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Brain versus body? Phrenological neuromania yesterday and today

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Abstract The trend of Neuromania (roughly, the brain tells us who we are) has its roots in the 19th-century phrenological approach developed by F.J. Gall and J.G. Spurzheim. Their initial intentions were embraced, a century and a half later, by some proponents of first-generation cognitive science. J.A. Fodor's modular theory of mind and localization of different brain functions reflects Gall's idea of a close "brain-mind(-body)" correlation, determining moral sentiments and intellectual faculties. Then as now, such a perspective inevitably leads to several risks: 1) an extreme scientificalization of domains outside scientific calculations (e.g., that of feelings and perceptions); 2) the hierarchization between more or less functional faculties which human beings would possess (deviating, e.g., into the legal sphere); 3) the possibility of detecting all this by studying the brain alone. So, the 19th-century phrenological quarrel both anticipated and clarified today's contention. Concerning the anti-phrenological side, G.F.W. Hegel's embodied approach and C. Cattaneo's concept of association of ideas derived from perception (i.e., cognitive semiotic *ante litteram*), provide a key to addressing the above issues and proposing remedies to neuromaniac deviations in their various forms.

Keywords: neuromania, 19th-century phrenology, embodiment, cognitive semiotic, association of ideas

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0. Introduction. Undermining a myth, from past to present and back

Since antiquity, philosophy kept *mythos* and *logos* separated to investigate their intrinsic relationship. With the modern age, however, the advent of the scientific method has never been separated from the elaboration of reveries and fabulous tales that have sought to, or otherwise risked, divert its path of progress.

Since the 2000s, the literature in the cognitive and neuro-psychological fields tried to identify and define the phenomenon of Neuromania, reconstructing its essential features and highlighting its breeding grounds. Among others, Tallis distinguished two related trends: firstly, Darwinitis, understood «as an inflamed mode of Darwinian» and «"Darwinization" of our understanding of humanity»; secondly, Neuromania, as «an appeal to the brain, as revealed through the latest science, to explain our behavior» (Tallis 2011: 5).

In this latter sense, rather than a mere reference point, the brain constitutes a paradigm or, in Tallis's words, an «imperative, *whether we know it or not*» (*Ibidem*, emphasis in original) to which we are subordinate regardless, and on which everything about our

being human depends. However, viewing something as a starting *and* ending point (namely, as postulated, already given, and not to be questioned) risks becoming more like a religious dogma.
Both Tallis (2011) and Legrenzi & Umiltà (2009) noted that the centralization of the human organism's functions in the brain was discussed long before neuroimages. The original debate focused on the soul's location and involved the Hippocratic medical school and the Presocratic philosophers. Cicero, who argued for the soul's immortality, summarized these views in the first book of the *Tusculan Disputations*:

> Empedocles holds that the soul is blood permeating the heart [*cordi suffusum sanguinem*]: others thought that a particular part of the brain had claim to the primacy of soul [*pars quaedam cerebri … animi principatum tenere*]; others do not regard the actual heart or a particular portion of the brain as being the soul, but some of them have said that the heart is the local habitation of the soul, whilst others place it in the brain; others however identify soul and breath […]. Now the views […] that *the soul is heart, brain, life or fire* [i.e., "fiery breath"] are those ordinarily held: the remaining views are as a rule peculiar to the individual thinkers […] [such that of Aristoxenus], who held the soul to be *a special tuning-up of the natural body* analogous to that which is called harmony in vocal and instrumental music; answering to the *nature and conformation of the whole body*, vibrations of different kinds are produced just as sounds are in vocal music (Cicero, *Tuscolan Disputations*, I, IX-X 19, eng. transl.: 22-25, my italics).

The diverse ancient ideas about localization thus highlighted the brain's role and emphasized the body's significance as a gauge of what is material and vital. This connection was mainly tied to instinct and emotion: for instance, terms like *animosus* and *bene animatus* referred to courage and being energetic and impetuous (*Ibidem*). Moreover, a theory of the soul such as that of the musician Aristoxenus demonstrated the prominence in antiquity of the idea of the body as a whole and harmonious organism, founded not on the autonomy of the parts, but on their intrinsic interdependence.
The relevance of this approach becomes clearer when looking at more recent times. In a strenuous attempt to demythologize the supremacy of the brain as a shaper of our lives (namely, to separate neuroscience from its deviations), critics have begun to refer to the neuromaniac approach as the "neo-phrenology" or 20th-century phrenology, to distinguish it from the previous century's phrenology headed by the school of German physician Franz Joseph Gall[1]. Far from assuming it as a purely critical value, a cognitivist such as Jerry Fodor rather embraced such terminology to explain his theory of mental modules. Furthermore, as Tallis noted, neuromaniacs have seen the distinction between science and scientism as a «diminish[ing of] the work of neuroscientists» (Tallis 2011: 28). Hence, the claim to "go *beyond* our brains since we are *more than* it" has taken on the appearance of an assault on true science. Translating the myth of Icarus, the neuromaniac attitude appears to be an arrogant challenge to attain the totality of knowledge by encoding it from the brain itself (e.g., by localizing brain functions).
With such premises, this article aims to demonstrate that the modern debate between phrenological and anti-phrenological trends is key to understanding further perspectives and new meanings of (past and present) neuromania. Starting from the legacy of

[1] Especially Mijuskovic highlights the pretentiousness of neuroscience about consciousness: instead, this demonstrates its «flagrant inability to predict human emotions, thoughts, and actions» and «to provide a convincing theory in accounting for how we are capable of creating theoretical, artistic, and ethical systems as well as their evaluations» (Mijuskovic 2019: 318). An approach, he concludes, that has led, particularly in the US, to selling «its collective soul to the Faustian god of Medication» in the name of a «fanatical faith in science and technology [which] has destroyed its common sense» (ivi: 319).

organology in present-day cognitivism as seen by supporters and critics (par. 1), the first focus is on Franz Joseph Gall's cerebrocentrism as the seed of a hierarchical and racist perspective, which shares common features with current neurodeterministic approaches (par. 2). Secondly, a comparison with the anti-cerebrocentric positions of G.F.W. Hegel and Carlo Cattaneo proves that they can be considered pioneers of an embodied approach and a cognitive semiotic perspective (par. 3, 4). After all, like therapists, they administered an antidote to Gall's theories: the return to the centrality of the body and sensations as a bulwark of intersubjectivity in the process of recognition as a subject, from a historical-philosophical, phenomenological and linguistic standpoint.

1. Curbing the Copernican revolution: a legacy sought from mistakes

Defining Chomsky's Neocartesianism as the idea that the child has an «innate [...] *body of information*» or linguistic knowledge, in his *Modularity of Mind*, Fodor (1983: 4, emphasis in original) recalled a recent debate in brain sciences and cognitivism on the organological conception of cognitive structures as "systems of rules and representations" (Chomsky 1980)[2].

Among others, Marshall (1980: 24) identified a family resemblance between Chomsky's new organology and Gall's old one. Compared to the first, the second could offer a valid answer concerning the identification of brain functions, but not the brain's functioning. Marshall thus concluded a «strategic» filiation between the two sides: a «significant analogy» between grammar and biology appears to be based on appropriate use of «the metaphors of growth and environmental triggering and regulation when looking at the language acquisition» (*Ivi*: 25).

From Gall's organological system, Fodor inherited the "vertical" faculties (e.g., propensities and aptitudes, as distinct from the "horizontal" ones such as memory, imagination, and sensitivity) in his functional architecture of the mind. Specifically, Fodor argues that there are cognitive modules in the mind, which are «domain specific», innate or «genetically determined», «hardwired» or associated with «distinct neural structures», and lastly, contrary to Gall's perspective, «computationally autonomous» (Fodor 1983: 21). From this perspective, the autonomy of the mental operations of mathematical computation from other cognitive capacities has essentially led to the drift of organology into phrenology as a mass of "fraud and quackery":

> It seems to me that the notion of a vertical faculty is among the great historical contributions to the development of theoretical psychology. So, why isn't Gall honored in the textbooks? […] Gall made two big mistakes, and they finished him: he believed that the *degree* of development of a mental organ can be measured by the relative *size* of the corresponding brain area, and he believed that the skull *fits* the brain "as a glove fits a hand" (*Ivi* 1983: 22-23, my italics).

While acknowledging Gall's innatist position, Fodor seems to blame him for indirectly slowing down the Copernican revolution in organology. This shortcoming thus made the founder of organology the architect of its own decline due to numerous changes of

[2] The *Open Peer Commentary* (which was followed by the *Author's Response*) presented a wide range of themes addressed in Chomsky's work. For obvious clarity and space reasons, we will only mention them in general terms: the notion of competence; empirism and non-empirism in theories of mind; the relationship of language faculty with linguistics and biology; the relationship between evolutionary anatomy and language; the development of rules and representations and their nexus with causation; cognition, language, representation and psychological reality; deep structure and innatism; language learning and grammar growth; Chomsky's radical break with modern traditions, as well as a proposal of an artificial intelligence perspective on Chomskyan linguistics.

direction. Nevertheless, Gall inevitably remains the new (old) starting point as solid proof of the modular hypothesis:

> The moral, I suppose, is that it would be rational to pray that Gall was *at least a little right*; that there are at least some cognitive systems that are sufficiently modular – hence sufficiently local in their computational character – that they can be studied prior to the development of theories of the effects of global determinants in belief fixation. That our cognitive science has got anywhere at all suggests that *this prayer may have been answered*. Modified rapture! (*Ivi* 1983: 129, my italics).

On the other hand, criticism of the Fodorian position reveals a legacy of thought and a relationship between past and present perspectives that is anything but trivial. Starting from Gall's errors identified by Fodor, Legrenzi and Umiltà open to a scenario that shifts from a level of pseudo-science (something false and not true) to one of para-science (which is not science anyway but resembles it, namely, it turns out to be altered but still related to it). Indeed, viewing Gall's phrenology as an attempt «to invent psychology» (Legrenzi, Umiltà 2009, eng. transl.: 10) might lessen the significance of his mistake. Connecting the idea of the "bumps" with current paleoanthropological studies (emphasising internal surfaces rather than external ones) seems to find a reason for the phrenologist's stumble:

> [Gall's] mistake was to have proposed rather *improbable* [specific and independent, i.e., modular] mental functions […] and to have thought that the development of the areas of the brain could be deduced from the *external configuration* of the skull (the "bumps") […] the more an area was developed [i.e., the bigger the bump], the more efficient would be the functions for which it was responsible. In other words, the bigger the bump, the better the function. […] However, to do Gall justice, it must be admitted that the idea of the "bumps" is less bizarre than might be thought. Modern palaeo-anthropologists attempt to infer the intellectual capacities of the predecessors of *Homo sapiens* by the marks left on *the internal surfaces of the skull by the cerebral arteries*, the courses of which provide information regarding the development of the areas of the brain they supplied. Therefore it could be said that we now study the concave side of the bump, whereas Gall studied the convex side (*Ivi*: 4-5, my italics).

All in all, what Fodor intended as the "answered prayer" of cognitive science is nothing more than an effort to choose a disciplinary father with the benefit of inventory. Obviously, this implies a selection of revolutionary elements, removing from the revolutionary elements the supposed correspondence and direct proportionality between intellectual degree and measured size as an index of brain function development – and, of course, between the level of regression and the presence of irregularities in the skull.

Nevertheless, the recent downplaying of the stakes makes the danger of neuromania lurking around the corner[3]. Basically, the theory of innate modularity leads in three directions. As *brainification*, it over-centralises the brain as the sole detector of all facts and implications; as *hierarchization*, it keeps mind and body completely autonomous, consequently subordinating the latter; as *scientification*, it constitutes the real springboard

[3] In the context of evolutionary psychology, for Egeland (2024), it is necessary to give new meaning to the modular debate against a misinterpretation and oversimplification of the two neuromaniac and anti-neuromaniac positions. For both sides, he proposes to specify the Fodorian properties being analyzed, to derive testable predictions from the proposed hypothesis, and not to question the discipline's epidemic status in the background.

to what Tallis called a «second wave of phrenology» – the same considered guilty of the deviations of the original organology (Tallis 2011: 33).
In the next paragraph, we will explore further the implications of Gall's cerebrocentrism. In this case, the triple goal of determining, defining and measuring essentially overshadowed the original good intentions.

2. Nothing but the brain: new science and seeds of racism

Born under the best auspices of science, the scholarly relationship between Gall and Johann Gaspar Spurzheim was full of ups and downs: from their first meeting in Vienna to various stops between Paris and England in search of a favorable audience, to the master's accusation of plagiarism against his pupil, until the subsequent spread and contestation of the theories in Europe (see Eling, Finger 2021).
The primary outcome of this collaboration is the four-volume work *Anatomy and Physiology of the Nervous System* (Gall, Spurzheim 1810-1819). Contrary to what one might expect, it essentially presented Gall's theoretical point, as evidenced by the alternation of the first person singular and the first person plural. Since the preface, Gall claimed a dual interest in the anatomical study of the brain and the *sem(e)iotic* study of human dispositions, which led him by pure chance to the idea of specific and independent areas of the brain:

> [The study of medicine] told a great deal about the functions of muscles, viscera, etc., but nothing about the functions of the brain and its various parts. While I was making conjectures about the signs of certain talents which are announced by the conformation of the head […] I assumed at first, and soon became certain, that the difference in the shape of skulls is caused by the difference in the shape of brains (Gall & Spurzheim 1810, 1: IV, my translation).

In Gall's perspective, the intellectual faculties must be caused by certain parts of the skull since they are closely dependent on the brain and its mass. However, this inference definitely needs a terminological premise. While Spurzheim legitimized the term "phrenology", with the new term "organology", Gall intentionally emphasized the relevance of the interior (the brain) rather than the exterior (the skull). Moreover, he focused his attention not on the object itself (the brain in its entirety, or phren), but on its functionality as a device (i.e., organ, or organon) for attributing innate intellectual and moral characters (which can only have material manifestations).
Gall provided a minimum of 27 brain functions (increased in subsequent editions), which we can map according to their position in the four lobes. In the frontal lobe, he placed the dispositions concerning the relationship with objects and the external world (e.g., language, size, calculation, time, comparison, causality etc.); in the temporal lobe, disposition to action and ambition, stability, prudence and expectation (e.g., constructiveness, cautiousness, secretiveness, firmness, etc.); in the parietal lobe, feelings of trust and distrust toward self, others and the external world (e.g., self-esteem, consciousness, approbativeness, etc.); finally, in the occipital lobe and cerebellum, feelings and dispositions related to types of relationships (inhabitiveness, parental love, conjugality, friendship or adhesiveness, etc.)[4]. In a nutshell, while the intellectual faculties would occupy the periocular area (in particular, language is positioned under

[4] For the sake of simplicity, we refer to American phrenologist Nelson Sizer (1882: 404-408), who divided the mental faculties as follows: domestic propensities, selfish propensities, aspiring group (head above and backward, around ears); moral sentiments, perfective group (top of the head); perceptive organs, literary faculties, and reasoning organs (forehead).

the eye), the more numerous moral and affective faculties would be in the rest of the cerebral hemispheres.
However, Gall did not limit his attention to the brain interior. Throughout the work, terminological locutions such as *(traits du) visage*, *(configuration de la) tête* and (*proportion de la) face* appear frequently. Regarding the latter case, the context is the critique of a direct proportionality between brain and face (Gall, Spurzheim 1810-1819: vol. 2, 325-332) claimed by coeval craniometric theories: the contentious objective is Petrus Camper's facial angle, which was rejected by Gall as a naturalistic and physiological tool but taken up in the latter 19th century by Paul Broca for his neuropsychological studies.
Moreover, Gall concluded the second volume of his work by arguing that the measure of moral qualities and intellectual faculties cannot depend on the relationship of the organ as a whole to other organs or parts of the body, let alone on the mutual relationship between the different parts of the brain. In his own words, «*at equal conditions* of encephalic mass and head size, instincts, inclinations, industrial aptitudes, feelings and faculties can manifest themselves to *very different degrees*» (*Ivi*: 460, my translation, my italics), implying the eminent development of some parts and the impoverished development of others in the brain of the same individual.
From an organological standpoint, the polarization of brain functionality at the expense of the body means that, in the beginning and in the end, it is *the parts of* the organ, not the organ itself. For this reason, Gall mainly addressed the objection of jusnaturalistic and sensualistic tendencies that affections result from "sympathetic" action (Fr. *sympathiquement*, denoting the participation of the same affection) of the heart and other parts of the body (i.e., perception) related to feelings. According to him, the core problem was rather the confusion of «the organ that produces an affection or passion, with the viscera on which this affection or passion acts» (*Ivi*: 241, my translation). On the contrary, «all the phenomena of the moral and intellectual faculties would be restricted to the brain» (*ibidem*) due to the *reciprocal* action (ensured by nerve branches) of the nervous systems of the brain and those viscera (chest, lower abdomen, spinal cord, senses). It follows that

> *The brain could not react in any way on the other parts*, and could not determine the instruments of voluntary movements to produce actions in conformity with affection or passion. Animals and humans would be nothing but brains, *the rest of the body would be nothing but inert mass* (*Ibidem*, my translation, my italics).

Abandoning previous approaches, Gall's novelty consisted in analyzing the brain as a composite of parts, each with a specific role. In his view, the organ of the mind (*organe de l'âme*) as a whole did not correspond to its – so to say – "headquarters" (*siège*; *Ivi*: 214). This was the basis for the argument of the brain as «the noblest of all nervous systems» (*Ivi*: 251, my translation), demonstrated by twelve proofs complementary to each other (*Ivi*: 251-267), which mainly concerned:

- a direct correlation between the perfection of the brain (and its parts) and the energy of moral and intellectual faculties (1, 4, 5);
- their correspondence in early development during childhood, i.e., *enfant prodige* (6);
- material conditions and the location of different brain parts influence the manifestation of intellectual faculties (2, 3);
- the fact that the brain and nervous systems are governed by the same laws, which directly impact the exercise of intellectual functions and the formation of ideas originating from affections (7, 8);

- the fact that different brain structures determine the different gradation of faculties, i.e., between man and woman, as well as in nations and in lineage (9);
- finally, the related involution and degeneration between the brain, its parts and moral and intellectual functions in the case of disease (10, 11, 12).

As a result, Gall's corollary that «the whole brain is not a single organ [but] each of its integral parts is a particular organ» with a distinct function (*Ivi*: 355, my translation) definitely forged and crystallized the inherent racist framework of organology. As Pogliano (2020: 23 ff.) noted, the trends of a differentiated autonomy of brain areas and a slippage between quantity and quality as parameters became crucially important as early as the late 18th century, both philosophically and anthropologically. Betraying the original stated goal of providing "scientific" answers, the collection and measurement of skulls instead stemmed from an established «objective racial hierarchy» (*Ivi*: 28). Basically, it was anchored to the «material parts» and «organic composition» of the human being, of which the brain (in its size and structure) was the actual distinguishing mark (*Ivi*: 37-38). If we claim that we are our brains (and our cerebral cortex), this inevitably substantiates the dangerous fixed correlation between scientific, legal and social planes. As is well known, this condition has been fueled by the study of the criminal man and maximized by Cesare Lombroso's physiognomy and anthropology.
As then pointed out by Renneville (2021: 24), the phrenological attempt to enclose the causality of crimes and misdemeanours in the brains of deviants (developing a «cerebral cartography» of essential functions) preceded the future work of those scientists who established a close relationship between brain pathology and criminality, explaining the latter by an organic determination. Such a problem can find its way out in history as a *refutation* of the theories of the past, «since a physiological trait says nothing about the resulting social behavior» (*Ibidem*, my translation).
For these reasons, Gall's fight against a holistic conception of the brain made him both a forerunner of scientific criminology and, as the chosen father of the new and purified organology, a permanent incentive of the spectrum of neurodeterminism. Despite this, the partial success of his theories left room for the construction of an alternative to cerebrocentrism. The time was ripe to bring the body back into the spotlight.

3. Anatomy of a «bad subterfuge»: Hegel's "embodied" response

One of the most noteworthy contributions in response to Gall's assumptions comes precisely from German idealism. Indeed, as a champion of anti-organology and anti-physiognomy, Hegel was deeply involved in the extensive debate of his time that intersected the "physiognomy-pathognomy" quarrel between J.K. Lavater and G.C. Lichtenberg.
In a specific section of his *Phenomenology of the Spirit* (Hegel 1807), discussing the "certainty and truth of reason", Hegel distinguished, from an evidently anthropocentric perspective, between what is *dead* or static and what is *living* or dynamic (i.e., something that presents an accent of spirituality while still being material). Recent studies thus considered the Hegelian perspective in light of the contemporary concept of embodiment, taken in its most general sense. As Achella noted, Hegel's anthropology presented the body as «the last bastion of resistance in the transition from consciousness to self-consciousness» (Achella 2021: 53), or in other words, as the main element of (inter-)subjectivity in the process of subjectivation (which is the next evolutionary step in Hegel's phenomenology).
Needless to say, this contrasts with the idea of a basic external essence of the human (namely, on facial features and brain bumps). Such a choice does not fail to be reflected

in the Hegelian lexicon as well, as evidenced by the use of the German terms *Körper* for «the dead body of natural objects», and *Leib* to indicate «the animate organism […] as a necessary condition for becoming human» (*Ivi*: 54).
Moreover, Inwood (2016: 10) alleged that the Hegelian critique was essentially against the localizationist thesis as a whole, viewing the brain as a non-homogeneous organ and a mere aggregate of parts with specific locations. Aiming to deny the well-known dependence between external skull shape and internal mental states, Hegel indeed correlated the fact of *signifying* something and that of being an *animate* and living organism, considering the second as a precondition for the first:

> *The skull-bone is not an organ of activity, nor even a speaking movement*; we neither commit theft, murder, etc. with the skull-bone, nor does it in the least betray such deeds by a change of countenance, so that the skull-bone would become a speaking gesture. – *Nor has this being the value even of a sign.* […] [B]ut the skull-bone for itself is such an *indifferent, unencumbered thing* that nothing else is immediately to be seen in it, or to be opined, than *simply the bone itself* (Hegel 1807, eng. transl.: 134, my italics with emphasis in original).

Then, the same organ that for Gall produced affections and actions was *inactive* for Hegel. Put otherwise, the latter conceived it potentially incapable of activity (even of its negation) as a nonviable, non-communicating and therefore *non-significant* thing, since it cannot have sign-value as simply a bone. Having no life, the bone cannot be an integral part of the process of "sense making", which Hegel believed is the true human prerogative. As Inwood highlighted, *signifying* is, from a Hegelian standpoint, «not a *sufficient* […] but […] at least a *necessary* condition, explaining why a man, but not his dog, is capable of participating in this way of life and taking up its opportunities» (Inwood 2016: 17, emphasis in original).
In a nutshell, if for Gall there was *nothing else outside* the brain, for Hegel, spirit is, at this intermediate level, *everything but* the brain/skull. In fact, the skull is devoid of vitality and spirituality because it is dried up and ossified. The body instead reacts, feels emotion, and creates language. As it is placed in the world, it is a combination of nature and culture. With Hegel, the brain/skull, free from any reciprocity or interrelation as it is lifeless, ceases to be the vital pivot of the body (as it was in the organological conception) and becomes an empty accessory to the living body:

> If, all the same, the relation is still to obtain, what is left and necessary is an *unconceptual*, free, pre-established harmony of the corresponding determination of the two sides; for one of the two sides is to be *non-spiritual actuality, a mere thing* – On the one side, then, there stands a multitude of inert skull-areas, on the other a multitude of spirit-properties, whose multiplicity and determination will depend on the state of psychology. […] The *Being* of spirit cannot at least be taken as something simply fixed and immovable […] we see what happens, as always, to a bad subterfuge, viz. that *it is itself ready to be used against what it is supposed to support* [...] to say that *by this bone something is indicated, but equally also not indicated* (Hegel 1807, eng. transl.: 135-137, my italics with emphasis in original).

We can therefore define Hegel's perspective as embodied, but with some reservations: among these, the fact that the body is a *passing* moment on the path of ascent to spirit. The essential critique of the bones as mere things indeed lies in their lack of *real and actual* corporeity. Nevertheless, mere observation could be misleading. Occurring as a «sensory thing» (*Ivi*: 140), bone could be mistaken as a "body" since it is «what is dead, insofar as what is dead is present in the living creature itself» (*Ibidem*). So, Hegel raised

the potential risk of objectifying as *real* something that exists simply in its materiality, without any *vital* breath, without any sensitivity. As Eco stated, Hegel's words let emerge, beyond the «sarcastic amenities» (Eco 1984: 50), a justified concern about an inevitable drift that makes historical changes irrelevant.
Accordingly, if to exist means to signify, Hegel's position encounters that of phenomenological semiotics. Following Sonesson's idea of the «multiple bodies of the mind», signification turns out «to be indispensable for our understanding of human consciousness [as it] supposes something of a body of its own» (Sonesson 2007: 86). Returning to the Hegelian perspective, «if the actuality is not present, the *empty possibility* serves equally well» (Hegel 1807, eng. transl.: 136, emphasis in original): it is, in short, a substitute to be taken only as such, namely, only in the absence of the actual.
After all, this corresponds to nothing other than the function of the sign as an element of memory. While for Hegel this ultimately refers to the spirit, for a profound empiricist such as Carlo Cattaneo, as we will see in the next paragraph, it remains in the depths of the body itself through perception.

4. Perception and association as a memory key: Cattaneo and the "CogSem" treatment

Compared to Hegel's open and specific attack, Cattaneo's criticism may seem more moderate, but only in appearance. In his view, political and philosophical interests were extremely linked and contributed to the development of society through the education of the individual.
The concept of association was absolutely central to Cattaneo, who attributed at least two main implications to it. Firstly, it took root in his political ideal of liberalist and secular federalism (the reference is to confederations between states in the Italian context of the time). Secondly, it reflected his philosophical and linguistic perspective of intersubjective or "associated" minds.
Furthermore, Cattaneo harshly criticized phrenology for separating medicine and philosophy through anthropometric direction (Cosmacini 1993). In the wake of the Enlightenment and sensualism, he especially intertwined the non-measurability of thought with intersubjectivity and the sensitive and perceptual origin of ideas.
From this perspective, Cattaneo's approach anticipated that of cognitive semiotics. Borrowing Zlatev's definition, we can say that the Milanese thinker fully engaged with «the multifaceted phenomenon of meaning […] into the realm of human signification and its manifestation in cultural practices», which is nothing more than a defragmentation of «the dialectical relationship between individual freedom (autonomy) and collective dependence (sociality)» (Zlatev's 2015: 1043, 1063).
Within the coeval medical-linguistic debate, Cattaneo made his mark with an article co-authored by the Italian physician Giuseppe Canziani and published in his journal *Il Politecnico*. Their interdisciplinary perspective did not actually call into question phrenology's status as a "science". Rather, they aimed to criticize both its claim to consider itself foundational with respect to craniology, and presumptuous disciplinary ambition (as well as arrogance) of creating its own artificial and obscure knowledge based on an unquestionable supremacy of principles:

> The phrenologist, to illuminate the problem of *man* [emphasis in original], lights a new torch, one more torch; but he must not therefore extinguish all the others and create a factual darkness for himself. […] Isolating a phrenological study at all may be done from time to time, *to give idiots splendid proof of the power of science*; but it always supposes the phrenologist in *jousting with opinion*, it does not suppose him in

> the quiet exercise of his conjectures. […] It would be the time that *the same demeanor be demanded of this new science as is imposed on others*. This would also help to appease those, who hate nothing in phrenology but the admiration of the multitude; and would gladly grant it the peace of the schools, if it did not occupy the arena of public attention for them (Canziani, Cattaneo 1839: 77-78, my translation, my italics).

Far from oxymoronicity, Cattaneo and Canziani continued to refer to phrenology as a science not so much because of its method, but to free it from its fierce dogmatism. Even if potentially typical of any other discipline, such an attitude appeared in this specific case clearly around the corner.
Thanks to his role as a political educator, Cattaneo later proposed the principle of associated minds as the result of the relationship between various individualities in linguistic, social, cultural, etc. fields. It did not consist of a sum, but of a *continuous interaction*, pushing for the abandonment of the anthropocentric terrain. Morality, politics and sociability were thus grounded in education, without ranking between savage and civilized man nor within human nature, because of the imitative core of language. As Cattaneo stated around the 1850s:

> We shall say, then, that ideas that can be revealed in the light of conscience, that is, of internal experience, *within that circle of external experiences accessible to the infant, the savage and the solitary, are primitive and inferior*. […] The ideas we shall call later, progressive, superior, social and scientific are those which *can only be manifested in the internal and external experience of several associated minds* (Cattaneo 2016, eng. transl.: 207, my italics).

The association of ideas through an activity of chaining memories or past experiences (lived and *perceived*) was rooted at the sensory level, which, at the same time, guaranteed the social matrix of psychic activity. Embracing an encyclopedic perspective, Cattaneo conceived the various disciplines (and particularly the sciences) as "associations of ideas" in the sense of a systematic reconstruction of remembrances through sensations.
As a result, we can argue that Cattaneo anticipated what Sonesson (2018) explained semiotically as a socio-cultural lifeworld. He indeed defined what we might call a *socio-memorative* process as an «art of signs», because an «isolated mind lacking signs» would lose most of its impressions (Cattaneo 2016: 274)[5]. To put it another way, in the absence of semiotic and interpretive concatenation, it would not record the experienced perceptions in memory, nor could it have access to the memories of others.
In short, the recollective enchainment of ideas enshrines the crowning of habit as a *synolon* between the natural element founded on perceptions and the cultural one derived from interactive inclusion in the "human consortium". For the latter point, in cognitive semiotic terms, this implies different levels of *agency* as a combination of active and receptive aspects of intentionality (Zlatev, Mendoza-Collazos 2022).
These are the reasons why the association of ideas cannot exist without the concept of system. Cattaneo properly denotes it as

> *a series of ideas* connected intimately to each other by means of a principal idea or a principle, so that, by starting from it, the mind cannot help but arrive, *by means of association and deduction*, at all others; and then, from these others, return *spontaneously and habitually* to it, experiencing an intimate sense of satisfaction and rest in such an

[5] Here we quote from the original Italian translation, as the English translation does not encompass all the parts published in it.

> act. The tendency to co-ordinate ideas around a principle is *by nature consistent with our intellect*. Firstly, every object of our perceptions is already part of the same universe; and for this reason our perceptions are already *related to each other in a system*. […] Secondly, as man, due to the limited nature of his mind, is unable to represent many distinct things simultaneously, he is forced to *combine many ideas in a single concept* […]. Thirdly, the individual mental faculties, sensation, memory, attention, reflection are not separate entities but *a single thinking entity performing different actions* (Cattaneo 2016, eng. transl.: 109-110, my italics).

In other writings from the same period, he also insisted that the instinct of imitation required proper education to ground the process of association of ideas, which was the basis of the making and unmaking of languages (*lingua*). This is because, unlike language (*linguaggio*), languages are not something naturally given or connected to anatomical constitution – thus denying any relationship between language and lineage. Rather, they are subject to continuous transformations given different actors and circumstances in time and in space:

> Languages [*lingue*] can, therefore, *make and unmake themselves*. No language [*lingua*] is necessary. They are human and social works like customs, laws and sciences. […] [The ancient peoples] must have seen in the infant's voice the *resemblance* to the bleating of the goat; and thus the tendency and capacity of man to *imitate sounds*. Hence, by *association of ideas*, a sound can become a sign that recalls the idea of a thing or an act and therefore indicates that thing or act; and it becomes a noun if it indicates the thing, a verb if it indicates the act (Cattaneo 1960: 324-326, my translation, emphasis in original).

Embracing the French eighteenth- and nineteenth-century *idéologues* and encyclopedists, Cattaneo adapted sensualistic and empiricist precepts and conceived both the *contingency* and the *social normativity* of signs. This means, above all, a refusal of a passive conception of memory. Like Condillac before him, Cattaneo acknowledged memory as an autonomous and voluntary function. It does not simply bring sensations to light, but gives them an organization through language.

5. Concluding: historicity as an antidote

Throughout this article, we have taken a retrospective approach, focusing on the aspects that have characterised the modern and contemporary debate on neuromania. In the second case, Fodor inherited from Gall the idea of the brain as the central device of human life.

This is not an accusation leveled at him by critics. Recognizing the shortcomings of early organology, Fodor consciously chose a theoretical authorship which, in its determinism, continued to fuel a debate that had never really died down.

Today, as in the past, arguments in response to waves of organology focus attention on the body. To use a theatrical metaphor, his entrance on stage does not, however, sideline the brain, which essentially takes on the role of supporting actor. In fact, both Hegel and Cattaneo's real polemical target was the static nature of the brain/skull taken as such and as the holder of every function. And ultimately, stripping them of their theoretical complexities, both embodiment and cognitive semiotics find in the body the key to moving and understanding animal life (human and non-human).

While the importance of the body increased, in nineteenth-century debate the significance of the face seemed to diminish, apparently relegated to a fetish of physiognomy and phrenology. In reality, looking at the arguments put forward by critics

of organology, it clearly constitutes not only the starting point of the *pars destruens*, but also that of the *pars construens*.
For Hegel, if the body is the way out of organology on the path to the spirit, the face, as a mosaic of expressions and a vehicle for the externalization of emotions, is the first material sign of vitality. For Cattaneo, in its multifaceted nature, the face constitutes anti-deterministic proof not only of the absence of a link between lineage (i.e., race) and language (contrary to craniological theories of human types), but also of the cultural nature of language and languages, which are formed through association and mnemonic processes.
Returning to Renneville's warning (par. 2), to address the risk of neuroscience slipping into neuromaniac approaches and other forms of scientific totalitarianism, it is certainly crucial to start anew from the lexicon. Following Leone (2023: 11, 17), physiognomy based its supposed certainties on the "immobility of the image" and its "absence of life". The usefulness of the skull was therefore in the stability and definition of those lines corresponding to the main facial features (the latter, however, subject to changes in facial expressions). In the relationship between semiotics and phenomenology, the skull, as a non-living object and simulacrum of measurement, acquires meaning in reference to a past vitality, that is, when it was part of a sentient organism.
In the anti-neuromaniac view, the body speaks as it is alive and, for this reason, is made with the other. That is, it exists insofar as it participates in the process of otherness (identity given in intrinsic difference) and intersubjectivity. In this sense, temporality, as recognition of being subject to historical becoming, constitutes the true antidote to the fixity of cerebrocentrism and the new organology, founded on the motto of "the already given". In the background, interdisciplinarity remains a necessary therapy: being able to look at the other side with the eyes of the other, not only with one's own.

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