philosophers about the ontology of modern science. This talk seeks to open discussion about the changing metaphysics of the neuroscience community through analysis of the reaction to Eccles’ project and the changing alternative models of the mind proposed by Eccles’ colleagues and philosophical opponents.

Brian Casey