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Scientificizing McLuhan: predicates of man-machine coupling, the triplex isomorphism hypothesis, and its aesthetic consequences.

Artigo inédito

Cientificando McLuhan: predicados do acoplamento homem-máquina, a hipótese do tríplex isomorfismo e suas consequências estéticas.

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In *Laws of Media*, written with his son Eric, Marshall McLuhan aimed to assign scientific status to his ideas, presenting his Tetrad model and offering several examples of its application. McLuhanism places great emphasis on media ecology specific perceptual bias; authors such as Maurice Merleau-Ponty, Humberto Maturana, Francisco Varela, David Chalmers and Andy Clark allow us to bridge it to the research on consciousness and brain carried through the last decades. If media creates an experience related to its epistemic context, it is possible to approach the forms of human-machine coupling – especially in digital culture –, by examining the hypothesis of a triplex isomorphism between <brain><apparatus><experience> that would turn mcluhanism into hard science. This hypothesis' aspects are discussed, alongside further problems related to contemporary artwork creation.

**palavras-chave:**

leis da mídia; experiência; neurociência; tríplex isomorfismo; estética

Na obra *Leis da Mídia*, escrita com seu filho Eric, Marshall McLuhan pretendeu atribuir um status científico às suas ideias, apresentando seu modelo em Tétrade e oferecendo vários exemplos de sua aplicação. O mcluhanismo enfatiza fortemente o viés perceptual específico da ecologia da mídia; autores como Maurice Merleau-Ponty, Humberto Maturana, Francisco Varela, David Chalmers e Andy Clark nos permitem associá-lo à pesquisa sobre consciência e cérebro das últimas décadas. Se a mídia cria uma experiência relacionada ao seu contexto epistêmico, é possível analisar formas de acoplamento homem-máquina – especialmente na cultura digital – ao examinar a hipótese de um tríplex isomorfismo entre <cérebro><aparato><experiência>, que transformaria o mcluhanismo em ciência dura. Aspectos desta hipótese são discutidos, juntamente a outros problemas relacionados à criação de obras de arte contemporânea.

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## McLuhan and scientific validation

In *Laws of Media* (LoM)<sup>1</sup>, written with his son Eric and released posthumously (1988), Marshall McLuhan attempted to assign a scientific status to his ideas about media and culture, presenting his now famous *Tetrad* and offering several examples of its application to media and other cultural phenomena.

At the very opening of the book, this is made clear: “This essay offers in testable and falsifiable form (the criteria of scientific laws) observations about the structure and nature of things man makes and does; hence *Laws* in its title”<sup>2</sup>.

Obviously, having dedicated his life to refining a way of interpreting the *history of culture* as *history of media*, McLuhan aimed to leave an intellectual legacy established in rigorous terms. Thus, while resorting to Karl Popper’s criteria of *falsifiability* – thus subscribing the idea of science as a collective enterprise towards objective material truth –, he also expected to align his ideas with *contemporary*, *systemic* science, rejecting classical linear causality (which he obviously considered related to literacy) and foregrounding the non-linear properties of his theoretical model, described as a *New Science*. As such, LoM is, most of all, the result of a style of asking, a “heuristic device” based on four questions to be asked to any technology, artifact or idea<sup>3</sup>:

- What does it enhance or intensify?
- What does it render obsolete or displace?
- What does it retrieve that was previously obsolesced?
- What does it produce or become when pushed to an extreme?

It is debatable if the Tetrad model indeed satisfies Popper’s demands, since its testability can be discussed in the same terms Popper dismisses Freudian psychoanalysis theory: it seems to always work, so it is not as falsifiable as the McLuhan claim. However, just like Freud’s model of interpretation of the unconscious, McLuhan’s model has had a lasting influence, and has generated a whole field of media-theory studies. Having embraced McLuhan’s theory long ago, I felt, in my own work, pressed by the same “scientific” demands, to validate my own thinking in different dialogue contexts.

Since one of McLuhan’s main thesis concerns media’s impact on human senses, it is possible, for example, to combine McLuhan’s findings with Merleau-Ponty’s work about perception (e.g., Basbaum<sup>4,5</sup>), but the question remains, doubled: Merleau-Ponty’s astonishing *Phenomenology*

1. MCLUHAN, Marshall; MCLUHAN, Eric. **Laws of media**. Toronto: University of Toronto Press, 1988. p. 98-99.

2. *Ibidem*. p. 3.

3. MCLUHAN, Marshall; MCLUHAN, Eric. *Op. cit.* p. 98-99.

4. BASBAUM, Sérgio. **O primado da percepção de suas consequências no ambiente midiático**. São Paulo: Intermeios: Fapesp, 2016.

5. *Idem*. McLuhan and continental philosophy: how merleau-ponty’s phenomenology of perception helps support and continue McLuhan’s directions. *In*: CIAPELLARDI, Matteo; ALMEIDA, Cristina; SCOLARI, Carlos (ed.). **McLuhan galaxy: understanding media today**. Barcelona: Universidad Oberta de Catalunya, 2011. p. 552-561.

**ARS** *of Perception*<sup>6</sup> was also released many decades ago (the original French edition was released in 1945), and since then a lot of water has passed under the bridge in the fields of the Philosophy of Mind and, specially, Neuroscience, which have experienced an enormous expansion in the last decades, surfing on the unfulfilled promise of offering a naturalistic account of mind, in hard-science terms: “No longer need one spend time attempting... to endure the tedium of philosophers perpetually disagreeing with each other. Consciousness is now largely a scientific problem”<sup>7</sup>.

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6. MERLEAU-PONTY, Maurice. **Phenomenology of perception**. New York: Routledge, 2013

7. CRICK, Francis, 1996 *apud* NOE, Alva; THOMPSON, Evan. Are there neural correlates of consciousness? **Journal of Consciousness Studies**, Exeter, v. 11, n. 1, p. 3-28, 2004. p. 3.

What follows reflects this aim to incorporate some kind of hard-science counterpart to ideas I have been working with in the last years, about technology and the senses, through a dialogue with contemporary cognitive neuroscience. Some interesting hypotheses emerge, which can also be questioned on different levels. At the core of these ideas lays the hypothesis of a *triplex isomorfism* between [*brain*<apparatus es><experience> (individual and collective)].

It is also useful to remind the reader that any discussion about senses and perception will, in one way or another, have consequences on our understanding of aesthetics; thus, a final section will be dedicated to considering some aspects of aesthetic experience and our encounters with works of art.

## Experience

To be a consciousness, or rather to be an experience, is to have an inner communication with the world, the body, and others, to be with them rather than beside them.<sup>8</sup>

8. MERLEAU-PONTY, Maurice. Op. cit. p. 99.

Therefore, if philosophy is in harmony with the cinema, if thought and technical effort are heading in the same direction, it is because the philosopher and the moviemaker share a certain way of being, a certain view of the world which belongs to a generation.<sup>9</sup>

9. MERLEAU-PONTY, Maurice: **Sense and non-sense**. Evanston: Northwestern University Press, 1964. p. 59.

## *Cinema spectatorship as media experience*

In LoM, McLuhan applies his tetrad to several ideas and apparatuses in Modern culture, sketching an innovative strategy to interpret their impact on human culture. Although LoM does not

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explore it, *cinema* is an excellent case to understand the relation between media technology and experience (individual and collective). The overheating of literacy in the 19th century flips into several media novelties, like photograph, telegraph, gramophone, telephone and movies. The impact of cinema on mass culture is enormous: Brazilian influential film director Glauber Rocha<sup>10</sup> has even named the twentieth century the “Century of Cinema”. Such impact is not fortuitous: as a media technology – specially in its dominant narrative form –, cinema is a synthesis of all key values of Modernity: *visuality, narrative, mechanicism, technical reproduction, appropriation of reality through the assemblage of small pieces* – such reality taken as an objective material visual appearance –, *an industrially produced commodity, a collective (mass) ritual*: cinema is the book for the masses. In Vilém Flusser’s quasi-mcluhanic account of Western culture, it is the imagination of nineteenth century texts: technical images have created a new imagination, able to unify a culture fragmented by literacy and classical science<sup>11</sup>. Indeed, in the first half of the twentieth century, it seems that the rich, the poor, intellectuals, ordinary people, artists, philosophers, priests and scientists... everybody had one common passion: Charlie Chaplin.

All this said, in terms of what it sets in motion, the movie theater’s spectator lives an *experience* that is directly related to the epistemological context from which “cinema” emerges: *the classical film spectator experiences the condition of the classical subject*. Its hegemony in mass culture transfers to the spectator the illusion of being a protagonist in the on-going cultural process of making-sense of the objective world, the illusion of playing a relevant part in the epistemological regime of the modern subject. Such is the *experience of cinema spectatorship*. From this, one can infer that *the experience set in motion by a certain media apparatus is directly related to the epistemological context from which it emerges*.

### **Neural correlates of consciousness**

In the last decades, as a direct effect of the invention of brain imaging devices, neuroscientists and philosophers of mind started to discuss which material neural processes support conscious experience, the so-called Neural Correlates of Consciousness (NCC). According to David Chalmers: “An NCC (for content) is a minimal neural representational system N such that representation of a content in N is sufficient, under conditions C, for representation of that content in consciousness”<sup>12</sup>.

10. ROCHA, Glauber. **O século do cinema**. São Paulo: Cosac & Naify, 2006.

11. FLUSSER, Vilém. **Towards a philosophy of photography**. London: Reaktion Books, 2000.

12. CHALMERS, David, 200 *apud* NOE, Alva; THOMPSON, Evan. Op. cit. p. 7.

NCC should account for the neural substrate of what is to be the neural activity able to respond for this or that specific subjective state – in such a way that, if we could provoke, in one’s brain, the very same *neuronal activity* which took place while she or he was in the movies, she or he would have the very same *experience* as if she or he was there. There are many problems here: to start with, the experience could not be the same, precisely because it was not the same: to replicate a mind state is not the same as to experience a circumstance – just like Merleau-Ponty said in the epigraph of the previous section. In a long article, Alva Noe and Evan Thompson demolish the possibility of orthodox NCC, through several different arguments, adopting the embodied mind view that the awareness of being situated in a circumstance is based on presences, not representations. However, they concede that, if there would be no relation between *mind states* and *brain states*, then there would also be nothing to look for, in terms of explaining how brain activity relates to conscious experiences. Thus, there must be some kind of *isomorphism*:

The isomorphism constraint demands that there must be a one-one mapping, *at some level of description*, between features of experience and features of the minimal neural substrate (...).

The isomorphism constraint is best understood as a criterion of explanatory adequacy. The thought is that if there is to be an explanatory link between the minimal neural substrate and the perceptual experience, then there must be some way to establish a relation of sameness of structure (at some appropriate level of description) between elements of the substrate and elements of the experience. To suppose that there was no isomorphism in this sense would make it an utter mystery how N could give rise to E (or how the pattern of activity at N could be E, according to one view).<sup>13</sup>

13. NOE, Alva; THOMPSON, Evan. Op. cit. p. 5.

Let us name this “structural isomorphism”, so that there would be a necessary relation between the structure of the experience and the structure of brain activity; and also, *the structure of the media apparatus to which a particular individual is coupled*. Thus, if *the medium is the message*, then, *at some level of description*, there should be a triplex isomorphism between *medium*, *experience* and *its neural basis* [ $\langle \text{brain} \rangle \langle \text{apparatus} \rangle \langle \text{experience} \rangle$  (individual or collective)]. The concept of “structure” satisfies here a fundamental question, which is the *Gestalt* imperative: experiences are experienced as a meaningful

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whole, which cannot be reduced to the sum of its parts – thus, any kind of possible isomorphism between experience and brain activity must take in to account that a point-to-point correspondence between brain and experience makes no sense. Since in the picture here framed the medium device is the least plastic of the three terms [**brain** <ap paratus> <experience>], one should suppose that the transformations in the very plastic terms “individual experience” and, specially, “neural activity”, should be verifiable: we would have accomplished a scientific, falsifiable, demonstration of McLuhan’s thesis.

That our daily involvements with all sort of digital devices may be affecting our brain connections in one way or another is an idea that is out there – especially among those who believe that the neural, internalist, explanation may account for most questions concerning human subjectivity. Authors such as Susan Greenfield<sup>14</sup> and Nicholas Carr<sup>15</sup>, for example, have been addressing this. What is attempted here is to organize the problem in possible new terms, by relating [**b** <a> <e>] on a structural level (and at some level of description), thus relating specific media to specific brain operations that support specific modes of experience. Also, it is important to consider that, even if interfaces have evolved in the last decades, as a result of the growing research on interface design and ergonomics, if one considers that digital devices are still, essentially, Turing Machines with von Neumann architecture, one must accept that, on a structural level, these devices have caused much deeper changes in us than the devices themselves have changed. One must be quite naive not to recognize this when looking to the world around. Especially if assuming a mcluhanistic interpretation of our society.

## Coupling

The subject of sensation is neither a thinker who notices a quality, nor an inert milieu that would be affected or modified by it; the subject of sensation is a power that is born together with a certain existential milieu or that is synchronized with it.<sup>16</sup>

### *Man-Machine Coupling (MMC)*

Humberto Maturana and Francisco Varela<sup>17</sup> name “coupling” the process of adaptation of a particular organism to a particular ecological environment. The choice of this term implies a systemic view of both

14. GREENFIELD, Susan: **Mind change**: how digital technologies are leaving their mark on our brains. New York: Random House, 2015.

15. CARR, Nicholas: **The Shallows**: how the internet is changing the way we think, read and remember. London: UK Books, 2011.

16. MERLEAU-PONTY, 2013, p. 219.

17. MATURANA, Humberto; VARELA, Francisco: **Autopoiesis and cognition**: the realization of the living. Boston: D. Reidel, 1980.

**ARS** organism and environment, according to which the trajectories of both  
 ano 17 systems intercross each other in such a way that they co-modulate and  
 n. 35 depend on the other in several ways. I shall adopt this definition to  
 describe the specific interactions experienced by an individual while  
 engaged with different media devices. Nowadays, coupling occurs  
 intensely with digital devices of various kinds. Most times, these devices  
 are coupled to other devices to which other individuals are coupled: we  
 live in, and make happen, a networked society.

Considering the coupling between individuals and devices in  
 a specific media-ecology circumstance, Man-Machine-Couplings  
 (MMCs) can be described on three different levels:

1. Man and Machine are understood as two distinct unities, which do not contaminate each other: rather, Man uses Machine for his own purposes;
2. Man and Machine are perceived as a unique composed whole, defining a new, complex unity, endowed with certain characteristic behaviors;
3. Man and Machine are understood as a composed whole, itself coupled to a particular ecological circumstance which surpasses their limit as a complex unity.

Each of these levels of description induces a different interpretation of the question of experience and demands different conceptual tools, if we intend to find some level of isomorphism between [**<a><e>**].

In the *first case*, Man and Machine maintain their autonomy and their identity, although the latter is the coupling's least plastic element. Therefore, it is reasonable to suppose that the synchronization of the individual to the demands of the apparatus determines an individual brain-state, and thus an experience, that is structurally isomorphic, *at some level of description*, to the structure of the apparatus;

The *second case*, however, must be conceptualized differently: we do not have two entities which, while coupled, maintain their identities. The coupling transforms both into a new unity, a new whole, in the same way that lighting a cigarette turns an "individual" into a "smoker"; or playing a piano turns him or her into a "pianist". In the case of our daily couplings with digital devices, we are all turned into a new kind of hybrid entity, *a cyborg*. We must then resort to new conceptual tools. For example, Michael Polanyi<sup>18</sup>, when discussing the structure of consciousness, states that "the mind is the meaning of the body". If

18. POLANYI, Michael. The structure of consciousness. In: GREENE, Marjorie (ed.). **Knowing and being**. London: Routledge, 1969. p. 211-224.

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we consider MMC to be a new body – a cyborg entity – then we can no longer speak of a simple isomorphic transference of the machine’s structure to the structure of brain-states, but rather suppose that individual and machine co-modulate each other. Again, however, the mechanical part of this new unity is its least plastic aspect and imposes some of its conditions to the organic part of the unity, thus resulting in new cognitive structures. This is what the concept of “expanded mind”, proposed initially by David Chalmers and Andy Clark<sup>19</sup>, and explored in more detail by the latter, is about: a man with a pencil and a piece of paper constitutes an entirely different cognitive entity than a man with a computer connected to the internet.

Finally, the *third* description expands the problem and includes its belonging to socio-cultural hermeneutical conditions, situating Polanyi’s claim in the context of a networked society where “consciousness” and “brain states” are the result of complex dynamical synchronizations which cannot be thought of as anything but *emergent states of a collective hybrid body*. According to this description, all we would be able to look for in individual and/or collective brain-states are synchronization patterns that are somehow isomorphic between themselves and to dynamic on-going collective processes. But even in such a complex description, *the least plastic element is still the media-device’s structure*, which would be supposed to modulate similar structures in individuals involved in the network. To be able to model this, we would not only need different conceptual tools, conceiving collective coupling as a dynamic complex system – for example, Rupert Sheldrake’s controversial ‘Morphic Resonance’ theory<sup>20</sup> –, but a different description of brain processes and consciousness: one able to model and interpret brain states in dynamic terms, and able to take in consideration a specific *culture* as an important factor in the understanding of conscious and, now, intersubjective processes. Such a theory could be, for example, Gyorgy Buszaki’s theory<sup>21</sup>, in which brain processes are described as a carnival of rhythms modulating and coupling to each other in a media ecology that takes place in a noisy environment.

### **Concerning the experience of art**

Art and science do not necessarily pursue the same goals. Both, however, are accepted as forms of knowledge. In a remarkable article, Michael Wheeler<sup>22</sup> brings together, in a single cognitivist account, many of the topics addressed in the present text. By discussing the cognitive impact of works of art, namely Mark Rothko’s paintings, Wheeler describes

19. CHALMERS, David;  
 CLARK, Andy. The extended  
 mind. **Analysis**, Oxford, v. 58,  
 n. 1, p. 7-19, 1998.

20. SHELDRAKE, Rupert.  
**A new science of life: the**  
 hypothesis of formative  
 causation. London: Icon, 2009.

21. BUZSAKI, Gyorgy. **Rhythms**  
**of the brain**. Oxford: Oxford  
 University Press, 2011.

22. WHEELER, Michael.  
 From robots to Rothko: the  
 bringing forth of worlds. In:  
 BODEN, Margareth (ed.). **The**  
**philosophy of artificial life**.  
 Oxford: Oxford University  
 Press, 1996. p. 209-236.



the coupling between spectators and artworks, individual experiences through which worlds are “brought forth”, placing such spectatorship on the limits of a certain socio-cultural context, which circumscribes specific hermeneutical pre-structures of knowledge. In a further step, Wheeler also suggests that only a dynamic systems approach can cope with the complexities of such situation, in which the possibilities of making sense of the experience seem to be restricted both by the spectator’s pertaining to such hermeneutical context and by the hermeneutical conditions to which the observer of this scene [who describes all this] belongs. As noticed much earlier by Walter Benjamin, technological changes, which emerge from and embody these gnosiologic structures, have a powerful impact on their social disruption.

What Wheeler does not address, in terms of the discussion raised here, is how these questions may be thought of in contemporary digital culture, with its ubiquitous placing of digital Turing-machine derived apparatuses modulating our daily encounters with objects and other people. In line with the arguments postulated here, understanding the experience of works of art, in the context of digital culture, demands considering the overall condition of the experience brought forth in our encounters with technological works of art, which happen in the midst of a full-digital culture: a media ecology in which networked cyborgs enact an intersubjective reality in concert with the pervasive presence of sensors, interfaces, zillions of data, non-organic agents and AI systems trained by rapidly improving technologies of machine learning.

As argued above, the experience of cinema spectatorship summarizes, expresses, implements the values of Modernity, bringing forth, on the individual and collective levels (given its reach), a subjective experience which is coherent with modern values, in such a way that the Modern ordinary man has easily recognized himself there. In his insightful *Histoire(s) du Cinema*, Jean-Luc Godard<sup>23</sup> states: “The cinema gives us a world according to our desires”. It is the mirror of *zeitgeist*.

The effects of digital networks, devices, interfaces and apparatuses are no different. McLuhan<sup>24</sup> names “Narcissus Narcosis” the effect by which media, by extending ourselves, immerses us into a narcissistic trance, a system closed to the surrounding reality. Looking at the world around us, with people frantically coupled to smartphones, it is fair to consider the comprehensiveness of such conceptualization. Although definitions and functions of art are highly debatable, following once again McLuhan, artworks should provide “anti-environment” experiences, able to make us aware of the conditions we are immersed in. Thus, it can be suggested that the challenge of artworks in such anesthetized societies

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23. *Histoire(s) du Cinema – 1A: toutes les histoires* (1998), Jean-Luc Godard, França.

24. McLuhan, Marshall: *Understanding media: the extensions of man*. Cambridge, MA: MIT Press, 1991.

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is, by exploring the same technologies we are coupled to, and disputing prevalence in the same technoaesthetic regime we are immersed in (Basbaum<sup>25,26</sup>), to provide meaningful displacement experiences.

Can this kind of awareness be measured in the terms discussed above, as to make a case in hard-science terms? It is quite common to hear people say that “this work of art has changed my life”. Although such no-return experiences certainly involve a plethora of other prerogatives which contribute for life-changing encounters, it is still up to neuroscience to show that existential, psychological impacts have such a measurable material counterpart. And yet, while all these varieties of human experience take place in a full-digital culture, there is still one and only common denominator in all human and non-human interactions in contemporary societies, which also lies behind all artworks that involve digital technology, and informs, on different levels and with different intensities, the daily experiences of every individual: Turing machine imperatives. For artists, this is the well-debated question of the flusserian black-box; for spectators, participants or interactors, performative agents of art experiences, this implies an immediate familiarity with the pre-structures of cognition, in many cases giving rise to a quasi-neutral art experience, in which no real displacement or anti-environment situation can take place. That is: in these cases, artists seem to be as immersed in a perceptual regime as any ordinary citizen, creating technological works with the same passive posture towards the environment as everybody else: artists become just agents of the intersubjective agreement in which the most constraining force is the structure of the experience imposed by the technological circumstance. Breaking away from this *cul-de-sac* is the enormous challenge digital technology still imposes on contemporary artists.

## Conclusions

That our bodies, thus our brains, must be changing somehow due to our belonging to an era of ubiquitous computing, is something hard to deny. What has been attempted here was to sketch a hypothesis according to which it would be possible to relate, on some level of description, *our bodies*, *our experience* and *the machines that are defining our era* and our culture, a Digital Culture – or, in more daring terms, our already consummated *full-digital* Culture. McLuhanism implies the acceptance and the exploration of the thesis that the medium is the message, and that a great part of this message can be described in terms of the impact of a certain media over our perceptual bias. Thus, as discussed above, there must be some structural

### 25. BASBAUM, SÉRGIO.

Technoaesthesia: the morning after the deluge (of technical images) – thoughts on perception, art and technology in our moistmedia times.

**Technoetic Arts**, Bristol, v. 13, n. 1-2, p. 125-136, 2015.

26. Idem. Tudo isso é do baralho: tecnoestese e infocognição (da ordem e dos predicados dos acoplamentos na circunstância contemporânea). **Texto Digital**, Florianópolis, v. 14, n. 1, p. 6-25, 2018.

relation between [**<a><e>**]. I have shown, through the example of cinema, that the structure of the experience the apparatus sets in motion is related to the epistemological context from which it emerges. Furthermore, the structure of the apparatus is, in this model, the least plastic term, thus deeply affecting the other two, which should adapt to, and, on some level, mirror the structure of the machine or medium. This picture becomes even more compelling once we recognize the level of pervasiveness and ubiquity digital sensors, devices and artificial intelligence systems do have in our present lives, creating enormous challenges for artists to engender displacement experiences in relation to an environment so encompassing that they hardly perceive themselves outside such perceptual regime. If art encounters are supposed to be cognitive experiences, they will be so only on the condition that they can offer alternatives to this all-involving environment.

Most of all, the fact that we are so deeply coupled with our devices up to the point that we have become cyborgs that cannot be severed or distinguished from their devices as separate entities creates new theoretical difficulties. The situation gets even more complex when we understand that we live now in a networked culture, in which the notion of experience can hardly be thought of in individual terms. There is nothing new about this: it is just the collapse of the experience of the classical subject in our contemporary media ecology. Thus, the measurability of McLuhan's theory through NCC observation becomes highly undermined. And so does the nightmarish dream of controlling human experience through neuronal control – although our experience seems to be highly amenable to modulation by media control.

I expect, however, to have opened some directions based on which we can consider the consequences of McLuhan's thesis, and that allow us to envision their "rigorous", "empirical", "hard-science"-like demonstrations in the following years. Even if, the way I see it, such demonstrations should not be necessary, since changes in culture and society clearly testify, by themselves, how right he was.

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