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Béatrice Galinon-Mélénece

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Équipe de recherche : Equipe Homme-trace, direction Pr. B. Galinon-Méléne
Pr. B. Galinon-Méléne est également directrice du CDHET/IUT (Communication & Développement des Hommes, Entreprises, Territoires), et co-directrice de RIGHT (Research : International Group of the Human Trace) : http://rightunivle Havre.wordpress et responsable de Human-trace Complex Systems DC UNESCO
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Béatrice Galinon-Mélénec

DOCTOR-PATIENT RELATIONSHIP AND DIAGNOSTIC COMPLEXITY: SIGNES-TRACES AND SYSTEMIC APPROACH


Medical diagnosis and symptoms\(^1\) will be interpreted as signes-traces\(^2\) resulting from interactions. My (non-exhaustive) enumeration of those interactions is an attempt to introduce parameters to complexity—parameters that are individual as well as societal, and which interact in the interpretation of all signes-traces. This process clarifies the application of facets of signes-traces, and not of clinical medicine itself\(^3\). The progression of thought will move from the particular to the general, progressively demonstrating the need to include more and more factors, and emphasising the complexity of the interpretation of a signe-trace. This chapter includes two large sections. The first discusses the experience of a very common communicative situation (the doctor-patient relationship) in developed countries. The second discusses fatigue as a corporeal signe-trace. This latter example is much more important to understand and position than it appears, since it is placed, paradoxically at first glance, in countries with high per capita income levels.

THE SITUATION OF THE MEDICAL CONSULTATION

To refer to the situation of medical diagnosis, in order to capture the complexity of what is at play in the interpretation of signs, has already been the object of relevant discussion in other fields. Two examples (Ginzburg, 1989) are well-known to semioticians\(^4\): Giovanni Morelli, an art critic who examined the tiny details of a painting to determine whether its signs reflected the trace of a master or that of a forger, was a doctor. Conan Doyle, the creator of Sherlock Holmes, a detective adept at identifying the smallest traces left by a criminal, was a doctor as well. Insofar as the majority of readers will have experienced the situation of a medical consultation, it seems fitting to select it to introduce the role of context in the interpretation of signs. The pathognomonic\(^5\) aspect of the diagnostic interpreted here as a signe-trace—will allow for a demonstration of the limits of rationality\(^6\), probabilistic dimension of interpretation, and the importance of intuition\(^7\), defined here as the externalised signe-trace of the continuum of internalised life history.

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\(^1\) For a discussion of “the symptom as communication”, see Watzlawick P., Beavin J. H., and Jackson D. D., 1972, p. 77.
\(^3\) A medical practice that we will come back to later.
\(^5\) Pathognomonic 1560, “one familiar with disease”; from the Greek *pathognômonikos* pathos (sickness, suffering) and gnome (mind, judgment, certainty). Med.: *Pathognomonic sign*: a symptom that occurs only in a specified illness that is sufficient to establish a diagnosis.
\(^6\) And therefore of the deductive process.
\(^7\) Meaning non-conscious processes where, as we will see below, the interaction and echoing of signes-traces by persons in presence plays a preponderant role.
Consultation and the Interpretive Context

The Situation of Consultation and the Asymmetry of the Relationship

The consultation constitutes a specific communication situation. The relationship is strictly framed: on one side is a patient with a complaint; on the other, a doctor who has attended university studies allowing him or her to provide a diagnosis that aims to eliminate suffering. The rules of the consultation are assumed to be known to both parties. The questions posed to the patient on his or her private life, and “touching the body” during clinical examination (through auscultation, palpation, etc.) are interpreted in this context. The medical oath\(^8\) obliges the doctor to keep to the “rules of the game” and not abuse the patient or the patient’s trust. In case of failure, lawsuits may follow, and the doctor may be banned from practicing medicine\(^9\).

The doctor-patient relationship is an “asymmetric” relationship (Watzlawick, Beavin and Jackson, 1972) in the sense that, by definition, the latter is dependent on the former’s diagnosis. The asymmetry not only bears upon the knowledge and the power granted to one of the two parties, but also on language, since the patient does not necessarily have the vocabulary to explain the precise nature of his or her ailments. The doctor compensates for this difficulty in verbal expression through a “hunt for clues” that relies on a “checklist” of questions and clinical examinations aiming to search for clues allowing for an interpretation of the symptoms. For this, the doctor possesses established protocols and reference tools that summarise the observed relationships between symptoms and causes.

Indexing the Sign in Medical Literature

However, indexing the sign in medical literature does not suffice to provide a diagnosis, because each case is different and the doctor needs to be cautious in the interpretation. Indeed, a symptom may be at the confluence of multiple systems, and thus be the trace of multiple system failures. Each system corresponds to a medical specialty. The doctor will then be led to investigate\(^10\) the various processes of several systems\(^11\) capable of producing the signe-trace, to track causes with the help of various aids (lab tests, second and third opinions, etc.).

The Limits of Rationality

The doctor is always led to complete a rational treatment of the information, first through intuition that can be interpreted as the signe-trace of the physician’s entire life history (training, experience, ability to listen and receive non-verbal signs, and so on). In effect, a doctor who has been practicing for a long time will have internalised, whether consciously or

\(^8\) The medical oath has replaced the Hippocratic Oath.
\(^9\) Extract from the medical oath.
\(^10\) And to prioritize the results of.
\(^11\) Neural, respiratory, blood, digestive, etc.
unconsciously, a multitude of correlations whose diagnostic will carry the trace. Thus an “old” doctor may assert a *savoir-faire* linked to professional experience.

**The Role of Signe-trace Echoing in Communication and Diagnosis**

In a situation of consultation, two people are in copresence: the patient and the doctor. Their corporeality consists of a set of signs that bear the trace of their individual history. Neither one pretends to possess theoretical knowledge of this. Nevertheless, these signes-traces exist and, partly unconsciously, the two people in presence receive some of them. This reception of signs refers to the receiver’s past, which leads to a more or less positive interpretation.

Thus, even as the relationship is a professional consultation with a view to diagnosis, there exists a more comprehensive relationship that develops and induces more or less sympathy between the co-actants. We can say that the signes-traces emitted by the two people in presence are more or less echoing\(^{12}\) in a way that is subconscious for both parties. Depending on the overall type of echoing\(^{13}\) (positive, negative, ordinary, strong, etc.), the openness to receiving signs will be greater or smaller, and the communication will be of higher or lower quality. This dimension thus interferes in diagnosis.

**The Oral and Written Expression of Diagnosis**

Diagnosis is itself a signe-trace, in the sense that it carries the trace of the process (reasoning, intuition) that produced it. The terms used to express a diagnosis are the signes-traces of the doctor’s anticipation of the recipient’s ability to receive (hear, understand, etc.) the message’s content and form. This interpretative assumption leads to an ad hoc presentation of the diagnosis. Letters between colleagues are one example. They respond to presentational norms, and the terms are so much more carefully chosen that the signe-trace constituted by the diagnosis is the object of a memorial inscription. Indeed, the medical archive itself becomes a signe-trace to be called upon in case the diagnosis is called into question. The doctor thus becomes all the more careful in the choice of terms, so that they can withstand a future challenge.

**The Patient**

For a doctor, the expressions and behaviours of a patient constitute the very essence of the search for symptoms, but they only acquire, like all other signes-traces, the status of “sign-signal\(^{14}\)” after being filtered, evaluated, and clinically judged. The patient’s words, often imprecise compared to theoretical medical referents, assume on the doctor’s part an effort to understand the complaint’s meaning. To achieve this level of precision, the doctor tries to

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\(^{12}\) One may therefore say that the situation of doctor-patient communication is, like any communication situation, an interaction between signes-traces.

\(^{13}\) The patient, questioned about the reasons for choosing a doctor, will answer simply, “We get on well”, which is another way to say that the signs echo positively.

\(^{14}\) A sign-signal is a sign that stimulates attention.
uncover the “hidden causes” using an “interrogation” whose protocol\textsuperscript{15} allows for the demonstration of various aspects of this “signe-trace”. This is completed through laboratory tests (e.g. studying cellular chemical exchanges), endoscopy (such as bronchoscopies and gastroscopies), imaging (X-rays, C-T Scans, MRI, etc.) as well as other investigative techniques.

\textit{The Search for Symptom-Producing Conditions and Verbalisation}

In the majority of cases, the doctor begins the consultation by asking about the context of symptoms’ appearance. The examination includes questions about biological factors (sleep cycle, food intake, etc.), physical and neural conditions in the workplace (physical positions leading to musculoskeletal disorders, too much stimuli causing undue stress, or conversely, overly monotonous tasks producing a loss of meaning at work, etc.) and affective conditions (professional, familial, and emotional conflicts).

\textit{The Said of the Unsaid: Discontinuity as a Sign-Signal}

When a doctor has known a patient for a long time, the concept of discontinuity plays an important role. Consider the case of a patient with a chronic illness, but who is usually confident about the future, and who jokes around with his doctor during visits for prescription refills and routine checkups. The doctor interprets these behaviours as indicating that the patient is dealing with his or her chronic illness without any major problems. The onset of sadness and/or fatigue then indicates something unusual, that is, a signifier. The doctor initiates a series of tests to discover the cause of change. The first interpretative hypothesis on the origin of the signe-trace will likely bear on the evolution of the disease itself and/or the effects induced by treatment; but the doctor is not limited to this hypothesis, and will explore different systems to find other possible causes.

\textit{Sign Visibility and Invisibility}

Faced with the multiplicity of causes that can provoke a symptom, the medical generalist begins the investigation by ruling out the most life-threatening (hematologic disease, cancer risk, etc.). In this case, the symptom is treated as a trace associated with an event that affects an internal system, or an organ. The generalist explores the various possible causes by consulting with specialising colleagues. Each specialist investigates the cause using specialised tools. For example, for the psychiatrist, the disturbance may be traced (so to speak) to the patient’s biography\textsuperscript{16}; the symptom is thus perceived as the signe-trace of a life history. The cardiologist\textsuperscript{17}, meanwhile, will look for the signe-trace’s causes using technical instruments to auscultate the heart and measure blood pressure, will run an electrocardiogram,


\textsuperscript{16} “[...] certain asthenias correspond at times to family conditioning [that] has created defensive, autarkic habits”, ibid., p.11. Translation by L. Kraftowitz.

\textsuperscript{17} According to the cardiologist and former professor at the Collège du Médecine, R. Rulliere, in “Le malade triste et fatigué”, op. cit. p. 27.
order X-rays or ultrasound, a coronary angiography or blood work. So it is that each physician
hunts for the signes-traces registered in the corporeal material, and uses the patient’s answers
to guide the interpretation of those corporeal signes-traces. Each hunts out causes that are
invisible to the senses.

Diagnostic complexity

*Questioning a Basic Assertion on the Cause-Consequence Relationship*

A symptom is rarely pathognonomic. So if we accept that angina (A) causes a sore
throat (B) (per the causal relationship of “if A then B”), we still cannot conclude that “if B
then A”, because the symptom of a sore throat may have causes other than angina. Therefore,
we can assert that signes-traces cannot be subjected to such “consequential affirmations” as
“if A = B, then B = A”, without ending up in a sophism.

*Etiology and Doubt On the Causes of the Signe-trace*

I will say, then, that the fact that the signe-trace carries within itself the process that
produced it does not imply that the sign’s receiver can be sure to have detected the causal
system that produced the signe-trace. The process that produces the signe-trace is a “black
box” wherein interactions are so tangled together that rational understanding always leaves
room for doubt. We can thus consider that the diagnosis of a signe-trace’s cause arises from a
more or less random methodology.

*The Patient’s Reaction*

*Denial of Diagnosis*

The request for consultation only to obtain a chemical prescription to ease a given
symptom, rather than to root out the symptom’s underlying cause, may appear as a signe-trace
of a rationale that might go something like: “Whatever the cause, the important thing is to get
back my normal life and level of energy.” If the fatigue happens to be psychological, and the
patient sees it as a minor form of depression, the reasoning may go something like, “I’d rather
be energetic with the help of chemicals than tired and weak without them. Regardless, I have
no control over the cause.” Thus, even when the signe-trace becomes invisible, it is not
inexistent. Rather, it is hidden, and its cause remains.

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18 A sophism imposes a logical relationship where there is only an implied relationship.
19 Etiology: the study of the causes of disease.
20 Note that historical knowledge also constitutes in certain ways a speculative approach. See Paul Veyne, 1978.
21 Sustained throughout life by chemistry, a person may appear capable, effective, and well-adapted to the contemporary
world, all the while being privately convinced that in reality, she or he is none of those things. Identity is broken and
fragmented, containing permanent existential fragility. *A contrario*, the person who, faced with infinite alternate possibilities,
admits to being only “oneself”, gains responsibility. Not subjected to animal research into well-being, that person manages
his or her own “essence” and constructs a self according to their own rules. The solution, then, would be “easy” if all
individuals had such strength of character. However, this is not the case, and the tendency towards depression “is the
inexorable counterpart of the human being who is her/his own sovereign” (p. 219, italicized in the original). Ehrenberg, A.
2010. Translation by L. Kraftowitz.
Willing a Trace Away

Furthermore, trying to hide the signe-trace may turn out to be illusory, since its concealment functions mainly in environments of general or rapid observation of signs\textsuperscript{22}. For others who are more concerned with details, the artificial side of such behaviour surfaces. That artificiality is interpreted as the signe-trace of the will to hide the original signe-trace\textsuperscript{23}.

Thus, the reason for a visit with the generalist doctor is not always diagnosis\textsuperscript{24}. Often, a patient simply comes seeking to mask the symptom signe-trace (fever, fatigue, and so on) through the prescribed delivery of pharmaceutical products\textsuperscript{25}. Indeed, since researching an illness’s root cause(s) and curing them can take time, the patient, who is subjected to the social necessity to perform and appear capable, comes in search of remedies that mask, but do not cure, the symptoms. Since this approach of hiding a corporeal symptom and avoiding the search for the process that created it has become widespread, I propose considering it a societal signe-trace.

THE WEIGHT OF NORMS

Thus Alain Erhenberg, in his book *The Weariness of the Self*, expressed that the contemporary value of well-being enters into tension with the rise of individualism, and that new questions arise in a person exercising freedom of power “over the self” (Erhenberg, 2010). The difficulty of responding with certainty engenders anxiety and fatigue, a signe-trace fed by the cult of performance that produces the anxiety of never being up to par. The energy that every person must mobilise to become themselves exhausts their strength.

In fact, the development of a society of appearance (Amadieu, 2002; Andrieu, 2006; Ferreri, Godefroy, Slama and Nuss, 1998), and the spread of various forms of drugs (medicine being the legal version drugs) suggest that *this desire to erase signes-traces is quite widespread*\textsuperscript{26}. Personal investments into physical appearance\textsuperscript{27}, to attain norms that are widely suggested - if not outright dictated - by the media\textsuperscript{28} and in the various beliefs that quiet anxiety, help people to avoid confronting their own individual complexity.

\textsuperscript{22} It should nevertheless be noted that the contemporary injunction of “always faster” effectively produces a society of appearance, where one must mask the signes-traces of a life history that could jeopardize the façade.

\textsuperscript{23} Thus, in a much more general fashion, a person who constantly, for years, maintains an outward appearance of being satisfied with all aspects of life may actually appear as seeking to hide the signes-traces of life’s disappointments.

\textsuperscript{24} I would like to take advantage of this reference to generally thank Dr. Marc-Henri Lemaire, a physician at Le Havre, for his careful reading of the medical sections of this chapter.

\textsuperscript{25} This is why France is the largest consumer of psychotropic drugs aimed at providing an appearance of well-being.

\textsuperscript{26} Note that the impulse to hide a trace stems from the anticipation that the trace will be unfavorably interpreted. This desire is transversal across many domains; the trace is part of behaviour, and the body is understood here as a medium, or in a material medium like the internet. As such, companies are created to manage your online reputation, which amounts to drowning out or erasing traces considered harmful in certain contexts (for example, a job search), and putting forward those that will be positively received as an image.


\textsuperscript{28} See bibliography and analyses put forward by B. Galinon-Mélénec and F. Martin-Juchat (2007) and their lectures at the Populist University of Le Havre (Normandie university), particularly the section on the body (audio available at http://www.univ-lehavre.fr/uhl_services/Les- Monday-of-the-universite.html).
Constant stimulus exhausts the nerves. To recover, one must be constantly on the lookout. Even the slightest lapse of awareness of complexity brings on slumber. This legitimate need exists in contradictory tension with the image of high-performance and the obligation for permanent alertness.

The doctor cannot change societal contexts, and is limited to relieving suffering by offering possibilities for recuperation via chemicals or through breaks from work to give the patient distance from the stress of permanent stimuli. But neither chemistry nor time off of work can resolve the root causes of this type of fatigue, and offering such solutions as these necessarily lead to the reappearance of the symptom.

The dissatisfaction produced by the result is driving research on a new mode of “wakeful sleep”. New medications, new prescriptions, and new beliefs act as a trigger for a new period of hope in change. This positive projection modifies the individual’s internal processes. The signe-trace (of the process) that the symptom constitutes is thereby improved. This phase lasts until the new situation created by the change is in turn invaded by numerous stimuli, and the individual enters a state of psychic overflow. And thus the process recommences.

The acceleration of this succession of events reduces recovery time, which in turn induces a state of chronic fatigue. *To my mind, this onset of long-term fatigue is a signe-trace of an awareness of the complexity of the world, and it is spreading and intensifying*. This fatigue deserves to be more deeply analysed than it has been in a few widely publicised cases, when it was the harbinger for “suicides at work”.

**Individual/Environnement Interactions: Principles**

*Definitions: Normin and Normex*

All behaviours are signes-traces, to the extent that they carry the traces of an individual’s past. From the moment of birth, an individual receives and internalises environmental information. The environment is both continuous (if we take into account all its levels, living and non-living) and discontinuous (if we only take into account certain aspects of reality). The discontinuity produces markings, labels, differences. Language gives them norms; thought sorts them into categories. By internalising their surroundings, humans internalise the language, judgments and rankings that their surroundings propel. I denote the

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29 The desire to avoid confronting complexity can feed into an unconscious tendency to seek the comfort of the womb, the period of life before social birth, a time when the world's complexity entailed neither questions nor doubt. Research on how consciousness is put to sleep by the senses can then be interpreted as the signe-trace of nostalgia for interactive processes between the body of the individual and that of the mother, a fractal figure (see Mandelbrot) of the world’s complexity.

30 “To be tired is to touch the infinite”, said Roland Barthes in “Fatigue”, *Le Neutre, Leçon au collège de France*, 25 February 1978. He goes on to say, “This is my body’s way of touching the infinite.” Translation by L. Kraftowitz.

31 I address this topic in Galinon-Méléne B., “ ‘Suicide at work’ et communication. La mise en question des normes [‘Suicide at Work’ and Communication: Questioning the Norms]”, in Perriault J. (dir.), “Profil d’apprentissage et normalisation [Profile of Learning and Norms]”, *Actes des séminaires 2010* [Proceedings of the 2010 Seminars], Institute of Communication Sciences of the CNRS (ISCC), forthcoming.

32 I developed these ideas long ago in Galinon-Méléne B., *Penser autrement la communication* [Rethinking
norms propelled by environment as “Normex” (external norms), and the totality of norms internalised by an individual as “Normin” (internal norms).

Early Childhood and the Anchoring of Normin

In the early years of life, a moment when emotion establishes the rules of the game, internalised Normexes are deeply set. A sort of “hard center”\textsuperscript{33} incorporates the values conveyed by family, culture, beliefs, relationship to the world, and so on. Certainly, internalisations made at this moment are not set in stone. They evolve\textsuperscript{34} with life experience, but they continue to play a major role, just as those profound life experiences that come later on.

Application to Professional Life

The Recruitment Situation

At the time of social and professional insertion, the individual moves towards choices that constitute Normin signes-traces. Recruitment (broadly defined) can be interpreted as the signe-trace of the recruiting company’s positive judgment of the recruited individual’s behaviour, or Normin signes-traces. Or as a harmony between the individual’s norms and those of the company.

The individual’s Normins integrate both present and future self-representation; relationship to spouse, children and friends; work-life balance, and relationship to money. As well, level of education, and the choice of whether to pursue work in the public sphere, or that of a multinational or a start-up company, make up an individual’s Normin signe-trace.

The Contract

Recruitment leads the individual to conduct a professional life within a company that has its own norms: management style, relationship between human and financial capital, sense of social responsibility, ability to evolve, individualised continuing education, stable guidelines, and so on.

If the individual signs a contract with full awareness of all these things, we can assume on his or her part an “optimisation equation under contraints”, and that if constraints exist, that they are acceptable and manageable.

The Appearance of Disnorm

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\textsuperscript{33} In the terminology of J. C. Abric (1999).

\textsuperscript{34} However, they evolve slowly since the normin generates judgments (good/bad, beautiful/ugly, right/wrong, true/false, etc.) that lead to an avoidance of whatever doesn’t fit into the normin. On the other hand, if an individual is in a situation against their wishes, and is unable to find a situation that matches the normin, the behaviours generated by normin are no longer adapted to the new environment. The necessities of adaptation for survival, then, often lead to learning new rules of the game. Otherwise, the individual becomes “maladapted” to the present system.
If constraints on the company force it to change management norms, or if the individual is subjected to continuous stimuli, a misalignment (Dis-Norm) between Normin and Normex may appear. This misalignment first generates stress, then fatigue. If adaptable behaviour is possible, the misalignment produces a positive learning curve and a favorable self-representation.

If the learning curve is too slow for the entrepreneurial environment at hand, and the individual is unable to find alternatives corresponding to Normin in the professional and familial environment, and that person cannot count on support for self-representation and learning, then that individual may suffer a loss of identity linked to the questioning of the relevance of Normin. The company in turn may express this misalignment through tension (translated into work conflicts), and exclusion that is either direct (threats of dismissal) or indirect (harassment meant to get the individual to leave voluntarily). All of these are organisational signes-traces of normin-normex misalignment.

**Debordpsy and Suicide Attempts**

“Debordpsy” denotes the critical threshold that pushes in individual over the line from the tolerable to the intolerable. It involves the accumulation of several factors:

- Work emptied of its identity function: pressure to live up to norms, a constant state of alertness, the need for reactive hyperresponsiveness, an inability to attain imposed goals, an obligation to achieve goals under constraints, the risk of being disqualified, and the threat of job insecurity;
- A weakened psychological state due to: constant criticism, continuous demands for justification, confused or contradictory directives, arbitrary changes of work conditions, surveillance of gestures and actions, isolation, and sudden changes of professional responsibilities;
- Withdrawal, coupled with a sense of futility, the absence of teamwork, the hardening of family life, and a drop in social life;
- The inability to envision where and how change is possible.

Thus, even if the suicides we’ve seen among teachers, France Telecom employees, and at Renault and Peugeot, don’t emerge within the exact same referents, suicide can be interpreted as the signe-trace of a Dis-Norm linked to a Debordpsy. In this case, there are concurrent individual and social causes.

**Broad Societal Implications**

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35 My thanks goes to Prof. Joël Colloc, doctor, physician and researcher, for his remarks on these approaches, and for his reading of this chapter.
36 Taken from the consultation diary of Dr. Marie Pezet of the Nanterre polyclinic, *Souffrance au travail, 1997-2008* [Suffering at Work, 1997-2008].
37 On this topic, see C. Dejours, 2001, p. 19.
This analysis shows that signes-traces are not only the creation of people’s physical bodies and behaviours, but also the behaviours of moral persons (in the judicial meaning of “organisation”), and of the social body generally.

Thus, the level of communication established in a professional situation can, in my opinion, be analysed as the signe-trace of interaction not only between individuals, but also between individuals and the systems that surround that communication.

CONCLUSION

My first example showed that even for a doctor, whose profession is to interpret corporeal signes-traces, interpretation—as with everything related to human life—involves the interaction of complex systems. Symptoms, which are by definition signes-traces, cannot be interpreted by a single specialist\textsuperscript{38} except in a very provisional way, and under a reasoning that is more trial and error than certitude; despite the extent of disciplinary compartmentalisation, to understand the complexity of interactions that occur in a patient’s body, diagnosis involves a healthy share of intuition.

The second example allowed us to identify the weight of internalised norms, whether of an individual or society, and their role in interactions, as well as their individual consequences (fatigue, stress, psychological overwhelm that can even lead to suicide), and their social consequences, in terms of communication between organisations. This process is not limited to work life; the course of existence brings us to jeopardise Normin to different extents. When there is a misalignment between Normin and Normex, relationships must evolve, and with them conventions and contracts. To establish new contracts with an environment, people must force themselves to identify the most relevant existential rules of the game.

Through these two examples, we have seen that the accurate interpretation of symptoms requires considering not only the complex factors producing the signe-trace (the symptom), but also those that go into its interpretation.

In “MENTAL HANDICAP AND REMEDIATION. PROPOSALS AND HYPOTHESES”\textsuperscript{39}, I will discuss the social consequences of a diagnosis of mental handicap. These consequences will be located in a process wherein we will revisit the way that classifications and norms weigh in on judgment. In accordance with the process of internalising externality that was discussed here, their cerebral signes-traces in the disabled will be examined. The externalising of cerebral signes-traces through patient behaviour will also be addressed. Demonstrating this

\textsuperscript{38} It is in this vein that in this essay, I have made use of several disciplines of the humanities and social sciences to initiate a general theory of the human trace.

systemic dynamic will lead to proposals for cognitive remediation using the new possibilities opened up by digital games.
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