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Neuroimaging & subjectivity: constructing identities in the 21st century[1]

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Abstract

Contemporary Western society tends towards inducing us to observe attentive vigilance over our own bodies, encouraging the adoption of rigorous physical conditioning practices, the incorporation of proper diets and habits, along with the submission to constant medical monitoring in order to instill the self management of health. Diagnosis technologies are fulcral to these complex negotiations, since they provide objective images that help legitimating and specifying disease concepts accordingly to the unyielding dogma of visual objectivity in Western sciences and culture, as well as to the logic of risk and the imperative of prevention. Therefore, this paper aims to explore the extent to which biomedical representations of the body affects the constitution of contemporary identities. In particular, it focuses on the profound cultural impact brought up by the shift on how formerly considered ordinary behaviors were pronounced pathological conditions since the association between neuroimaging and neurobiology in the 1980's.

Keywords
Neuroimaging. Medicine Visual Culture. Body. Biopolitics. Communication.

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1 Introduction

When real infirmities fail us,
knowledge lends us hers.
Montaigne
(*Apology to Raymond Sebond,Essays,* II)

A loyal companion to the good old mind/body dualism, the belief in a correspondence between exteriority and interiority is not exactly foreign to us. The long-lasting association of virtue – and definitely vice – with supposedly analogous body features, especially in the nineteenth and twentieth centuries, has already provided us with countless gruesome examples of what might happen whenever biologists engage in flirting with this obnoxious yet apparently ever fascinating popular belief.

However, over the last few decades, this volatile correspondence has been gaining momentum once again, particularly in the field of neurobiology, where brain imaging technologies – along with the increasingly eager politics of the pharmaceutical industry – play a key role in the framing, definition, classification and astounding proliferation of mental disorders.

On the one hand, though, biomedicine visual culture itself is deeply rooted in such assumptions. Vesalius's *De Post Humani Corpori Fabrica* (1543) founded not the corpse but its very double as the object of modern medicine (BRETON, 2003, p. 18), and by turning the body into a book designed for experts in decoding its language, the Dutch anatomist made way for the idealization of a realistic representation of the body in medicine, as inherited by medical photography, which started being used by doctors back in the 1850's as a means to solve diagnostic impasses, and, a short while later, to capture the rampant invisible demons of madness. Likewise, Roentgen's phantasmagorical rays were quickly credited by both spiritualists and the general public with the romantic ability to unveil the invisible realms of the heart and soul (CARTWRIGHT, 1997, p. 121).

However, in the early 21st century, through PET scans and MRI, many disorders are being ascribed to the physiology of the brain itself, regardless of experiences or subjectivity, therefore settling an organic, biological cause not only for big deals such as serial killing, but also for every possible plain ordinary misbehaving. The amygdala, for instance, emerged through these studies as the new core of human affections – which would depend on its high or low activation – and so as a key for explaining emotional behaviors and affective disorders[2]. Besides, it hardly could be considered overreacting to mention as well that it seems that neurobiology has a neurobiology for each one of the so far widely and fairly acceptable misdemeanours of everyday life, like smoking, feeling down once in a while, or simply daydreaming on math classes.

What is definitely worrisome is a disconcerting continuity between this specific trend in contemporary neurobiology and the modern sciences of man with the likes of Bertillon and Lombroso's criminal anthropology, for instance, whose goals were mainly screening for visual evidences in order to sort people out not only as ill or healthy, but also in other patently Benthamian dualities such as inoffensive/dangerous, sane/insane, worthy/unworthy, and so on. This particular trend in neurobiology focuses on the proneness to certain behaviors, and even moral values, which allegedly could be detected or, in a near future – fortunately, in this case, like most biotechnologies, its promisses lay way ahead of its actual powers – rather predicted through brain scanning.

Therefore, this paper attempts to trace a brief genealogy of such correspondences in the history of brain sciences and the representation of the

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2 See Barrett *et al.* (2007).

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body, a combination with an undeniable potential to pervade not only the courtroom, but all the spheres of life, especially through mediatization, due to the apparent validity and reliability it elicits regarding disorders diagnosis from the 1980's on.

2 A penny for your thoughts: peering into the brain

By 1807 in Germany, Philipp Bozzini invented the "Lichtleiter", described in his essay *The light conductor or description of a simple device and its use for the illumination of the inner cavities and insterstices of the living animal body.* This device consisted of an assemblage of mirrors, tubes and a lighting source that enabled an inaccurate view of a few body's recesses. As Stanley Reiser (1978) accounts, Bozzini believed that observing the internal organs was vital for their appropriate understanding, and hence he criticized any biological concepts lacking in visual evidences. Despite its blatant imprecision, however, the little gadget inspired other explorers to examine the inner realms of the body, and, from 1820 on, there were several attempts at looking into the larynx, until the invention of the laryngoscope in 1855. Years earlier, though, Hermann von Helmholtz developed the ophthalmoscope. Reiser notes that, before the invention of both devices, surgical intervention was the only means for seeing into the living body (REISER, 1978, p. 51-55).

Before photography became available in the 1850's, according to Nikolas Rose, psychiatrists of the nineteenth century, like Pinel's successor at the Salpêtrière Jean-Étienne Esquirol, author of *Des Maladies Mentales* (1838), an illustrated Atlas of deranged bodies, employed the observation and drawing of the patients appearance and behavior in order to set diagnostic standards (2007, p. 192). Knowledge – as then encouraged by *The Lancet* – resorted to photography as a means of capturing the truth in every form it intended to investigate (TAGG, 2003, p. 255).

Enter the physiologist and moving images groundbreaker Etiénne-Jules Marey, who developed cronophotography, the method that allowed a dynamic and temporalized vision of the living body – Helmholtz's experimental physiology's own language *par excellence* (CARTWRIGHT, 1997, p. 11-13). The work of Eadweard Muybridge, by its turn, besides inspiring Marey's experiments, also made way for the studies of corporal movements associated with derangement (REISER, 1978, p. 57).

In 1853, British psychiatrist Hugh Welch Diamond started picturing his female patients at the Surrey County Lunatic Asylum (PRODGER, 1998, p. 162), where this founder member of the Royal Photographic Society was the resident superintendent in

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charge. Three years later, in a paper titled *On the application of photography to the physiognomic and mental phenomena of insanity*, asserted that

> The Photographer catches in a moment the permanent cloud, or the passing storm or sunshine of the soul, and thus enables the metaphysician to witness and trace out the connection between the visible and the invisible in one important branch of his researches into the Philosophy of the human mind (DIAMOND *apud* PRODGER, 1998, p. 163).

Assigned to the Salpêtrière in 1862, with the pedagogic purpose of organizing the largest asylum of France described in his own words as a *"living museum of pathology"*, Jean-Martin Charcot began to devote himself to cataloguing the cases, and was appointed ten years later as professor of pathological anatomy. Since observing behavioral disorders in corpses would be an obvious unfeasible task, Charcot embraced photography as an experimental procedure, thus extolling the practical and epistemological advantages of an *"image factory"*, what Georges Didi-Huberman considers the validation of a "museological authority of the sick body, the museological agency of its 'observation': the figurative possibility of generalizing the **case** into a **tableau**" (DIDI-HUBERMAN, 2003, p. 17-30).

Désiré Magloire and Paul Regnard, both medical interns under the neurologist's supervision, along with Albert Londe, a chemist hired as a photographer, produced the famous collection of iconographic studies on the spectacular hysterical spasms, grimaces and squirming orchestrated by Charcot (CARTWRIGHT, 1997, p. 48), following the path opened up by neuro-motor and physiological regulations diagrams in order to introduce, according to Didi-Huberman, a representation for theregion (DIDI-HUBERMAN, 2003, p. 21). Therefore, as Alain Ehrenberg argues,

> Hystery is the pathology which allowed the construction of the idea of psychism besides providing it with a specific context other than a brain lesion. By then, a lesion was necessary to explain the ill in order to speak about the disease. Confronted by the vast problems of the connection between a lesion that is not found and a disconcerting symptomatology, the neurologist Charcot employs the notion of "functional" or "dynamic lesion". This allows him to consider hysteria as an authentic pathology, fitting it among the well known classes of *sine materia* diseases and constitutional diseases whose lesions experimental pathology was helpless to find [...] Charcot shows that the discriminating sign of hysteria is its suggestibility by hypnosis, that produces a *physiological* response – and not a psychological one... Therefore, Charcot saves hystery's disease statute, solidly sheltering it, at least that's what he believes, within neurology's domain. This conception's disqualification, on the one hand, generates psychopathology and, on the other, restricts neurology's action range. Imaginary diseases are followed by diseases of the imagination, to which will be reserved the multiple psychotherapies invented then, as for instance, psychoanalysis... (EHRENBERG, 2003, p. 4)

Later, in 1882, while a wide range of medical efforts towards the insertion of light bulbs into the body cavities still took place (CARTWRIGHT, 1997, p. 113; REISER, 1978, p. 56; SIMON, 2005,

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p. 283), Paul Emil Flechsig was named professor of the Department of Psychiatry at the University of Leipzig, what, as Eric Santner notes, citing Zvi Lothane's work *In defense of schreber: soul murder and psychiatry*, should not be surprising at all as long as he was not a neuroanatomist without any substantial experience in psychiatric clinic. Santner considers this fact a significant shift in psychiatry towards its medicalization, since Flechsig, pursuing a biological approach to psychopathology as shown in his essay written in 1894 and published two years later named *Brain and soul* (*Gehirn und seele*), states that mental illness was due to brain anomalies (SANTNER, 1997, p. 89).

Also in 1896, after the publishing of Wilhelm Roentgen's *On a new kind of rays* – the paper disclosing his experiments with the mysterious X-radiation – according to Bettyann Kevles, Thomas Alva Edison was challenged by the legendary press tycoon William Randolph Hearst, on February 5th, to create a "cathodograph" of the human brain. Edison accepted the challenge only to fail miserably since the fluoroscope was unable to capture a view of soft tissues (KEVLES, 1997, p. 36).

By necessity, Cesare Lombroso, a forensic medicine professor and head of a psychiatric clinic in Turim, Italy, as well, since he was particularly interested in dissecting brains and skulls, also engaged in this adventure. Lombroso, who not surprisingly became an enthusiastic spiritualist in the end of his life, was the first to observe the *fossa occipitalis media*, what he claimed to be an atavic feature of the so-called criminal brain, through a kind of device of his own making (ZIELINSKI, 2006, p. 237). Indeed, by comparing the method employed by physiognomists for decomposing the human body in smaller parts in order to analyse it to the anatomist practice, physiognomy and phrenology beliefs in a correspondence between physical features and spiritual qualities seem to be deeply connected with the anatomic studies of the nineteenth century (ORTEGA, 2008, p. 110). Hence, Erhenberg argues,

> When biologists (and not biology *itself*) assure they can prove that everything comes from interiority (including the social), they replace metaphysical interiority by a biological interiority: metaphysics assumes the semblance of a scientific matter (ERHENBERG, 2003, p. 14)

3 Brains 'r' Us

Another important transformation, this time in therapeutics, began to take place around the 1930's, when a few experiments were attempted by inducing coma in patients using insulin. After World War II, barbiturates were largely applied to psychotherapy. Henri Laborit obtained good results with the calming effects of the antihistamine promethiazine on cases of shock, and, along with Chlorprozamine, which brought up improvements in the treatment of schizophrenia, the advent of other psychotropic drugs represented a twist on psychiatric

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practices, that now separated themselves from psychoanalysis by resorting to biological models of treatment. However, individuals themselves have apparently accepted this change and began regarding their conditions in terms of problems or imbalance of their own brain chemical (HARRISON, 2004, p. 169). A trend for specifying disease in order to specify medication, and vice versa, was now launched.

Also during the 1930's, the experiments with radioactive tracers succeeded in allowing the mapping of the inner body, although the first scans, according to Kevles, did not provide actual images but rather a highlighting of the organs functional or anatomical features. Only in 1968 an actual technology for producing three-dimensional images of the internal body was invented – the SPECT (Single Photon Emission Computed Tomography) – although the results were still very primitive. Four years later, in Conpenhagen, Niels Lassen used SPECT to observe the brain blood flow aiming to map function in the left cerebral cortex activated by the right hand movement. Lassen was the first one to add color to these digital impressionist-like brain images After the successful experiments with positron scanners in the 1950's, EMI introduced the CT (Computer Tomography) scanner in 1972 and, by the early 1990's, Henry Wagner, head of the PET (Positron Emisson Tomography) program at John Hopkins University, was successful at capturing the first imaging of a dopamine neuroreceptor (KEVLES, 1997, p. 207-209).

Since then, the brain imaging odyssey was so overwhelming that the 1990's became known as the "decade of the brain". Combined, PET, fMR, and MRI technologies have established a new visual paradigm that led both to the deeper understanding of disabilities such as the ones caused by Parkinson and Alzheimer's diseases, among others, as well as to a reductionist, mechanicist conception of human action. The mapping and measurement of brain activity and functions, however allowing the improvement of neurological and degenerative diseases therapeutics, was and still is celebrated as a means for reaching the invisible lesions that supposedly would cause certain behaviors. The interest in the proneness of violence, for instance, a of *déja-vu* becomes particularly unsettling regarding the employment of the biological approach of neuroscientific knowledge to mind and behavior by forensic psychiatry. Especially when we stumble onto statements such as J. Arturo Silva's on the editorial of *The journal of the american academy of psychiatry and the law*:

> Significant progress in forensic neuropsychiatry also has affected the practise of law, in which an understanding of the complex interplay among mind, brain, and behavior is becoming increasingly desirable and even necessary. Practitioners and scholars of criminal law in particular have taken an interest in neuroscientific developments within psychiatry, forensic psychiatry, and other behavioral sciences. With respect to forensic psychiatry, this trend is not surprising, given that many topics of rele-

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> vance to it, such as the neuropsychiatric basis of violent behavior, moral decision making, and the nature of empathy – have become the object of intensive study (SILVA, 2007, p. 6).

There is a clear tendency towards a classification of disorders accordingly to what Flechsig, Lombroso, Gall, Esquirol or Charcot would rather consider an organic pathology, hence attributed to a diagnosable, albeit imaginary, lesion, that is, to biology itself. For Erhenberg,

> The era between the end of the nineteenth century and the early twentieth century saw the establishment of a separation, founded on the clinic, between neurology's cerebral and psychopathology's speaking man. In the first case, the symptom transcends the patient who has a nervous system disease (the brain is the target of therapeutic imputation), in the second, the symptom is entirely singular to the patient who is sick of him or herself, so to speak, of his or her intentionality (desire, belief, will, and so forth). Since then, psychiatrists and neurologists often search for connections between both realms. Simultaneously, the distinction between lesion and function became the cause of controversies on the body/spirit (or brain/spirit) interactions (ERHENBERG, 2003, p. 5).

4 Conclusion

According to Paulo Vaz *et al*, in a cultural context dominated by the belief in a generalized virtuality of disease, biomedicine and media - associated by the ever present discourse on risk - cooperate to shape not only behaviors and life styles, but identities themselves (Vaz *et al,* 2006, p. 148-149).

Throughout the twentieth century, due to the cultural impact of the advance and the ubiquitous mediatization of diagnosis technologies, as well as the huge improvement in therapeutics, biomedicine not only changed social perspectives regarding health and illness, but also influenced expectations, objectives and identities in numerous and significant aspects, as Rose singles out. Indeed, according to Rose, the language of biomedicine became second nature in Western culture and, consequently, people tend to regard themselves as "somatic" individuals, whose personhoods and bodily experience deeply relate to the medical vocabulary (ROSE, 2007, p. 25-26).

For Nízia Villaça and Fred Góes (1998, p.142), as well, it is no longer possible to describe the body without resourcing to the knowledge which accomplished the authority for discoursing on it, since the identity of the body became totally inseparable from medical technologies and the representations they produce, turning public performances such as reproduction and mood regulation, once primarily private. Charles Rosenberg argues that, along with therapeutic innovation, diagnosis technologies actually "defined and legitimated disease concepts as they have empowered medical practioners and reconfigured lay expectations of medicine" (ROSENBERG, 2002, p. 248).

Considering that, Rosenberg notes that, besides structuring social life, disease is an extremely

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complex category, for simultaneously it is a constitutive element within the relationship between doctor and patient; a biological event; a vocabulary disseminated by medicine in its different historical and epistemic contexts; the necessary evidence to consolidate public policies; an aspect of the individual's identity and social role, as well as an argument enabled to legitimate cultural values. The process of naming a disease, of framing it in order to specify it, consequently, is crucial both in the social sphere and the medical field, supposing, as Rosenberg remarks, a conceptual distinction between them. Therefore, a disease only comes to existence – as well as its bearers – as long as it is named (ROSENBERG, 1997, p. 305-310).

Disease, thus, is not simply an abstract entity able to destabilize and deteriorate the physiological structure and its functions, whose experience is restricted to the interactions in the clinical, scientific and institutional environments of public health. Above all, disease absorbs specific characteristics from the cultural and historical contexts within which they are framed. Disease – and therefore the notion of health – results from a framing process that engages the definition of disease and its influence on individual lives, public policies and the structure of health care services (*Ibidem*). Therefore, as Rosenberg states,

> Diagnosis is central to the definition and management of the social phenomenon that we call disease. It constitutes an indispensable point of articulation between the general and the particular, between agreed-upon knowledge and its application. It is a ritual that has always linked doctor and patient, the emotional and the cognitive, and, in doing so, has legitimated physicians' and the medical system authority while facilitating particular clinical decisions and providing culturally agreed-upon meanings for individual experience (ROSENBERG, 2002, p. 240).

Regarding disorders, whose definitions and classifications seem to be perhaps even more problematic and complex than the one of diseases, it is vital to mention the worldwide accepted American Psychiatric Association's publication, the *Diagnostic and statistical manual for mental disorders* (*DSM*). DSM's first version, published in 1952, represented an effort to standardize nomenclatures, mental disease categories and, so, diagnosis. By that time, however, psychoanalists still were the prevailing group in psychiatry. Therefore, terms like "neurosis" still made sense.

Nonetheless, from 1968 to 1979, DSM-II presents different classes of neuroses. Anxiety Neurosis, for instance, was defined in opposition to "normal aprehension or fear" as an anxious over-concern, associated with somatic symptoms. According to Kutchins and Kirk, anxiety in general became a mental disorder, whereas neuroses were completely banished from the DSM-III in 1980, although the idea of anxiety was kept (KUTCHINS; KIRK, 1997, p. 24-25).

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DSM III, however, meant a rupture with both former editions. It had 494 pages, an awesome feature in comparison with DSM II's mere 134 pages. It also reflected the crisis in the American psychiatric community, now about to leave the psychoanalytical approach behind, as well as setting new standards of normal and pathological, besides playing an important role in the organization of new identitary groups, since, lately, what shall be or not classified as a disorder by the APA's "bible", in certain cases, has also to be negotiated with the concerned groups or activists, like homosexuals, for instance. Published in 1994, however, DSM IV brings forth about 350 different disorders in its 886 pages (ROSE, 2007, p. 198-199; VENÂNCIO; RUSSO, 2006, p. 465).

Since the first edition of DSM, the number of disorders multiplied in a frenzy, and along with several kinds of depression, for instance, one may find sleep disorders as well. It is also clear that disorders became regarded more like organic conditions that, unlike disease, are solely attributed to the individual's physiology and not to external factors, although the exposition to stressful situations is still mentioned. Therefore, being pathological never was as normal as in the 2000's. And if it depends on APA's "visible criteria", on the pharmaceutical industry, neuroscientists and brain imaging experts, the proliferation of disorders is not likely to stop so soon.

This recurrence of the modern belief in the prevalence of the representation of the body provided by medical technologies over the individual himself in order to explain mental pathologies and also behavior seems clear. Finally, to close this brief reflection on the entanglements between neurobiology, disorders representations and culture as a whole, maybe it would be useful to remember President Schreber's famous example. Delegated to the care of Paul Flechsig back in 1893, who was much more concerned with brain anatomy and functions than with the whimsical scope of meaning, it is possible to think that the legendary Daniel Paul Schreber served as guinea pig to the epistemological rupture that brought forth what, in his *Memoirs of my nervous illness* (1903), he called "soul murder": the violent submission of meaning to biology.

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Neuro-imagem & subjetividade: construindo identidades no século XXI

Resumo

A sociedade ocidental contemporânea tende a induzir à atenta vigilância de nossos próprios corpos, encorajando a adoção de práticas rigorosas de condicionamento físico, a incorporação de dietas e hábitos apropriados, ao lado da submissão à constante supervisão médica para promover o gerenciamento de si sobre a saúde. As tecnologias de diagnóstico são fundamentais para essas negociações complexas, posto que proporcionam as imagens objetivas que ajudam a legitimar os conceitos de doença segundo o dogma inflexível da objetividade visual nas ciências e cultura ocidentais, assim como para a lógica do risco e o imperativo da prevenção. Este trabalho busca explorar a extensão na qual as representações biomédicas do corpo afetam as identidades contemporâneas, enfocando o profundo impacto cultural causado pelo deslocamento do modo como comportamentos antes ordinários passam a ser condições patológicas desde a associação entre a neuro-imagem e a neurobiologia nos anos 1980.

Palavras-chave

Neuro-imagem. Cultura visual médica. Corpo. Biopolítica. Comunicação.

Neuroimage y subjetividad: construcción de identidades en el siglo 21

Resumen

La sociedad occidental contemporánea tiende a inducirnos a la observación atenta de la vigilancia de nuestros cuerpos, encorajando la adopción de prácticas rigurosas de condicionamiento físico, la incorporación de dietas y hábitos apropiados, junto con la sumisión a la constante supervisión médica para promover la gerencia de "uno mismo" sobre la salud. Las tecnologías de diagnosis son fundamentales para estas negociaciones complejas, puesto que proporcionan las imágenes objetivas que ayudan a legitimar los conceptos de la enfermedad según el dogma inflexible de la objetividad visual en las ciencias y cultura occidentales, así como para la lógica del riesgo y el imperativo de la prevención. Este trabajo explora el grado en el cual las representaciones biomédicas del cuerpo afectan identidades contemporáneas, centrado en el profundo impacto cultural causado por el desplazamiento del modo como comportamientos antes ordinarios pasan a ser condiciones patológicas desde la asociación entre la neuroimagen y la neurobiología en los años 80.

Palabras clave

Neuroimagen. Cultura visual de la medicina. Cuerpo. Biopolítica. Comunicación.

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