

Steps towards a *Critical Neuroscience*

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ABSTRACT

This paper introduces to the motivation and idea behind recently founded interdisciplinary initiative *Critical Neuroscience* (www.critical-neuroscience.org). *Critical Neuroscience* is an approach that strives to understand, explain, contextualize and, where called-for, critique developments in and around the social, affective and cognitive neurosciences with the aim to create the competencies needed to responsibly deal with new challenges and concerns emerging in relation to the brain sciences. It addresses scholars in the humanities as well as, importantly, neuroscientific practitioners, policy makers and the public at large. Does neuroscience indeed have such wide-ranging effects or are we collectively overestimating its impacts, at the expense of other important drivers of social and cultural change? Via what channels is neuroscience interacting with contemporary conceptions of selfhood, identity, and well-being? Importantly, *Critical Neuroscience* strives to make the results of these assessments relevant to scientific practice itself. It aspires to motivate neuroscientists to be involved in the analysis of contextual factors, historical trajectories, conceptual difficulties and potential consequences in connection to their empirical work.

This paper begins to spell out a philosophical foundation for the project by outlining examples of the interaction taking place between the neurosciences and the social and cultural contexts in which they are embedded, and by exposing some of the assumptions and argumentative patterns underlying dominant approaches. Recent anthropological work will be discussed to convey a sense of the *de facto* interactions between neuroscientific knowledge, its promissory projections and the self-understandings of laypeople. This can be seen as a first step towards a phenomenology of the “seductive allure” that the neurosciences are exerting upon both the academic and the popular imagination.

Keywords

Neuroscience; Critique; Normativity; Anthropology; Capitalism

1. Why we need a Critical Neuroscience

Talk of revolution is in the air. This time, we are told, it is a technoscientific revolution of our understanding of man: the Neuro-Revolution. The cognitive, affective and social neurosciences and the rapidly emerging hyphenated “neurocultural” disciplines (neuro-education, neurolaw or neuro-theology, to name just a few) are increasingly amassing resources and attention.¹ In the academic and popular literature we often find the conviction that quite soon scientific approaches to the human brain will transform or even supersede cultural, philosophical, literary or ‘folk’ explanations of human phenomena.² The neurosciences are bringing upon the horizon new technologies that are mobilized in the name of educational improvement, treatment, illness prevention and security: new pharmaceutical drugs, brain-based methods to boost intelligence, attention and happiness as well as screening devices with potentially wide-ranging medical, civil and military uses. New programmes designed to screen for neuroscientifically identifiable *biomarkers* in the areas of mental health, the law, and education are founded upon the hope that neuroscience will soon enable reliable early detection of problematic traits and conditions (Singh & Rose 2009).

This trend raises several concerns. Vivid depictions of the new brain sciences in the media and popular writing, often in the form of a futuristic discourse of promise and progress, increasingly lead to the incorporation of neuroscientific claims and language into laypeople’s self-understanding. There seems to be a readiness and even ‘hunger’ for self-objectification that is not easy to explain. These trends are strengthened by the tendency that neuroscientific claims and explanatory patterns are often treated as authoritative – likely because of their alleged “hard” scientific validity –, even with regard to important normative questions in the

¹ I use ‘cognitive neuroscience’ in a broad way to denote all those neuroscientific approaches and subfields that deal more or less directly with higher-level mental and behavioural phenomena *in humans*. Thus, ‘cognitive neuroscience’ as understood here encompasses fields such as social, affective and also the newly emerging cultural neuroscience. If not explicitly stated otherwise, unqualified uses of the term ‘neuroscience’ in this paper are meant to refer to cognitive neuroscience in this broad sense.

² Just a small selection of publications that make some noise about an alleged “neuroscientific revolution”: Edelman (1992), Crick (1994), Churchland (2002), Zeki (2008), Metzinger (2009). Much more material from surprisingly diverse areas can be obtained by typing “neuroscientific revolution” into an internet search engine such as Google.

domains of morality, ethics and social policy. This happens despite the fact that many of the experimental results and their theoretical articulations are unstable and provisional at the current stage of development in brain research. A related concern is the increasing push towards early and potentially premature application of brain-based technologies, especially when these might affect important aspects of the personality – examples are fMRI-based lie detection, brain “fingerprinting” or other forms of neuronal screening or new drugs that enhance or alter mental capacities.

Critical Neuroscience is an approach that attempts raise awareness of and to better understand, explain, contextualize and, where called-for, critique these developments with the aim to create the competencies needed to responsibly deal with the concerns hinted at above.³ It addresses scholars in the humanities as well as, importantly, neuroscientific practitioners, policy makers and the public at large. What is going on in and around contemporary neuroscience that potentially affects society in significant ways? Does it indeed have these wide-ranging effects or are we collectively overestimating its impacts, at the expense of other important drivers of social and cultural change, such as, for example, developments in the capitalist economy? How and via what channels is neuroscience interacting with contemporary conceptions of selfhood, identity, and well-being?⁴ What are the predominant ‘styles of thought’ that have emerged in and around the neurosciences and in the new hyphenated “neuronal-” disciplines?⁵ And not least: how is neuroscience institutionally and politically entangled with powerful agents such as pharmaceutical companies, funding agencies, policy makers etc.⁶

³ For an initial outline of the project’s aims and structure, see Choudhury, Nagel, & Slaby (2009). A collection of essays on Critical Neuroscience is scheduled to come out in early 2011 at Wiley-Blackwell, see Choudhury & Slaby (*forthcoming*). The project is in full swing as an independent research and project group operating from Berlin, Germany. See www.critical-neuroscience.org.

⁴ On this, see Dumit (2004), Rose (2006), and Joyce (2008).

⁵ That it is no longer a style of blatant neuronal reductionism and methodological individualism is persuasively argued by Pickersgill (2009). See also Abi-Rached & Rose (2010).

⁶ More on this in Choudhury, Nagel, & Slaby (2009).

As a further step, *Critical Neuroscience* strives to make the results of these assessments relevant to the practice of cognitive neuroscience itself. What difference would it make to scientific practice if neuroscientists themselves were involved, from the outset, in the analysis of contextual factors, historical trajectories, conceptual difficulties and potential consequences in connection to their work? The hope is to engage in collaborations focused on specific themes of societal relevance: for examples inclusive studies of mental illnesses such as depression, the investigation of social pathologies of various kinds (such as alienation in work and life environments, violence, attention problems), or ideas and popular conceptions of well-being, to name just a few. These phenomena call for neuroscientific approaches, but they have to be investigated from much more inclusive, multi-level perspectives.

In this paper I begin to lay a philosophical foundation for the project by outlining a few examples of analyses of interaction taking place between the cognitive neurosciences and the social and cultural contexts in which they are embedded, and try to hint at some of the assumptions and argumentative patterns underlying the dominant approaches. To set the stage, I briefly introduce Ian Hacking's account of how scientific classifications have the power to 'make up people' and suggest that today, the neurosciences and brain-oriented approaches importantly contribute to this often complex and opaque process. This makes today's neurosciences in their various institutional settings and social contexts an important object of inquiry. In the final part of the paper, I describe anthropological work that conveys a sense of the *de facto* interactions that take place between neuroscientific knowledge, its practices and promissory projections and the self-understandings of common people. This can be seen as, among other things, a first step towards a phenomenology of the appeal, or even "seductive allure" (Skolnik-Weisberg et. al. 2008) that the neurosciences are exerting upon both the academic and the popular imagination.

2. ‘Making Up People’ and the Hidden Anthropology of the Neurosciences

According to Ian Hacking, science, medicine, education, and other areas of social practice and policy have, to some extent, the capacity to ‘create’ kinds of people. Not by magic, but by establishing classifications that interact with the people so classified and their respective surroundings. *Interactive kinds* are classifications taken up into the self-understanding of those subject to these classifications. These processes can lead to the emergence of new practices, new alliances, new institutions that interact in various ways with the persons in question. Hacking’s term for this is ‘classificatory looping’. Upon being classified in a certain way, a person, by enacting the classification, can turn into a proper instance of the category in question. But it can also work in the other direction and *falsify* an initially adequate classification, in case the people so classified respond by changing their behaviour in relevant ways. The process is complex and involves much more than an idea being voiced or a concept applied. What results can be a new type of person in a new ‘niche’ – literally an ‘ecological niche’ – in which a new way of being a person is sustained (Hacking 1998, 13).⁷ Among the most prominent examples are many concepts of mental illness: 19th century hysteria, multiple personality disorder, mad traveling, anorexia, attention deficit hyperactivity disorder (ADHD), depression, and so on. But also social categories such as ‘homosexual’, ‘hyperactive child’ or ‘juvenile delinquent’ are examples of interactive kinds. Importantly, the interaction in questions occurs within the framework of institutions and practices surrounding the people so classified. Classifications, when they stick, are richly situated materially and institutionally – they come packaged with practices, regulations, tools and policies.

From this it should be clear that scientific classifications could have significant social and policy implications. Take ADHD. Since this category has been established we have

⁷ “I argue that one fruitful idea for understanding transient mental illness is the ecological niche, not just social, not just medical, not just coming from the patient, not just from the doctors, but from the concatenation of an extraordinarily large number of diverse types of elements which for a moment provide a stable home for certain types of manifestation of illness” (Hacking 1998, 13).

witnessed specific treatments being administered, behavioural regimes being imposed and environmental conditions manipulated so as to detect, monitor and treat the condition in the children affected (see Singh 2006 & 2008). As a consequence, the children's self-understanding very likely changes too, as they find themselves in the focus of new practices directed specifically at them.⁸ Today, there is an 'ecological niche' for being a hyperactive child, a specific environment that sustains this condition.⁹

One should not underestimate the ontological impact of these classifications and the practices and regulations that accompany them. Hacking even considers the possibility that a diagnosis – such as that of depression – interacts directly with the *biology* related to the condition diagnosed. His example goes like this: Upon being diagnosed a depressed person might adopt a specific behavioural regime, change certain hazardous routines, avoid stress etc. and as a consequence the neurological condition underwriting her depressive symptoms might change. Classificatory looping would have turned into *biolooping* (Hacking 1999, 123). Of course, more often this seems to work in the other direction: The semantic and social weight of a diagnosis, voiced with legitimate medical authority, reinforces a behaviour pattern and a way of thinking that in turn stabilizes the condition in question. This might be part of the processes that sustain mental illnesses that suddenly emerge and become fashionable at a specific time and place such as “hysteria” or “multiple personality”.

It is important to see that Hacking's position does not amount to an extreme form of social constructivism. His discussion of interactive kinds creates a space in which both the idea of biochemical or neurological conditions underlying many of our concepts of mental illness *and* the idea of these conditions being subject to transformative social and interpretive

⁸ The highly innovative VOICES project at the London School of Economics, led by Ilina Singh, tries to bring the children's perspective into the debates surrounding ADHD. See www.addingvoices.com.

⁹ To this ecological niche of ADHD most probably belongs the heightened systematic attention being paid to children's behaviour and development, virtually from the cradle onward. Another aspect is the new informational environment with which today's children are inevitably confronted, with television, computers, video games and mobile phones providing constant, though highly discontinuous informational input. Not to forget changed practices and expectations in teachers, parents and care-givers that constantly leave less room for what once was considered quite normal “boyhood behaviour” (see Shorter 1997, 289/90).

dynamics can be developed. To see how this is possible consider the distinction, in the semantic theory of kind terms, between *stereotype* and *referent* (or extension). On the classical Kripke/Putnam style accounts, the meaning of a kind term is seen as a vector consisting of two components.¹⁰ First, the stereotype: a commonly shared idea that approximates agreed-upon characteristics and that may very well be subject to change in response to historically situated social dynamics, learning processes and cultural change. Second, the extension or referent that could be a robust natural kind, a specifiable neurological condition, and that in many cases of mental illnesses or human traits might as of yet be still unknown. Thus, the paradox of a category of mental illness being both an interactive *and* an indifferent kind is resolved.¹¹

However, the phenomenon of *biolooping* shows that mental illnesses – and, by analogy, many nonpathological mental capacities – are likely much more interesting than the less controversial natural kinds: The commonly shared idea of an illness might interact with the neurological condition so that our understanding of the illness and our practices surrounding it may change its neurological foundations. In this case, the distinction of stereotype and referent collapses and it would be literally true that *biological* illness conditions are themselves (in part) socially constructed.

Critical Neuroscience draws upon this conceptual background because it shows how inadequate the stark alternative “either biologically based *or* socially constructed” really is. The most interesting cases of human traits and phenomena are in fact both, and therefore we have to approach them from both sides, and make sure that we grasp the relevant dynamics of interaction. That is Hacking’s message.

¹⁰ For more on this, see Putnam 1975.

¹¹ A good example might be schizophrenia. On the one hand, it seems uncontroversial that schizophrenia has a robust neurological foundation, but on the other hand, it seems equally clear that schizophrenia is and has been subject to significant historical changes, in terms of symptoms and prevalence. (see Boyle 1990 and Hacking 1999, 116/7). For a more detailed analysis of Hacking’s conception of making up people, see Brinkmann (2005).

Against this stands the assumption, implicit or explicit in the thinking of many neuroscientists and “neurophilosophers”, that the neuronal level of description has to be prioritized when it comes to determining “what we really are”. Several assumptions and preconceptions, often unacknowledged, are in play here – amounting to what can be called the “hidden anthropology” of the neurosciences.¹² It is an important task for Critical Neuroscience to uncover these assumptions and assess their validity.

Here, I can only address one of the anthropological assumptions, however one that has a claim to be at the very core of the hidden anthropology of the neurosciences: Historian of Science Fernando Vidal has captured it nicely by claiming that increasingly, these days, “brainhood”¹³ is taking the place of personhood. Most radically put, this assumption holds that “we are our brains”. Since our neural make-up fully determines our mental processes, our mental life and thus our sense of self and ultimately what we are as persons and individuals – it is claimed to be solely a matter of processes in the brain.¹⁴ However, what is thereby neuralized, and, as it were, *essentialized* as stable, pre-given and authoritative, is a quite contingent, historically developed idea of subjectivity and selfhood. Claims to the effect that the “self” is a neuronal structure of course presuppose a conception of the self, some idea of subjectivity. This conception is invested into the science beforehand. As a particularly striking example, take Thomas Metzinger’s theory: In his *Being No One* (2003) and the subsequent popular *The Ego-Tunnel* (2009), Metzinger makes much noise about his grand claim that the “self” is an illusion, a product of neurocomputational processes that in the end is no more than a “user-illusion” while what is really robustly there is just the complex computational machinery realised in the neural *wetware*. However, Metzinger goes on to outline how this

¹² Thanks to Max Stadler for suggesting the term “hidden anthropology”.

¹³ The term “brainhood” has been coined by historian of science Fernando Vidal, see Vidal (2009). Vidal and his collaborators have analyzed this trend extensively, see for instance the project website www.brainhood.net that provides plenty of resources and further references.

¹⁴ There are several stark statements in the literature that express this persuasion. For instance, neuroscientists Francis Crick (1994) writes: “you, your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free-will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules.” Or take this one by Patricia Churchland (2002): “The weight of evidence now implies that it is the *brain*, [...], that feels, thinks, decides.”

alleged illusion called “the self” does a surprisingly important job in our mental architecture. For all intents and purposes, Metzinger’s “phenomenal self model” simply *is* a self – the old fashioned subject, with all its philosophical excess baggage such as radical representationalism, internalism, skepticism with regard to knowledge of the world and of other minds etc., just this time fancily dressed up in neurocomputational language. *Plus ça change, plus c’est la même chose...*¹⁵

This “brainhood” or “neuralized subjectivity” assumption forms the core of the hidden anthropology of much of current cognitive neuroscience and neurophilosophy, the metaphysical foundation from which its assumed relevance to human affairs at large is mostly drawn. Hacking’s perspective leads us to challenge the brainhood- and other reductionist assumptions without thereby throwing out the baby with the bathwater. What Hacking calls interactive kinds, classificatory looping and the dynamics of changing conceptions of what it is to be a person, embedded in the right social and institutional environments, provides a more valuable background for approaches to human reality – it can pave the way for a non-reductive human science (that includes what we could call a hermeneutics of subjectification). Importantly, this approach can also be applied directly to neuroscience itself and to its institutional settings, cultural context and political and economic situatedness. In fact, neuroscience itself – viewed sufficiently broadly and “in context” – is an important influence on human self-understanding; it is itself contributing to “making up people”. All those new brain-oriented depictions, discourses, forms of knowledge, tools, institutions and practices create a secondary objective structure, a kind of “second nature” that contributes to the constitution of personhood, to the way we understand ourselves, and it begins to create the practices and institutional environments in which these new kinds of person can thrive.

One key task for Critical Neuroscience is to bring into view and critically reflect these processes – with a focus on the “ontological impacts” of the practice, institutionalization,

¹⁵ For a refreshing, sharply argued and scientifically well-grounded rebuttal of the ideology of “brainhood”, see Noë (2009) – a book that can very well be read as a direct counter to Metzinger’s *The Ego-Tunnel*.

application and public dissemination of the findings and aspirations of the scientific approaches under study. In what follows, I will highlight the beginnings of interpretive studies directed at some of these developments.

3. Normative First Nature

A growing number of neuroscientists and neurophilosophers seem to hold the following: Our theorizing and our practical decisions in areas such as morality, ethics, and social policy should be guided by knowledge about neural mechanisms. Increasingly, *normative conclusions* about how to conduct one's life or how to organize society are drawn from insights into natural processes that supposedly underwrite human functioning (Hartmann forthcoming).

Apparently, nature itself as it is revealed by the natural sciences is treated as possessing a specific authority that warrants normative conclusions and recommendations for social reforms in line with particular scientific findings (however provisional and contested these may be). Frankfurt-based philosopher Martin Hartmann has called this tendency to attention, calling the argumentative pattern at work here *normative first nature arguments*. These arguments rest on the – unacknowledged – conviction that whatever is true about the portion of nature under discussion can (and should) guide our conduct with regard to that part of nature. A key notion here is that of “functional demands” that, for instance, a part of an organism's biological architecture imposes upon the organism as a whole:

In this sense, findings about the brain are not just treated as findings about the natural preconditions of mental life, but as powerful guides to the way this life should function. This may not in all cases amount to a naturalistic reduction of the mental categories at hand, but it certainly amounts to the thesis that whatever purposes they serve for human organisms, they ought to pay attention to the ‘demands’ of the brain and the specific requirements of its functioning. (Hartmann *forthcoming*)

Biological teleology functions as the hidden source of normativity. This normativity is then projected out from specific biological mechanisms to the conduct of the person and from there even to the functioning principles of social institutions such as the penal system, education, medical prevention, or the make-up of modern companies (see next section below). Thus, a specific form of ethical naturalism is reappearing in a new guise, fashionably dressed up in the terms of a new science.¹⁶ The position faces obvious problems. There is no justification for inferring from “is” to “ought”, and thus we are faced with an instance of the naturalistic fallacy. Moreover, the position importantly presupposes a successful access to a first nature entirely free of human values and interests – an access that is dubious in face of interest-specific constraints and value-ladenness of perspectives on the world, scientific or otherwise. Acknowledging these constraints should rather lead in the other direction, i.e. to the attempt to open up science somewhat more towards controlled forms of democratic participation (see Kitcher 2001), or at the very least to re-affirm the importance of an inclusive and open dimension of discursive critique to any scientific perspective on the world. In any case, the result of the normative-first-nature argumentative pattern is clear enough: The autonomous subject of ethical and socio-political decision-making is increasingly disempowered. Instead, the power to decide important normative issues is gradually ceded to the experts of brain function – they become the true experts of all human affairs. We witness the rise of what Nikolas Rose has called “the new pastors of the soma” – techno-medical experts of human bodily functioning that claim for themselves the ultimate biopolitical authority (see Rose 2006).¹⁷

¹⁶ A new science whose shiny machinery and highly visual results create the image of eminent clarity, objectivity and ultimately, authority. I come back to the imaginative appeal of current neuroscience and its relation to the alleged authority of its findings in section 5 below. See also Joyce 2008, especially chapter 3.

¹⁷ One example for the trend towards normative first nature arguments, explicitly stated by Hartmann, is William Casebeer’s book *Natural Ethical Facts* (2003). In it, Casebeer attempts to ground ethics on evolutionary biology and connectionist cognitive science plus recent brain imaging studies with moral judgment tasks. Casebeer’s “natural ethical facts” are exactly what Hartmann points to in his critique of the normative first nature argumentative pattern. A somewhat related, although more carefully articulated tendency is to be found in the work of Joshua Greene, a philosopher who has done empirical work (using fMRI) on ethical decision-making, see, e.g., Greene 2003.

This provides an important methodological directive for Critical Neuroscience. We need to pay specific attention to what is brought forth as allegedly natural, as natural facts, in and around contemporary neuroscience (and of course also in other areas of the sciences, where applicable), especially where it is relevant to human conduct and human affairs more broadly. What does our very nature – especially, of course, the nature of our brain – tell us about human reality and about the possibilities that may slumber under our skulls, both on an individual and on a social level? What stories are being told, who tells them and why, and what is ultimately informing and driving these stories?

4. Cognitive Neuroscience and the Discourse of Flexible Capitalism

It has often been observed that scientific concept- and theory-formation is subject to influences from the surrounding culture. Just take the historical succession of prominent metaphors of the mind: calculating machine, central telephone exchange, system of hydraulic forces, digital computer/information processing engine etc (see, e.g., Borck 2005). The newest entry in this list is the metaphor of the self-organizing and non-hierarchical network – a network that is highly adaptive, displaying various kinds of plasticity and generative capacities.

In line with a number of other authors I want to point to a surprising parallel between cutting-edge neuroscience and the now fashionable discourse in organizational and management literature and in neoliberal politics.¹⁸ Both discourses are centred on networks, non-hierarchical organization, flexibility, the capacity to adapt to ever-changing circumstances and demands. The human brain as a self-organizing, adaptive non-hierarchical network exhibiting developmental and regenerative plasticity seems to resemble the modern company. Moreover, it is organized such as to enable just those characteristics and capacities

¹⁸ See Malabou 2008, Hartmann *forthcoming*, and the articles collected in Karafyllis and Ulshöfer 2008.

demanded of the modern employee. One can be tempted to think that social structure – in this case the organization of work in flexible capitalism – has finally caught up with neuronal organization so as to promise a harmonious relation between individual capacities and economic requirements. “It is as if the brain is made for flexible capitalism, as if it has a more or less natural response to the demands of the present.” (Hartmann *forthcoming*)

Is neuroscience unwittingly contributing to the justification of structural reforms in the capitalist economy? Does it help to naturalize and stabilize these tendencies by claiming that our brains are specifically enabling several of the very capacities prized by the new economical status quo? In this way, neuroscience would openly or tacitly work in favour of those who try to promote and establish economic imperatives as “natural” requirements. It would become ideological.

Catherine Malabou (2008) has explicitly drawn this consequence when she talks about the ideological drift that neuroscience is subject to. On the one hand, scientists might remain unaware of these broader developments and thus may unconsciously contribute to these processes. On the other hand, many practitioners today play an active role in contributing to a neoliberal management discourse that is mapped upon a specific image of neuronal organization. As soon as such a discourse is dressed-up as science – referring to robust facts about our neuronal organization and functional architecture – it is effectively removed from political discussion. In this context, Malabou diagnoses a paradoxical conjunction, in neuroscientific discourse, of the traditional stress on hard-wired connections and rigid mechanisms in the brain that seemingly exclude personal responsibility and, on the other hand, a new stress on plasticity, self-organization and adaptability to changing circumstances that seem to lead back to quite specific forms of personal responsibility: Namely, the responsibility of the modern employee to adapt flexibly to changing requirements in the work place. Paradoxically, then, although one might think that new discoveries of the brain’s generative and regenerative capacities would lead to a new sense of freedom, of possibilities

for an active and conscious shaping of individuals and social arrangements, what happens is the exact opposite: The “new world order” of flexible capitalism is inscribed as an inevitable condition, as the unrelenting reality of neuronal organization. A truly disappointing story, as Malabou concludes:

[I]t seems that the neuronal revolution has revolutionized nothing *for us*, if it is true that our new brains serve only to displace ourselves better, work better, feel better, or obey better. The synthesis of the neuronal and the psychical thus fails to live up to its task: we are neither freer, nor smarter, nor happier. (Malabou 2008, 68)

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Of course, all of this requires a more detailed treatment which I cannot provide here. Instead, I want to add another example of the tendency under discussion. The UK government recently sponsored a massive interdisciplinary initiative called the *Foresight Project on Mental Capital and Wellbeing*. A summary version of its final report is titled “The Mental Wealth of Nations” (Beddington et. al. 2008). As these titles indicate, what we see here is the framing of concepts referring to personhood, human experience and the ‘good life’ in a way that makes them a perfect fit to the neoliberal market orientation. The mind is seen as an economic resource, as a form of capital that has to be invested in the ubiquitous marketplace. This is clearly evident in the definition of the term “mental capital” as stated in the project’s final report:

[Mental Capital] encompasses a person’s cognitive and emotional resources. It includes their cognitive ability, how flexible and efficient they are at learning, and their “emotional intelligence”, such as their social skills and resilience in the face of stress. It therefore conditions how well an individual is able to contribute effectively to society, and also to experience a high personal quality of life. The idea of “capital” naturally sparks association with ideas of financial capital and it is both challenging and natural to think of the mind in this way. (Foresight Mental Capital and Wellbeing Project 2008, 2)

In the same vein, the concept of “well-being” is introduced without much ado as a capacity to work well and function economically under present-day circumstances: “Mental well-being, [...], is a dynamic state that refers to individual’s ability to develop their potential, work productively and creatively, build strong and positive relationships with others and contribute to their community” (Beddington et. al. 2008, 1057).

Given that this grand-scale project is bringing together high-level research from fields such as neuroscience, developmental and social psychology, economics, education, psychiatry and sociology, one can hardly overestimate the consequences of this choice of core concepts. Within the Foresight project, knowledge in these fields is organized such that it is oriented from the outset towards a particular image of life, work, and human development. This orientation is simply assumed as given, it becomes the unquestioned foundation of all the research in this initiative. This image is clearly dominated by the logic of contemporary capitalism, by ideas of all-encompassing resource exploitation, investing and maximizing one’s capital (in a broad sense of the term), and economically “functioning” individuals, and moreover this market logic extends in full to the private and emotional aspects of human existence. What is particularly notable is the project’s “from the cradle to the grave”-perspective when it comes to monitoring and intervention policies. In effect, it recommends a lifelong regime of control, regulation, and intervention to assure the maximizing of mental capital and of the equally capital-like resource of mental well-being over the life course of individuals.

One need not be a social constructivist to notice how political tendencies, economic interests and policy agendas take part in shaping what will come to count as the “results” of these scientific endeavours.

Current neuroscience and neuroscience-dominated research programs like *Foresight* participate in ‘making up people’ – and at the same time systematically hide this very fact. By

creating the impression that it is on the verge of uncovering the complex neural underpinnings of human traits, capacities and pathologies, neuroscience discourages the view that a person's traits are importantly shaped by ecological conditions. At the same time, the assumption that the knowledge generated has a specific (even normative) authority inspires ambitious reform initiatives – in areas such as mental health, the law, education, child rearing etc. Thereby, neuroscience actively participates in the creation and stabilizing of the practices, institutions and classifications that form the condition of existence of specific person types and behaviour patterns. While it promises to get straight at first nature, it in fact participates in the construction of “second nature” and is thereby potentially (and unwittingly) subject to ideological drift. This shows why we need not only a Critical Neuroscience, but precisely something like a *critical theory* of the neurosciences – an approach that makes these entanglements and the construction processes explicit and has theoretical tools that are adequate to the task (Hartmann, *forthcoming*). What is especially relevant is a broader understanding of current developments in society at large, for instance in the economy and at the workplace, so as to be able to grasp the interactions, often intricate and subtle, that are taking place between scientific theorizing and social and political discourse and practice.

5. Real Responses

What is so far missing is a view on what actually goes on in individual experience, on the micro-sociological level where brain science enters the lives of common people. In order to understand the neuroscientific challenge, we need to penetrate some more into the details of interaction between the science and real people. To this end, I will conclude with a brief discussion of the work of medical anthropologist Simon Cohn.

Cohn conducted field interviews with psychiatric patients who had their brains scanned in non-treatment related fMRI studies. All patients were truthfully told that the scans

had no medical purpose and all were given copies of their brain scan to take home afterwards.

The results are quite remarkable. Here are examples taken from Cohn's interviews:

This picture. This is the most accurate portrait you can ever get. It's a picture of who you really are. On the inside. I tell people its my self-portrait. (Cohn in press)

For me, I just can't tell you how important it is. All these years, and now they can finally prove it. I'm sure that this will make a huge difference. I feel different already. Almost like new. (Cohn forthcoming)

What is striking is that these interviews show emotionally charged and narratively rich encounters of patients with depictions of their brains. The first thing that is notable in these encounters is that the brain seems to figure in them as a cultural object, as a kind of "centre of discursive gravity" that is invested with significance. Its representations are readily incorporated into self-fashioning. Take this quotation from one of the interviews:

I have bi-polar, and I have done for years. It's who I am, and I can't imagine not suffering from it. So, you see, I don't want to suddenly wake up and not be a bi-polar... What I want is to be able to say to people, 'Look. This bit of my brain, that's why I am bi-polar. But I am bi-polar, so if I have to live with it, why can't you?' (Cohn forthcoming)

Here, we see a part of the process described by Hacking unfolding *in situ* – the brain scan assumes the role of a stabilizer of a classification that defines the identity of this patient. The quotation nicely shows that the scan fulfils a paradoxical double role, at once changing and stabilizing the image of the mental illness. It changes the illness by providing a physical base for the formerly diffuse and stigmatized condition – and it thereby solidifies it as something real, which then serves to sustain a part of the identity of the patient as a sufferer from this particular illness.

This result is somewhat unexpected, as one might have thought that patients would seize the possibility to refute the stigma associated with their illness and readily embrace a physical description. Instead, the patients hang on to the original diagnostic category that they

indeed cherish as a part of their identity.¹⁹ The scan provides a new framing for the condition, at once a legitimization for it as something real, out there for everyone to see, and as something now endowed with a new future-directed perspective. Thereby, the brain image functions as a powerful disrupter of existing narratives of mental illness and as an anchor of new ones, still centred on the same old psychiatric conditions but oriented towards a different future. Some of this is vivid in the following exclamation of another patient:

The scan is important because it shows just what has been wrong with me all these years... you don't have to listen to descriptions or anything, you can see it there before your very eyes... (Cohn forthcoming)

Ludwik Fleck characterized a “fact” as that which is able to resist alternative explanations (Fleck 1979 [1935]). This is what the brain scans in all their vivid materiality and backed by a system of techno-medical promise can do – they intrude into the circulation of ideas and beliefs about psychiatric conditions. The brain scan has the power to re-orient the patient’s self-understanding, and in this it conspires with the powerful image of objectivity and progress that present-day neuroscience is so good at conveying. Study participants frequently cherish the pictures, proudly showing them to friends and loved ones. Apparently, to them the scans become objects invested with optimism and change, even though patients are aware that there are no concrete prospects for effective treatment.

It is not easy to understand the implications of these findings. Surely, it is not a story of reduction or complete transformation of the self-understanding of these patients. The neuroscientific intrusions into the lifeworld are a welcome material for self-fashioning and self-interpretation. Neuroscience seems to carry its messages into an environment that, to some extent, plays its own game and imposes its own “rules”. But this does not mean that the

¹⁹ Cohn elaborates upon this in the following manner: “Interestingly, the patients repeatedly insist that their enthusiasm is not driven by a crude desire to refute social stigma associated with their particular condition, since many actually don’t want to lose this aspect of their identity. This frequently left me confused: on the one hand, they would willingly volunteer to participate in imaging studies, enduring all the inconvenience that it entailed and aware it would not have any clinical consequence for them, yet, in the act of looking at their own brain on a screen, or taking a copy home with them, they would say that making their illness physical was largely not about wanting to completely divorce themselves from their condition” (Cohn forthcoming).

fears of the “neuroscptics” are unwarranted. The flip side of these developments is the readiness with which objectivist claims are integrated into these patients’ self-understanding, even in the absence of a tangible medical advantage. Being useless, premature or false seem to be no reasons whatsoever not to incorporate an alleged piece of neuroscientific knowledge (an alleged “brain fact”) into one’s self-fashioning.²⁰ Instead, the physical appearance and aesthetic quality of the shiny new and clean technology seems to work as a “placebo space” – a dream factory that fuels the imagination to fantasies of healing and unlimited possibilities of medical intervention. One could thus be led to assume that through processes of the kind described by Cohn, neuroscience might in the end succeed in achieving a naturalization of subjectivity – not by proving successful scientifically, but by offering the most attractive, most persuasive images and narratives of self-objectification. While it aspires to be a “hard” science delivering new facts about humans, it might in the end be more of a generator of technoscientific dreams and fantasies, constructing ideas and images that offer a new self-understanding. Thus, while the objectivism with regard to the human mind is delusional as a scientific stance, it might still come true as a self-fulfilling prophecy, enabled and sustained by the well-arranged promises and representations of the new science and, paradoxically, implemented and enacted by the very process whose existence alone seems to belie any kind of objectivism of human existence: By our very human capacity to change what we are through interpreting ourselves anew.²¹

6. Conclusion

I hope to have made plausible that the various dynamics surrounding the brain sciences might run deep – in affecting social practice and institutions and individual and

²⁰ On the difficult notion of a “brain fact”, meant as an application to neuroscience of Ludwik Fleck’s highly nontrivial concept of a scientific fact, see Choudhury, Nagel, & Slaby (2009).

²¹ Obviously, I implicitly draw on Charles Taylor’s conception of human being as “self-interpreting animals”. See Taylor (1985[1977]); see also Brinkmann (2005) for a helpful discussion of Taylor’s notion in relation to Hacking’s conception of ‘making up people’.

collective self-understanding, and through this, ultimately, even the make-up of what we are as human beings. In an important sense it is here, in the dynamics of ideas, practices and material interaction surrounding the sciences in their social context, where the subject matter of the human sciences is constituted. This idea might serve to correct the misleading impression that ‘human nature’ is descriptively capturable in a straightforward way by empirical approaches that neglect the dynamics of self-interpretation. One consequence resulting from this might be a blurring of the boundaries between scientific and interpretive approaches to human reality, perhaps paving the way to what Joseph Rouse has called “cultural studies of science” (Rouse 2002).²² Importantly, this would not just be another area of expertise *outside* of the scientific domain under study, but rather a form of self-reflection of a given scientific field from within. In the case under discussion one could think of this approach as an added layer in the multi-disciplinary field of the cognitive neurosciences, and thus of the cognitive sciences at large, as opposed to merely being yet another attempt at critique from outside of science. Seen in this light, the current emergence of interdisciplinary programmes, schools and research institutions might offer a chance for progress: By adding, in an “organic way”, a perspective of critical context-analysis, including historical and anthropological studies, to the mix of disciplines that set out to investigate human reality. To outline this potential addition to cognitive science in a systematic and methodologically rigorous way has to be the next step in the development of a *Critical Neuroscience*.

This articulation would also have to include a more thorough analysis of what is – or should be – meant by the term “critical” in *Critical Neuroscience*. The challenge is to render the term “critique” meaningful again after a recent history of inflationary usage and of its being over-invested with conceptual and ideological excess baggage such as links to radical political projects, out-of-date systems of thought or a broadly anti-scientific, neo-romantic attitude that is hostile to any form of productive engagement of the natural sciences. One

²² See also Rouse (1996)

possible way to move forward is to take as an inspiration Bruno Latour's recent contrasting, in an essay about perspectives of critique, of *matters of fact* and *matters of concern* (Latour 2004). To show that science is importantly not about value-free matters of fact but rather about ontologically robust but intrinsically contested *matters of concern* might point the way to an understanding of critique as constructive, even creative and encouraging in its seeking, describing, highlighting, enriching issues of human interest, while at the same time losing none of its bite in the perennial struggle against all sorts of abuses of power in the name of "the facts" or of science as such.²³

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²³ Something like this is also at the core of Joseph Rouse's impressive manifesto on philosophical naturalism *How Scientific Practices Matter* (Rouse 2002).

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