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**Neurocapitalism**

Today, the neurosciences enjoy a similar prestige as psychoanalysis in the twentieth century, write Hennric Jokeit and Ewa Hess. Despite the immense costs for healthcare systems, the fear of depression, dementia and attention deficit disorder legitimises the boom in neuro-psychotropic drugs. In a performance-driven society that confronts the self with its own shortcomings, neuroscience serves an expanding market.

Today, the phenomenology of the mind is stepping indignantly aside for a host of hyphenated disciplines such as neuro-anthropology, neuro-pedagogy, neuro-theology, neuro-aesthetics and neuro-economics. Their self-assurance reveals the neurosciences' usurpatory tendency to become not only the humanities of science, but the leading science of the twenty-first century. The legitimacy, impetus and promise of this claim derive from the maxim that all human behaviour is determined by the laws governing neuronal activity and the way it is organised in the brain.

Whether or not one accepts the universal validity of this maxim, it is fair to assume that a science that aggressively seeks to establish hermeneutic supremacy will change everyday capitalist reality via its discoveries and products. Or, to put it more cautiously, that its triumph is legitimated, if not enabled, by a significant shift in the capitalist world order.

There is good reason to assert the existence, or at least the emergence, of a new type of capitalism: neurocapitalism. After all, the capitalist economy, as the foundation of modern liberal societies, has shown itself to be not only exceptionally adaptable and crisis-resistant, but also, in every phase of its dominance, capable of producing the scientific and technological wherewithal to analyse and mitigate the self-generated "malfunctioning" to which its constituent subjects are prone. In doing so — and this too is one of capitalism's algorithms — it involves them in the inexorably effective cycle of supply and demand.

Just as globalisation is a consequence of optimising the means of production and paths of communication (as Karl Marx and Friedrich Engels predicted), so the brain, as the command centre of the modern human being, finally appears to be within reach of the humanities, a field closely associated with capitalism. It may seem uncanny just how closely the narrow path to scientific supremacy over the brain runs to the broad highway along which capitalism has been speeding for over 150 years. The relationship remains dynamic, yet what links capitalism with neuroscience is not so much strict regulation as a complex syndrome of systemic flaws.

Repressive late nineteenth-century capitalism, with its exploitative moral dictates, proscriptions and social injustices, was a breeding ground for the neurosis diagnosed by scientists in the early twentieth century as a spiritual epidemic. This mysterious scourge of the bourgeoisie, a class which according to Marx, "through the rapid improvement of all instruments of production [...] draws all, even the most barbarian nations, into civilisation", expressed the silent rebellion of the abused creature in human beings. It was, in other words, the expression of resistance — as defiant as it was futile — of people's inner "barbarian nation" to forceful modernisation and civilisation.

To introduce here the inventor of psychoanalysis and neurosis researcher Sigmund Freud as the first neurocapitalist practitioner and thinker might be thought to be overstepping the mark. Yet people tend to forget that Freud was a neuro-anatomist and neurologist by training, and saw himself primarily as a neuroscientist. What distinguished him from his colleagues was that he was more aware of the limitations of the methods available for studying the brain at the end of the nineteenth century. Having identified neurosis as an acquired pathology of the nervous system for which there was no known treatment or way to localise, he decided instead to take an indirect route. The means he invented in order both to research and to cure this mysterious illness was psychoanalysis. Fellow researchers like Oskar Vogt, who continued to search for the key to psychopathology and genius in the anatomy of the brain, were doomed to fail. From then on, psychology served the requirements of everyday life in a constantly changing capitalist reality. As a method based on communication, psychoanalysis penetrated all spheres of social interaction, from the intimate and private to the economic and cultural. In doing so, it created new markets: a repair market for mental illness and a coaching market for those seeking to optimise capitalist production and reproduction.

Delayed by the Second World War, the repressive capitalism of the nineteenth century was eventually replaced by libertarian, affluent capitalism. Conformity, discipline and feelings of guilt — the symptoms of failure to cope with a system of moral dictates and proscriptions — gave way to the new imperative of self-realisation. The psychic ideal of the successful individual was characterised by dynamically renewable readiness for self-expansion, which for the subject meant having a capacity for self-motivation that could be activated at any time and that was immune to frustration. Failure now meant not being able to exhaust the full potential of one's options. This development brought a diametric change in the character of mental illness. Neurosis, a disorder born of guilt, powerlessness and lack of discipline, lost its significance. Attention shifted to the self's failure to realise itself. Depression, the syndrome described by Alain Ehrenberg in *The Weariness of the Self*, began its triumphal march.

Depression, however, was also the first widespread mental illness for which modern neuroscience promptly found a remedy. Depression and anxiety were located in the gaps between the synapses, which is precisely where they were treated. Where previously there had only been reflexive psychotherapy, an interface had now been identified where suffering induced by the self and the world could now be alleviated directly and pre-reflexively.

At this point, if not before, the unequal duo of capitalism and neuroscience was joined by a third partner. From now on, the blossoming pharmaceutical industry was to function as a kind of transmission belt connecting the two wheels and making them turn faster. In the first half of the twentieth century, mental disorders were treated mainly with sedative barbiturates, electric shock

therapy and psychosurgery. But by the 1930s, neuro–psychopharmacology was already winning the day, as Freud had predicted it would.

Is it a paradox, or one of those things that are so obvious they remain unobserved, that the success of Freud's psychoanalysis and that of modern neuroscience are based on similar premises? Psychoanalysis was successful because it wove together medically relevant disciplines like psychiatry and psychology with art, culture, education, economics and politics, allowing it to penetrate important areas of social life. At the beginning of the twenty–first century, the neurosciences seem to be in a position to take on a comparable role in the future.

What cannot be overlooked is that the methodological anchoring of the neurosciences in pure science, combined with the ethical legitimacy ascribed to them as a branch of medicine, gives them a privileged position similar to that enjoyed by psychoanalysis in the early twentieth century. Unlike the latter, however, the neurosciences are extremely well funded by the state and even more so by private investment from the pharmaceutical industry. Their prominent status can be explained both by the number and significance of the problems they are attempting to solve, as well as the broad public recognition of these problems, and by the respectable profits to be made should they succeed. In other words, they are driven by economic and epistemic forces that emanate from the capitalism of today, and that will shape the capitalism of tomorrow — whatever that might look like.

## II

In Germany, the USA and many western European countries, it is neither painkillers nor cardiovascular drugs that now put the greatest strain on health budgets, but rather neuro–psychotropic drugs. The huge market for this group of drugs will grow rapidly as life expectancy continues to rise, since age is the biggest risk factor for neurological and psychiatric illness. All over the world, whole armies of neuroscientists are engaged in research in universities, in projects often funded by the pharmaceuticals industry, and to an even greater extent in the industry's own facilities, to find more effective and more profitable drugs to bring onto the market. The engine driving the huge advances being made in the neurosciences is capital, while the market seems both to unleash and to constrain the potential of this development.

Depression, anxiety or attention deficit disorders are now regarded by researchers and clinical practitioners alike as products of neuro–chemical dysregulation in interconnected systems of neurotransmitters. They are therefore treated with substances that intervene either directly or indirectly in the regulation of neurotransmitters. Given that the body's neuro–chemical systems are highly sensitive and inter–reactive, the art of successful treatment resides in a process of fine–tuning. New and more expensive drugs are able to do this increasingly effectively and selectively, thus reducing undesirable side effects. Despite the immense costs for healthcare systems, the high incidence of mental disorders and the fear of anxiety, depression and dementia make the development of ever better neuro–psychotropic drugs desirable and legitimate.

However, the development and approval of drugs designed to alleviate the symptoms of mental disorders also open the gates to substances that can be used to deliberately alter non–pathological brain functions or mental states. The rigid ethical conventions in the USA and the European Union — today the most profitable markets for neuro–psychotropic drugs — mean that drug

development, whether funded by the state or by the pharmaceuticals industry, is strictly geared towards the prevention and treatment of illness. Few pharmaceutical companies are therefore willing to make public their interest in studying and developing substances designed to increase the cognitive performance or psychological wellbeing of healthy people. The reason is simple: there is no legal market for these so-called "neuro-enhancers". Taking such drugs to perform better in examinations, for example, is a punishable offence in the USA. Yet sales figures for certain neuro-psychotropic drugs are considerably higher than the incidence of the illnesses for which they are indicated would lead one to expect. This apparent paradox applies above all to neuropsychotropic drugs that have neuro-enhancement properties. The most likely explanation is that neuro-enhancers are currently undergoing millions of self-trials, including in universities — albeit probably not in their laboratories.

The ten top-selling psychotropic substances in the USA include anti-depressants, neuroleptics (antipsychotics), stimulants and drugs for treating dementia. In 2007 one hundred million prescriptions were issued for these drugs with sales worth more than sixteen billion dollars. These figures illustrate how, in an environment that is regulated but difficult to control, supply and subjectively perceived need can create a market turning over billions of dollars. What is more, it is a market that is likely to expand into those areas in which a performance-driven society confronts the post-postmodern self with its own shortcomings: in others words in schools and further education, at work, in relationships, and in old age. Among the best-selling neuro-psychotropic drugs are those that modulate the way people experience emotions and those that improve their capacity to pay attention and to concentrate, in most cases regardless of whether there is a clinically definable impairment of these functions.

Attempts to offset naturally occurring, non-pathological deviations from the norm are referred to as "compensatory" or "moderate enhancement" — in the same way that glasses are worn to correct the eyes' decreasing ability to focus. The term describes a gradual improvement in function to a degree that is still physiologically natural. By contrast, "progressive" or "radical enhancement" denotes a qualitative improvement in function that exceeds natural boundaries. To return to the optical metaphor, we could say that the difference between these forms of performance enhancement is like that between wearing spectacles and night-vision glasses.

In all ages and cultures, producers and purveyors of drugs and potions purported to enhance the individual's cognitive state have been able to do a tidy trade, as the many references to magic potions and fountains of youth in literature and the fine arts testify. Nowadays, one substance with this kind of mythical status is ginkgo. Billions of dollars worth of ginkgo-biloba preparations are sold in the USA every year; and if ginkgo really did have any significant effect on cognition or memory, it would be a classic case of the widespread, unchecked use of a compensatory neuro-enhancer. As it is, however, the myth and commercial success of ginkgo are more a testament to the perhaps universal human need for a better attention span, memory and mental powers, and to the willingness to pay good money to preserve and enhance them.

For the attainment of happiness as the aim of a good life, Aristotle recommended cultivating a virtuous mind and virtuous character. This is precisely what some neuro-psychotropic drugs are designed to do. The virtues of the mind are generally understood to be instrumental traits like memory and

attention span. The extent to which these traits are innate or acquired varies from person to person. After adolescence, their efficiency gradually goes into decline at individually varying rates. Inequality and the threat of loss are strong motivations for action. The current consensus on the ethics of neuro-enhancement seems to be that as long as the fundamental medical principles of self-determination, non-harm (*nil nocere*) and benefit (*salus aegroti*) are adhered to, rejecting pharmacological intervention in the instrumental traits of the brain would be at odds with a liberal understanding of democracy.

A more complex ethical problem would seem to be the improvement of so-called character virtues, which we shall refer to here as socio-affective traits. Unlike instrumental traits such as attention span and memory, traits like temperament, self-confidence, trust, willingness to take risks, authenticity and so on are considered to be crucial to the personality. Pharmacological intervention that alters these traits therefore affects a person's psychological integrity. While such interventions may facilitate and accelerate self-discovery and self-realisation (see the large body of literature on experience with Prozac, e.g. Peter D. Kramer, *Listening to Prozac*), they may also do the exact opposite. We will never be able to predict with any certainty how altering instrumental and socio-affective traits will ultimately affect the reflexively structured human personality as a whole. Today's tacit assumption that neuro-psychotropic interventions are reversible is leading individuals to experiment on themselves. Yet even if certain mental states are indeed reversible, the memory of them may not be.

The barriers to neuro-enhancement actually fell some time ago, albeit in ways that for a long time went unnoticed. Jet-lag-free short breaks to Bali, working for global companies with a twenty-four hour information flow from headquarters in Tokyo, Brussels and San Francisco, exams and assessments, medical emergency services — in all of these situations it has become routine for people with no medical knowledge to use chemical substances to influence their ability to pay attention. The technologies that have sped up our lives in the era of globalisation — the Internet, mobile phones, aeroplanes — are already a daily reality for large numbers of people and are interfering with their biologically and culturally determined cycles of activity and rest.

It is difficult to evaluate the impact of interventions of this kind on people's brain chemistry in isolation. The challenge this represents is best illustrated by a much-cited US study conducted in 2002 to investigate the effect of the acetylcholinesterase inhibitor donepezil on the performance of pilots who were around fifty years old. Their performance was recorded during training for critical flight situations in a flight simulator. After completing seven training units, all the pilots were given either a placebo or donepezil for the next thirty days, without knowing which they were taking. After thirty days they completed an identical training unit. The pilots who had been taking donepezil did better than those who had been given the placebo. The study followed a standard procedure recognised by the drug approval authorities for evaluating the efficacy of pharmacological therapies. What was unusual about the study, however, was that the researchers tested the efficacy of the substance in a context of general interest, namely flight safety. Another important feature of the study was that the pilots who participated were past middle age.

Whether the authors of the study were trying to establish the efficacy of an intervention designed to offset the effects of age — which would have come in for heavy criticism — is not specified. Whether intentionally or not, the study

actually looked at two different dimensions of human performance enhancement simultaneously: flying as a radical extension of the normal radius of mobility, and the training sessions as a means of moderately improving existing skills through practice. It is certainly no coincidence that the researchers chose to study the new brain doping technology in a situation involving the acquisition of special skills to master complex technology. Just as shift workers are sometimes given stimulants, so the point here was to adapt the innate neurobiological capacity of humans as a productive force to the technologies and rhythms of globalisation.

As we enter the age of globalisation at the beginning of the twenty-first century, the capitalist system that at the beginning of the twentieth century Marx and Engels declared to be at an end appears to be not only alive and kicking, but on the threshold of a new phase of development. Following the paradox of the libertarian phase, in which democratically-based prosperity for the broad mass of people (ironically, a state of affairs postulated but never realised by communism) became possible under capitalist rule, at least for a time and at least in one part of the world (and of course at the expense of the others), global capitalism now seems to be claiming to — and seeking to realise instantly — another myth borrowed from the storeroom of communist dreams: that of a new and better human being.

### III

The ability to image the brain of a living human being with millimetre precision without exposing the patient to damaging rays was a long-cherished dream of neurologists. Magnetic resonance imaging (MRI) has now made it possible to do even more than that — namely, to visualise localised neurone-induced changes in blood flow in the brain. This paves the way for the study of the spatial distribution of brain activity, and with the aid of another modern technology — positron emissions tomography (PET) — for controlled experiments to observe the activity of neurotransmitters and their receptors in particular behavioural states. Since the late 1990s, medical journals have published more and more articles describing the neuronal correlations of love, hate, envy, *Schadenfreude*, mourning, altruism and lying. The list grows almost daily — albeit without these findings actually shedding much new light on the human condition.

That is not to say that the popularisation of these findings has had no effect at all. Reconceptualising joy as dopamine activity in the brain's reward centres, melancholy as serotonin deficiency, attention as the noradrenalin-induced modulation of stimulus-processing, and, not least, love as a consequence of the secretion of centrally acting bonding hormones, changes not only our perspective on emotional and mental states, but also our subjective experience of self. That does not mean that we experience the physiological side of feelings like love or guilt any differently, but it does make us think about them differently. This, in turn, changes the way we perceive, interpret and order them, and hence the effect they have on our behaviour. By viewing emotions in general terms rather than as singular events taking place in a unique temporal and spatial context, the neurosciences have created a rational justification for trying to influence them in ways other than by individual and mutual care.

The possibility of pharmacological intervention thus expands the subjective autonomy of people to act in their own best interests or to their own detriment. This in turn is accompanied by a new form of self-reflection, which



encompasses both structural images of the brain and the ability to imagine the neuro-chemical activity that goes on there. What is alarming is that many of the neuroscientific findings that have triggered a transformation in our perception of ourselves are linked with commercial interests.

It is already clear that global capitalism will make excessive demands on our material, and even more so on our human-mental resources. This is evident from the oft-used term "information society", since information can only function as a commodity if it changes human behaviour, and it can only do this if we accord it our attention and engage with it emotionally.

It is not by chance that feelings and the attention on which they are based form the focus of two more recent theories of capitalism: Eva Illouz's *Cold Intimacies. The Making of Emotional Capitalism* and Georg Franck's *Mental Capitalism*. Mental capitalism is an economy of attention that is controlled (i.e. generated, intensified or made scarce) via the mass media. That this volatile resource can be marketed as a commodity is only thanks to its channelling through the available channels.

By contrast, writings on emotional capitalism describe how emotions are exploited, the shifts that have taken place in the way they are interpreted, and how they become pathologised under modern capitalist conditions. Emotions are social attention signals directed inwards and outwards. They have become more significant because social interaction is governed by social convention to a much lesser extent than it was fifty years ago. This makes social interaction unpredictable, which in turn gives rise to social anxiety. Our knowledge about emotions — in particular knowledge generated by the neurosciences — is by its very nature not just interpretive but also productive knowledge, for it implies the possibility of application.

Whereas it is likely to be a long time before we can influence emotions at the genetic level, the possibility of temporarily controlling various spheres of life at the neuro-chemical level has already become a reality. Using chemicals to improve our economy of attention and become emotionally "fitter" is an option that penetrated public consciousness some time ago. Today's teenagers know what attention deficit syndrome and hyperactivity are, and that they can be treated. They can conceptualise the inability to sit still or to concentrate as neuro-chemical symptoms, and are quite willing to control them with the help of stimulants.

Bipolar attention deficit disorder (ADD) probably encapsulates the key symptoms of mental illness in the twenty-first century. Just as the repression of past centuries gave rise to the silent drama of neurotic symptoms, and the apparently boundless excess of the second half of the twentieth century created a breeding ground for the desireless state of depression, so the elevation of pre-selective attention skills and emotional intelligence to decisive competitive advantages could, in the event of failure, be very harmful to precisely these.

Wriggling helplessly between a dearth and an excess of stimuli, unable to escape the ubiquitous flood of signals, the relaxation mechanisms impaired and experience of emotions brutalised — all of these are symptoms that in the collective consciousness go under the general heading of ADD.

In the new era, old age may well follow on directly from prolonged adolescence. The young-old of the future will be even less prepared to accept

forgetfulness, any more than failing eyesight or declining libido, as a natural sign of growing old. Newly in love senior citizens will know that the pain of separation they experience is caused by lower serotonin levels and will ask for a drug to boost them.

The lifting of temporal and geographical constraints on communication nurtures the illusion of unlimited accessibility and mobility. Just as the libertarian phase of capitalism offered ways for the individual to optimise his or her external appearance and status, so the imperative of the future will be to optimise cognitive and emotional resources as well. The availability of an unlimited supply of effective neuro-enhancers, the opportunity to exchange experiences of using them with others via the Internet, and the utilitarian approach to ethics taken by many individuals, are all preparing the ground for the market success of substances that today are still being experimented with in the laboratory.

The psychologically relevant question of how the self will relate to a mood-enhanced, more capable version of itself is rendered irrelevant by the fact that the requirements of the new capitalist reality make an individual improvement of this kind appear a highly desirable option. Indeed, as a consumer and commodity value appropriate to capitalism, it has already been in currency for some time. Alongside globalisation — the capitalist rationalisation of space and time — we are witnessing the epistemic and technical rationalisation of the neuronal foundations of the self, or what Walker Percy called the abstraction of the self from itself.

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Published 2009-11-24  
Original in German  
Translation by Melanie Newton  
Contribution by Merkur  
First published in *Merkur* 6/2009  
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