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## **A PHYSICALIST RECONSTRUCTION OF A THEORY: THE CASE OF THE FREUDIAN THEORY OF HYSTERIA**

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### **Abstract**

Dora, an 18-years young girl, goes with her father to Freud's clinic, on account of several close to disabling signs and symptoms: “*tussi nervosa*”, aphonia, appendicitis attacks, etc. that Freud diagnoses as hysteria. During the treatment, he discovers that Dora has full knowledge of human sexuality, even of so-called perversions. She is in love with Mr. K, with Mrs. K, probably with her own father, she has intense relationships with other females, and she dreams with houses that catch fire. While retelling their interviews, Freud builds his psychoanalytical conception of hysteria. From that material –and following the distinctions of the structuralistic conception- I extract its components and fundamental laws, using them to describe Dora and the other cases of hysteria that resemble this paradigmatic case. This reconstruction of the *Freudian theory of hysteria* is carried without using -or starting with- the description of abstract mathematical structures, as usually happens in structuralism. Briefly, it is a reconstruction of the *applications* of the theory that complies with all the usual requirements of a structural analysis. In this way I solve some ontological tensions of this conception, showing that it can be developed with an ontological and epistemological monism proper of a physicalistic and nominalistic approach.

### **Key words**

Freud; hysteria; psychoanalysis; structuralist conception of science; physicalism; nominalism;

### **Introduction**

In 1905 Freud publishes the article *Fragment of an Analysis of a Case of Hysteria* - commonly call the *Dora's Case*<sup>1</sup>-, written in two weeks five years after December 31 1900 when the patient herself put an end to her treatment.

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<sup>1</sup> Freud, S. (2000) Vol. VII (1901-1905) “Fragment of an Analysis of a Case of Hysteria (1901 [1905]) pp. 7-125. German Edition: Bruchstücke Einer Hysterie-Analyse, Mschr. *Psychat. Neurol.*, 18 (4 and 5) Oct and Nov., 285-310 and 408-467.

As it lasted less than three years, Freud could remember it completely and register it as a clinical history, the canonical form in which the doctors communicate their cases.

In this paper I will summarize the main notions that Freud introduces in his article, and the relationships between them. This characterization will be presented by means of an informal reconstruction that conserves the basic tenets of the structuralistic conception of the theories, assuming that everything I say can be stated in a formal language without losing any content in the process.

Freud has not always followed in his text all the notes that he wrote during the treatment. Notwithstanding that, we can still witness a process in which certain facts are present, the interpretation he makes by means of a theoretical apparatus, as well as the ways he perceives new data corroborates the interpretation. We are spectators, thanks to his narrative style, of the genesis of an important portion of the psychoanalytical theory; in fact, of a paradigmatic case of his conception of hysteria that is at the same time the central, paradigmatic nucleus, of the other amplifications of such theory.

In the course of Dora's analysis, we see how empirical data force Freud to formulate theoretical presumptions, and to apply those already established, in such a way that the contexts of discovery and of justification of the fundamental tenets of psychoanalysis sometimes overlap or follow each other in a continuous way.<sup>2</sup>

My reconstruction, therefore, will be as much of what happens to Dora, as of the Freudian conception of hysteria. The Dora's Case enacts the terminological apparatus and laws of psychoanalysis. As we will see further down, I will characterize hysteria by its applications, and not by its abstract models.

We know that it is after writing his clinical cases when Freud presents his psychoanalytical conception theoretically, with few empirical references.<sup>3</sup>

If we proceeded to analyze his thought from these later –rather abstract- articles, and tried to begin the reconstruction in the traditional way, characterizing the abstract models of the theoretical core, we would be ignoring the enormous empirical load of his theory. That is what makes it a factual conception, and not merely a theoretical one.

When I reconstruct hysteria by its paradigmatic application, namely Dora's Case, I am consequent with Freud himself, and with the medical thinking from which he comes. In

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<sup>2</sup> Speaking of his scientific method, and of the discovering of the unconscious, Freud says (2000, Vol. VII, pp. 112-113): "I can only assure the reader that I approached the study of the phenomena revealed by observation of the psychoneurosis without being pledged to any particular psychological system, and that I then proceeded to adjust my views until they seemed adapted for giving an account of the collection of facts which had been observed." He adds: "I take no pride in having avoided speculation; the material for my hypothesis was collected by the most extensive and laborious series of observations." As he knew very well the standards of empiricism, he expresses: "But of this I am certain –that any one who sets out to investigate the same region of phenomena and employs the same method will find himself compelled to take up the same positions, however much philosophers may expostulate."

<sup>3</sup> I refer to writing as: Freud (2000) Vol. XIV, "A History of Psycho-Analytic Movement", "Papers on Metapsychology and Other Works" (1914-1916), and Vol. XIX, "The Ego and the Id and Other Works" (1923-1925).

general, there are no illnesses at all, just sick people; similarly, I will say that there is no hysteria, but hysterical people. There is nothing but cases of illnesses –and of hysteria- and their knowledge by doctors and psychoanalysts. However, text books simplify the knowledge of those individual, unique cases, eliminating their more particular aspects, and we only read their more general profiles. In the process it becomes *general* knowledge that is compatible with other similar cases. When applied, a new clinical history is written, and the inverse process takes place, endowing the new case with the whole specificity that it possesses.

On the other hand, as is well known by structuralism -following Wittgenstein- without paradigmatic cases we would not know how to use those purely theoretical statements, and we would not realize that they are immersed in the factual world from the very beginning.

The proposal of reconstructing the theory by its applications –and not by any abstract structures- is due to the conviction that factual knowledge could never be characterized correctly by non-interpreted mathematical or logical structures, and even when we need to use mathematical structures, they are already interpreted.<sup>4</sup>

As I mentioned before, this strategy introduces several modifications to the standard reconstruction of theories. The first one is to reconstruct the theory using the steps of the empirical claim<sup>5</sup>, as a natural and pedagogical way to do it. It recognizes its historical importance, since the empirical claim and its problems are in the origin of structuralism. The other modification is to use diagrams to show elements and relations of the theory instead of a formal notation. They are simpler than the mathematical symbols and illustrate a different way to represent the structure of the theory. These pedagogical and historical reasons are good enough to justify the reconstruction of the *Freudian theory of hysteria* by means of applications and diagrams, and it could be adopted by the structuralistic community within the usual framework. It is more controversial to use them to solve an ontological and epistemological tension between a mathematical core with no interpretation, and a set of empirical applications as its Wittgensteinian semantics. There is a tension –and perhaps a contradiction- between a Platonist core and a nominalist use of the theory. I expect that the reconstruction that we develop further below will be considered appropriate to solve that tension in a homogeneous physicalist and nominalist way.

In what follows, I will present successively:

- i. a synthesis of Dora's clinical history,
- ii. a reconstruction of Freud's hysteria theory, in an amended version of the structuralistic conception;

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<sup>4</sup> I will use *abstract* in two senses. The first one refers *abstract* to non-spatiotemporal entities. The other one refers to non-interpreted mathematical or logical structures. I will try to show that both of them are superfluous in the foundations of empirical knowledge. The first sense is rejected by physicalism as pure platonic metaphysics. Of course, you have to be a physicalist so as to say so. I will try to argue –and show in my reconstruction- that to reconstruct scientific knowledge by means of logic or mathematical procedures all is needed –and all it may be used- are *interpreted* logic and mathematics, and not pure mathematics and logic, avoiding the discussion about the Platonic nature of its objects that is not the purpose of this article.

<sup>5</sup> See below: **The empirical claim as a strategy of reconstruction**

- iii. I will argue meanwhile about the physicalist consequences to work out a reconstruction of applications.

### **Fragment of an Analysis of a Case of Hysteria**

“Fragment of an Analysis of a Case of Hysteria” is the original title of Freud's text, perhaps better known as Dora’s Case. We will here present a synthesis, necessarily incomplete, just to offer the reader an overview of that history, and of Freud’s procedures.

The patient –who is call Dora<sup>6</sup>- is an 18 year-old girl that is taken to Freud’s clinic by her father, a man around 45 years of age, because she presents several signs that Freud unequivocally attributes to hysteria, a pathological entity well studied and typified by the medical science of the time. Just as in medical studies, Freud uses the word “signs” to talk about Dora’s alterations. They are the following: “*tussi nervosa*”, aphonia, migraine, appendicitis, depression of spirit, enhanced excitability, suicide warning leaving the letter in sight, *taedium vitae*<sup>7</sup>.

According to Freud, one of the signs that allowed him to identify hysteria is that the history told by those suffering the illness is not exact or coherent, and it possesses dark areas, even amnesias and voids.

By that time, Freud had already published *Studies on hysteria*<sup>8</sup> in collaboration with J. Breuer in which he established that the genesis of the illness includes traumatic facts and conflict of affections, and that different aspects of sexuality are involved. Those events are hidden -they are repressed- and therefore they become pathogen. He had also published *The Interpretation of Dreams*<sup>9</sup>, in which he claims that those repressed events appear, transfigured, in the dreams.

There was an episode narrated by Dora, that her father, though not yet believing that it was true, judges as responsible for her depression of spirit, excitability and suicide notions.

The event that Dora had communicated to her parents consisted in the fact that in a walk with Mr. K, her father's friend, he made love proposals. In principle, this was the characteristic traumatic event stated in the *Studies on Hysteria*; but the ulterior facts discovered in Dora's analysis, namely that some of the signs had often appeared long time before this episode, even when she was eight, forces Freud to go beyond this first theory. This makes him look back in time. He found, indeed, that she had forgotten a kiss forced by K when Dora was 14

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<sup>6</sup> Dora is the nickname that Freud uses for Ida Bauer, sister of Otto Bauer, the well known Vienna Marxist, who was related to Otto Neurath.

<sup>7</sup> These are medical terms used by the English translation of the paper.

<sup>8</sup> Freud, S. (2000) Vol. II (1893-1895) “Studies on Hysteria”.

<sup>9</sup> Freud, S. (2000) Vol. IV and V (1900-1901) “Interpretation of Dreams”, “On Dreams”.

years old, and that causes her a sensation of repulsion, and other events that could be related to her childhood signs.

Freud concludes that in those times she was already hysterical, because if she was in love with K, it would have been normal to feel some genital excitement, but not repulsion. He believes that she noticed the erect member of K, and that this sensation was displaced upward, towards the respiratory system, causing "*tussi nervosa*" and hoarseness, as well as repulsion and nausea.

Dora's family did not pay any attention to the fact that K, who was older than Dora, sent flowers to her every day, and gave her important gifts.

Dora thinks that was so because her father, who was the lover of K's woman, consented to it so as not to disturb this relationship; in a certain sense, he gives her up to K.

Freud believes that even before this there were some traumatic episodes, because she showed symptoms when she was eight years old. As we will see afterwards, they were revealed during the analysis of Dora's first dream.

Freud enunciates the rule that the symptom represents the realization of a fantasy of sexual origin.

As an example of his long interpretations, we will relate one of them. It begins when Dora says that her father is a man of (monetary) resources. Freud thought that its meaning was literally the opposite. In fact, she thought that her father had limited resources, another way of expressing that he was impotent; and that presumption was not contradictory with the relationships that he maintained with Mrs. K, because Dora suspects that they satisfied each other by means of oral sex. Freud stated that this was the probable origin of the signs that she experiences in her mouth and throat.

The fact that the cough disappeared after this explanation confirms the validity of the interpretation.

For those that believe that a young girl cannot have these thoughts and knowledge, Freud adduces that perversions have their natural origin in primary sexuality, and that all of us can surpass the limits of normality, although it usually is sublimated, i.e. it is energy that is used for other ends, namely to produce culture. Freud thinks that the symbolic mechanism of associating images allows us to go from the erotic sensation in the lips during the suction of the breast by the infant – an example of primary sexuality-, to the penis, following an intermediate road that goes through the vision of naked babies, and of calves suckling from their mother.

Freud had already sketched the theory that the early love that babies feel for their parents - Oedipus complex- fixes the loving impulse when it takes the form of sexual inclination during puberty.

He relates us that Dora took care of her father during his periods of illness, lung tuberculosis, that forced him to live in special places, where she met K and his wife. She was jealous of her father, but she also felt homosexual jealousies for K's wife. The predominant, obsessive idea of her father's illicit relationships with Mrs. K was hiding in a completely unconscious way

her love for K, and his wife. Freud thinks that when the sexual libido of a hysterical woman focused on a man is repressed, the homosexual tendency is intensified, and it can even become conscious. He says that contradictory ideas can coexist, as her love toward K, and toward his wife, even when the latter criticized him all the time.

Dora relates two dreams during her treatment. We will only narrate the first one. It is highly symptomatic of Freudian interpretations.

**First dream:** "A house was on fire. My father was standing beside my bed and woke me up. I dressed quickly. Mother wanted to stop and save her jewel-case. But father said: I refuse to let myself and the two children be burnt for the sake of your jewel-case. We hurried downstairs and as soon as I was outside I woke up."<sup>10</sup>

As it happens in some occasions, the dream is built with events that happen in the vigil. They are the following ones: The mother closed the dining room, and in doing so she also closed the exit of the brother's bedroom. The father arrives in the town where the family was in the middle of a storm, and he expresses the fear that lightening could cause a fire in the wooden house where they were vacationing.

Some of the elements that appear in the dream, as the fire, the closed bedroom that could damage the children, the father's protective attitude, were already there, in the events of that day.

When Freud goes deeper into the dream, Dora relates that she dreamed it the very day when K tried to kiss her: therefore, it is a kind of answer to that event. She remembers that K was near her while she slept in her bedroom; that's why she wants to close it with a key, but the key is not in its place (she thinks that K took it out so as to avoid that possibility). For that reason, she always gets dressed in a hurry (as she says in the dream). That dream lasted four nights, as long as they stayed in the vacation place.

Here the dream goes from an obvious daytime event, to another one connected to Dora's intimacy. Freud had already established previously that dreams are the representation of desires. When he goes deeper into it new material emerges that reinterprets the dream, and leads to other discoveries from Dora's past.

K had given her a case. It is a figure that makes allusion to the feminine genital. My case –my sex- is in danger, she says in the dream. Her father saved her. The mother appears in the dream, although she was not with them, because Dora is willing to give to her father what the mother denies him (the case). She had said before that she believed that her parents didn't have sexual relations. The mother's feminine figure can substitute Mrs. K who fakes to be sick to avoid having relations with her husband; so, in the dream Dora expresses now with regard to K, with the ambivalence that characterizes dreams, that she can give him what her wife denies to him. Freud interprets that Dora was afraid to surrender to her desires for K.

Here the infantile element appears for the first time in the interpretation: a dream has as an origin in a current event and also in a childhood one. The desire that the dream satisfies –the Oedipus complex- is infantile.

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<sup>10</sup> Op. cit. Vol. VII, p. 64.

While they speak about the dream, Dora puts a box of matches on the table. Freud associates matches with playing with fire, and immediately with urinating in bed (an old saying states that he who plays with fire will wet the bed). Dora remembers something she had forgotten until that moment: she had suffered from bed-wetting until her 8 years of age. And bed-wetting is caused always, according to common knowledge of those times, by masturbation that can also produce genital flow –leucorrhoea-. Dora admits she masturbates herself. She knows that her father had venereal illnesses and she suspects he infected her mother, and that was why she had a flow. When Freud tells her so, she plays “with a small reticule of a shape which had just come into fashion, opening it, putting a finger into it, shutting it again, and so on”, a symptomatic act whereby she acknowledges that the interpretation was correct.

In the long interpretation of the dream some repressed memories arise that have to do with hysteria episodes that Dora had when she was 8 and 14 years old.

Signs of her hysteria such as dyspnoea, asthma, are imitations of her father when he snorts during the coitus, a memory that had been repressed. A similar imitation of father's cough is the cause of her “*tussi nervosa*”.

The desire to replace K by her father provides the energy that causes the dream.

The scent of smoke she remembers in the dream has to do with the smell of tobacco in K's breath when he kissed her.

Here I stop telling about all the evolutions of Dora's complex affective life; her love for K, whom she rejects, the attraction that she feels for his wife, the reproduction in those relationships of her infantile affection for her father -her Oedipus complex-, as well as the first relationships she had with a governess. I will omit her second dream, and the scenes that marked the end of Dora's treatment.

Freud knows that the temporary lapses are important for Dora. Thus, he points to her that the 15-day period before she informs him about the end of the treatment, is the same length of time used to notify domestic staff that they are fired. And that is related -among other circumstances- with a maid who was fired after 15 days in advance when the fact that she had succumbed to her father's seduction becomes public.

Without deepening in these final scenes, I will say that Freud uses them to let us know about the *transference* concept, showing that Dora projects her previous experiences on him.

Let us now leave Freud's and Dora's story, and begin to reconstruct it using some central notions of the structuralistic conception of theories.

In what follows, I will present the principal notions of the structuralistic conception. Then I will argue within this conception about the use of the empirical claim of a theory as a strategy to reconstruct a theory, instead of the most classical approach of characterizing its mathematical models. According to the empirical claim, and following its steps, I propose a reconstruction of the applications of the *Freudian theory of hysteria* that follows the most important features of structuralism, with no the formal/mathematical structures that according to the main stream of philosophy of mathematics –and logic- are supposed to be abstract entities. In concordance with this position, a whole branch of philosophy of science sees theories as a kind of abstract entities.

## The structuralist conception

Let us remember that for the structuralist conception the best way to characterize a theory is to specify the class of its models, and a set of applications that give empirical interpretation to the models.

For those who are not familiar with the structuralist conception and with its jargon, I will say that a theory  $-T-$  is characterized by an abstract core  $-K-$ , and a set of intended applications  $-I-$  of this core:

$$T = [ K, I ]$$

In turn, the abstract core  $K$  is formed by several types of models; some of them are characterized by the non-theoretical functions of the theory, others by these functions and also by the theoretical ones, and finally, by a law-form axiom that relates the objects and functions of the theory among each other, in such a way that:

$$K = [ Mpp, Mp, M, C, L ]$$

The models characterized by the non-theoretical functions are called *partial models*  $-Mpp-$ ; the models that also possess theoretical functions are the *potential models*  $-Mp-$ , and finally those that also satisfy a relational axiom are the *models*  $-M-$  of the theory.

It will be noted that  $I$  added to the models of  $K$  a relationship  $C$  that exists among the different models of the theory, and a relationship  $L$  between those models and others of other theories.

It is convenient to specify that according to the structuralist conception, non-theoretical terms are those that come from another theory, and the theoretical terms are those that are characteristic of the theory that is under consideration. It is a distinction *relative* to that theory, since a non-theoretical term in a certain theory can be theoretical in another. A function is theoretical when it can only be determined in a successful application of the theory.

It is a distinction *relative* to a theory – a function is  $T$  theoretical or  $T$  non-theoretical in a theory  $T-$  and *functional*, according to the role it plays in that theory.

It differs from the traditional distinction between theoretical and observational terms since this is *epistemological* -it refers to the observability or not of objects and proprieties - and *absolute*, since something will be observable or not in any theory under consideration.

The intended applications  $I$  integrate an open set of factual systems proposed as applications of the theory, and as in Wittgenstein's conception, it works as an informal semantics, giving empirical content to the abstract models of  $K$ .

In the usual characterization of the structuralist conception, the systems of  $I$  are subsets of the *partial models*  $Mpp$ .

If we proceeded to carry out a reconstruction following the usual standards, we would first have to characterize all the *potential models*  $-Mp-$  then cut the theoretical terms so as to identify the *partial models*  $-Mpp-$  and finally we have to establish the *models* of the theory.



Afterwards, the applications are formally identified as a subset of the *partial models*.

Of course, this approach -together with other conceptions including the traditional one- views the formal/mathematical part of scientific theories as abstract entities. However, the structuralistic conception differs from other conceptions in that it incorporates a pragmatic element to the mathematical apparatus, the *intended applications* that give empirical meaning to the mathematical models.

### **The empirical claim as a strategy of reconstruction**

My purpose is to move away from the approach of the scientific theories as abstract entities – there is no such a thing from the physicalist point of view-, or as a non-interpreted calculus – is impossible to lose the empirical meaning when the theory is built-.

To achieve my objective of reconstructing the *Freudian theory of hysteria* without resorting to abstract entities, I will lean on what perhaps is the starting point of the structuralist approach, i.e., the solution to the problem of making an empirical claim within a theory knowing that its conceptual apparatus includes theoretical terms.

Joseph Sneed holds that it cannot be done directly, i.e. it cannot be said that “a is an S” being “a” a physical system and “S” a theory that includes theoretical terms. The solution he proposes consists in saying that a description of a physical system, characterized by means of the non-theoretical functions, can be expanded *theoretically* by adding the theoretical functions, and finally that it will satisfy also the laws of the theory. This can be said, and it does not involve any theoretical terms from the beginning. I won't develop it any longer, but I will say that this is a modification of the Ramsey-eliminability of theoretical terms.<sup>11</sup>

This is more than a formal solution to one of the problems outlined in empirical philosophy of science by those terms; the most interesting aspect of this proposal is its pragmatic consequences, which were immediately accepted by Sneed, in the sense that it constitutes a reconstruction of how a theory is in fact used, and consequently, it is an elucidation of scientific practice. According to the structuralist approach, when scientists do research they follow successively each one of the steps stipulated by the empirical claim.

I will go further with this statement, stating that the empirical claim reconstructs both how a theory is used, and also the stages followed when a theory is created -its genesis - since the method of construction of a theory consists mainly in making sure that an empirical system described by a previous theory can be described accurately by means of the terms that are introduced by the theory that we are considering, and that it behaves as its laws predicts.

In accordance with the empirical claim, I will keep two distinctions in my reconstruction. The first one is the difference between theoretical and not-theoretical terms. The second one distinguishes among the different structures of the theory –partial, potential, and actual-. With them I will establish the structural features that Freud uses to describe Dora as a *psychoanalytic hysterical*.

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<sup>11</sup> Sneed, J. (1971), Stegmüller. W. (1973)

I will also conserve in the theory the role of a paradigmatic example that comes from Wittgenstein, and that the structuralistic conceptions uses as informal semantic of applications for the mathematical core, so that when a scientist finds some kind of resemblance between a paradigmatic case and another one, he is authorized to do some research to include it in the theory.

### **Toward a reconstruction of applications**

Having come to this point, it is necessary to state that I intend to confer a central role to the empirical claim of the structuralistic approach. I will use its distinctions, its constructive stages and its Wittgensteinian semantics, to reconstruct the *Freudian theory of hysteria* starting from its applications. That is to say, the cases of hysteria that he analyzes, namely Dora, his paradigmatic case. This perspective could well be called *physicalist*, since I do not use any mathematical models, and all its elements are located in space and time.

In so doing, I will show a paradigmatic example of structuralism without abstract entities from the ontological point of view. And I will also show a route to be followed for those who think that Platonism is a doctrine with serious epistemological problems –it has no plausible theory of knowledge-; it postulates ghost entities, and it blocks questions that are genuine from the perspective of neurosciences, because this is a scientific discipline whose research program, as we know, is in fact based on setting the foundations of an organic explanation of behavior and psychological phenomena, as neurologist Freud aptly perceived over a century ago.

One of the consequences of making a reconstruction of the theory by means of its applications is that it is always clear that although some general forms are adopted for expositions reasons –*applications*, for instance-, we are always speaking of Dora, and, consequently, of any patient with characteristics similar to Dora's.

I will show also that it is not necessary -and not even desirable- to reconstruct the theory beginning with mathematical models. This procedure entails the danger -as indeed is the case - of thinking that the latter are empirically empty, and therefore in need of some kind of interpretation. Doing anything of the sort would mean relapsing unnecessarily into an ontological Platonism, hiding that in its genesis the theory never lacked empirical meaning, and that the process always proceeds from what is closer to experience, to more general forms.

Although traditionally the word “application” is used to name facts –data- that the theory has to explain introducing theoretical terms and laws, I prefer to keep this terminology to describe also *potential* and *actual* cases so as to emphasize that they *are* physical systems, and not mathematical models.

It is necessary to remark that when I do so, I modify the standard version of the empirical claim, because I intend to specify first the *partial applications* of the theory -*Ipp*-, then the *potential applications* -*Ip*-, and then the full, *actual applications* -*I*-.

In the usual empirical claim the *partial applications* after being “theorized” –i.e. enriched by theoretical terms- become *potential models*. This sequence implies an unjustified ontological and linguistic leap. It is impossible that the addition of theoretical terms might transform an

empirical application into a mathematical –abstract- structure, or an interpreted language into a pure, not interpreted mathematic language. The names of individuals and non-theoretical terms empirically interpreted in the *partial applications* do not disappear with the addition of theoretical terms –and even the latter have empirical meaning in a precise application-. Therefore, the *potential applications* are also physical, because they are the *partial –physical- applications* plus theoretical *interpreted* terms, added by Freud –or any other theoretician- as a hypothesis to be corroborated by the axioms that make them *actual –physical- applications*.

In this sense, the reconstruction of the theory based on its applications is physicalist. A natural consequence of this strategy, since even the *partial applications* that do not admit the addition of theoretical terms –and remain as such- are also physical systems.

What happens then with the psychological entities of Freud’s theory, and even with the knowledge that he elaborates as long as Dora’s treatment advances –or our knowledge of Freud’s writings or about philosophy of science-? Are they all mental, and therefore immaterial, non physical events?

My answer is that the psychological events are basically the expression of neurophysiologic phenomena, as Freud points it out, and with whom I mostly agree on these matters. Much earlier, in *Project for a Scientific Psychology*<sup>12</sup> he proposes a neurological approach to the psychic apparatus; in Dora’s Case (p. 113) he insists that “It is the therapeutic technique alone that is purely psychological; the theory does not by any means fail to point out that neuroses have an organic basis –though it is true that it does not look for that basis in any pathological anatomical changes, and provisionally substitutes the conception of organic functions for the chemical changes which we should expect to find but which we are at present unable to apprehend”. Or: “No one, probably, will be inclined to deny to the sexual function the character of an organic factor, and it is the sexual functions that I look upon as the foundation of hysteria and of the psychoneuroses in general.” There is no doubt that for Freud his *theory* is neurophysiologic, and that only his *therapeutic method* is psychological.

In brief, and more formally, we will characterize the *Freudian theory of hysteria* by means of the identification of three instances in its applications: *partial, potential* and *actual*, such that:

T F H = [ Ipp, Ip, I ]

Further on, we shall see that it is necessary to add to these three instances some elements that act as constraints –C- in the structuralistic conception so as to connect the different patients – cases- suffering hysteria to each other. I will complete the description of the theory by specifying its relationships with other theories, the links L. I had mentioned that the *partial applications* Ipp of hysteria –defined by the non-theoretical elements- generally come from previous theories; they constitute the facts that test the predictions of the theory, and that it tries to explain.

### **Partial applications Ipp of hysteria**

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<sup>12</sup> Freud, S. (2000) Vol. I (1886-1899). *Pre-Psycho-Analytic Publications and Unpublished Draft* 283-294. “Project for a Scientific Psychology” The original carries no title.

Within the *Freudian theory of hysteria*, let us consider that the non-theoretical elements come from the psychiatry of that time, that had already characterized and identified hysteria, and of the contemporary psychology, that normally uses the representation<sup>13</sup> concept. These are the basic theories that underlie Freud's approach to hysteria. We know that when Freud begins to study hysteria with Breuer, he had already learned with Charcot the psychiatry and the advanced neurology of his time, and particularly a key illness for the specialty, hysteria<sup>14</sup>. He had also concluded his stage of neurophysiologic investigations –mainly the studies on aphasia- that marked him so deeply that he never altered his claim that psychological diseases have organic bases in the central nervous system.

Let us begin then with the informal characterization of the *partial applications –Ipp-* of the *Freudian theory of hysteria*.

I will do it by means of a diagram which indicates the non-theoretical elements of the theory, and the relationships they establish. As a general rule for diagrams, elements are shown by means of circles and relationships by the lines joining them. The reasons to prefer this way of showing the structure of a theory are on the one hand, to make it easier to understand its main features by whoever is not too familiar with the symbols of group –and model- theory. On the other hand, by refusing to use the habitual notation of structuralism, I strongly indicate that it is not a matter of abstract models, but of empirical applications.

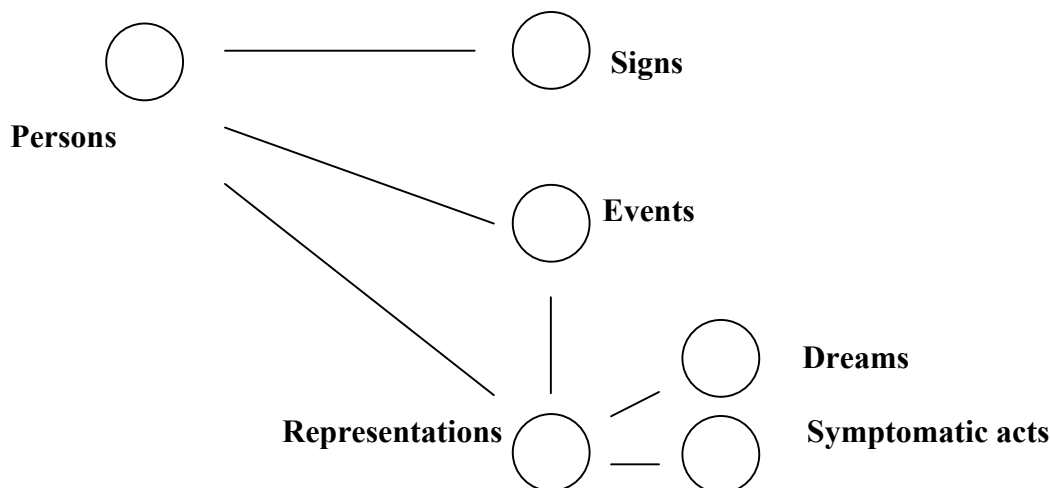
Of course, this exposition of the structure of the theory could be replaced by the usual set theory notation within the framework model theory, *only if we give them a physicalist foundation* such as taking them only as written signs that are understandable for a trained individual. Should we consider them in this way, it would mean, briefly, that we use a given language for pragmatic reasons, which allows us to speak of elements and relations that only can be expressed in that language.

In fact, it is sustained that the description of the theory carried out by means of diagrams can be transcribed to this language without losing anything in the process, *if it is reconstructed as applications*, and not as abstract models.

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<sup>13</sup> The representation notion was used by philosophers, psychologists and epistemologists in the Vienna of Freud's times, especially by Hermann von Helmholtz, Ernst Mach, Heinrich Hertz or Ludwig Wittgenstein. The German words that Freud uses are *Bild*, literally image or design, and often translated as picture, but he uses more specifically *Vorstellungen*, an equivalent of the idea of the British empiricists, as a representation of sensations in a private sense, or *Darstellungen*, used in a more public, linguistic sense.

<sup>14</sup> Freud, S. (1983) “Quelques considérations pour une étude comparative des paralysies motrices organiques et hystériques”, in: *Anch. Neurol.*, 26 (77), 29-43.1888-93. English version. (2000) “Some Point for a Comparative study of organic and hysterical”: “M. Charcot, he was kind enough to entrust me with the task of making a comparative study of organic and hysterical motor paralyzes based on the observations of the Salpêtrière.”



In this diagram, the objects of the theory –what it talks about, its ontology- are **Persons**, i.e. human beings. The other elements such as **Events**, **Representations**, **Dreams** and **Symptomatic acts**, since they happen to **Persons**, are not ontologically independent.

In Dora's clinical history, they are not many **Persons**: Dora herself, her father, Mr. K, K's wife, Freud. Hardly any other actors are mentioned in the drama of Dora's hysteria.

If we deepen in other clinical histories, and in Freud's theoretical papers, usually there are interpersonal relationships with very few actors.

The *non-theoretical elements* that affect **Persons** are:

- i. Somatic and psychic **Signs**, as Dora's manifestations of hysteria characterized according to the psychiatry of the time, such as the ones already mentioned.
- ii. **Events**, as interpersonal events with Dora as main character and finally
- iii. **Representations** of those **Events**.

The relationships between Events and Representations are schematized in the diagram by a line that unites them, as well as the relationships between Persons and Signs, Events and Representations.

It is necessary to mention that in Freud's view representations –as a mnemonic footprint of events- are basically images<sup>15</sup> although they integrate a complex Gestalt of visual, smell, tactile or gustatory registers.

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<sup>15</sup> This is the way Freud presents them in *Interpretation of Dreams*. Although in this text not only the images of the dreams are related each other in symbolic associations, but also the *words* that appears in the dreams give place to symbolic associations; in this case, the association mechanisms acts mainly considering the written *form* that the words possess, and treats them as if they were only a kind of images among others.

We must add to this non-theoretical elements that were already known by doctors and psychologists, two elements that were not supposed to have any relation to hysteria at all.

They are:

iv. **Dreams** and

v. **Symptomatic Acts**.

The first one was studied by Freud in his *Interpretation of Dreams*, a text that established its importance to explore the unconscious. **Symptomatic Acts** such as tics, playing with coins in a pocket, losing objects, were also studied by Freud in their unconscious meaning before Dora's Case<sup>16</sup>. "I gave the name of symptomatic acts to those acts that people perform, as we say, automatically, unconsciously, without attending to them, or as if in a moment of distraction. They are acts to which people would like to deny any significance, and which, if questioned about them, they would explain as being indifferent and accidental".<sup>17</sup>

It is interesting to notice that in this sense Freud continues the medical tradition to reinterpret and put into a semiological<sup>18</sup> context elements that come from folk knowledge. I do not include them in **Signs** of hysteria because a diagnosis of hysteria based on dreams or tics of a patient can not be done. They are non-theoretical elements that Freud uses to explore the unconscious of the patient by means of the psychoanalytical interpretations tools. They are signs of the unconscious, not of hysteria, and are related in the *partial applications of hysteria* to another non-theoretical element, namely **Representation** as it happens in normal life. We will see below that they are also an exteriorization of repressed representations of hysteria.

### **Potential applications of hysteria**

In order to obtain the *potential applications* of the theory, we add the theoretical elements to the *partial applications*.

It is necessary to remember, summarizing Freud's article about Dora that sexuality has a crucial role in the genesis of hysteria up to the point that he claims it concerns all aspects of the illness.

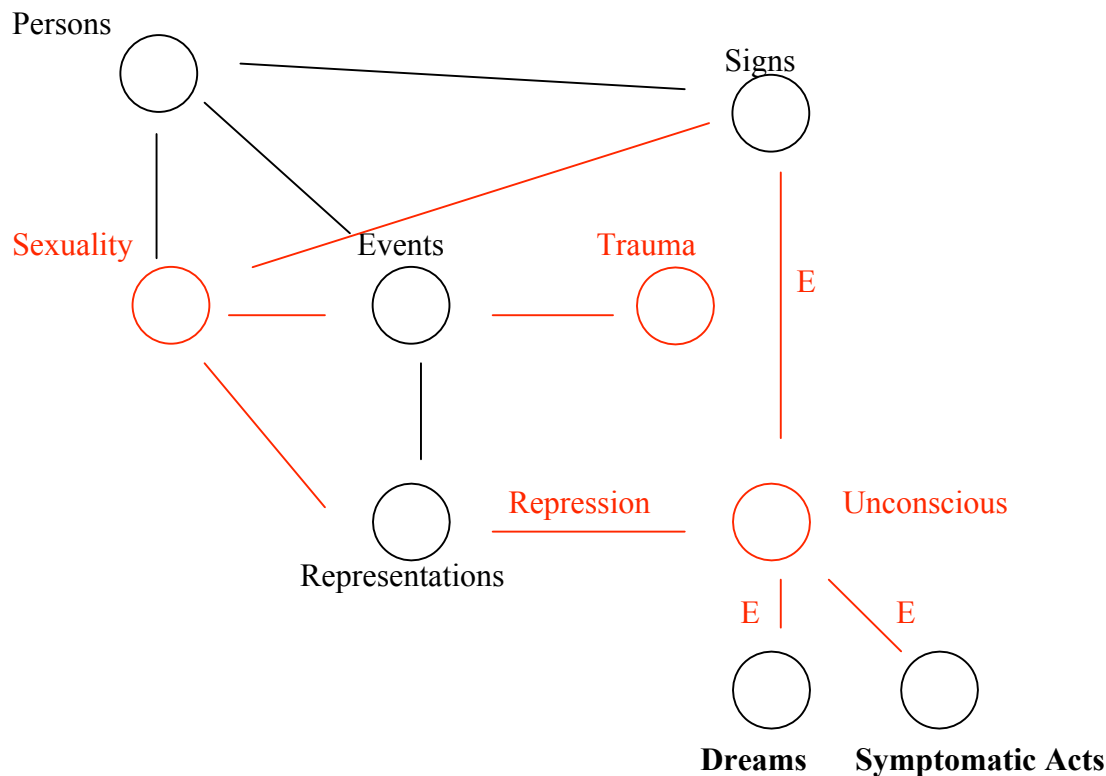
In a diagram:

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<sup>16</sup> See *Psychopathology of Everyday Life*, Freud (2000), Vol. VI, Chapter IX.

<sup>17</sup> Freud (2000) Vol. VII, p. 76

<sup>18</sup> *Semiology* is an old medical discipline established by Hippocrates as the science of (observable) signs of diseases that are related to internal changes of human organs. Freud, as medical doctors do, relates these signs to internal changes of the psychical apparatus.



The diagram reproduces those elements of the *partial applications -Ipp-*, adding to them the elements introduced by the theory. In order to help their understanding, these new elements are in red.

They are:

- i. **Sexuality.** In Freud's view, sexual aspects are involved in all the features of hysteria. Actually, they act on the three non-theoretical aspects mentioned above. It appears under two forms: hetero and homosexual.<sup>19</sup>
- ii. **Trauma.** The sexual aspects of an Event transform them into a trauma.
- iii. **Repression.** The action of Sexuality on Representation of traumatic Events causes their repression, and then:
- iv. They become **Unconscious** for Person.
- v. A relationship **E** –exteriorization- connects **Unconscious** with **Dreams**, **Symptomatic Acts** and **Signs**.

The theoretical elements of the theory of hysteria have already been made explicit. In the diagram, there are lines connecting **Sexuality** with the three non-theoretical elements. It has been stated that it acts on *Events*, and on *Representation*, and this is shown by the lines that go from **Sexuality** to **Events** and **Representation**. It is necessary to add that they also act on *Signs* since, according to Freud, when these signs attain full development, they imitates an

<sup>19</sup> Although Freud introduces the word *libido* for the first time in 1895 to distinguish the psychological tendency –libido- from the organic sexual component –sexuality-, in the Dora's Case he always refers to "sexuality".

imagined situation of sexual life; that is to say, a scene of sexual exchange, such as pregnancy, puerperium, etc. This is shown by the line that unites **Sexuality** and **Signs**.

The unconscious representations are exteriorized by means of **E**, as **Symptomatic Acts, Signs, and Dreams**.

Freud thinks that representations, as a general mechanism of the psyche, are either remembered or forgotten without causing any pathological symptom. It is only when they are connected with a traumatic sexual event –and then are repressed- that they are exteriorized by oblique roads -dreams, symbolic acts - and they are not forgotten.

### **Actual applications I of hysteria**

Besides the theoretical and non-theoretical elements, application *I* possesses, at least one statement –axiom- that fulfills the function of relating them to each other and that is functionally equivalent to the laws of a theory. Of course they stated in a nominalistic version of a law that refers to the structure of an exemplar –a case of hysteria- and not to the set of all the exemplars –a platonic entity not admitted by our ontology-, and the possibility of using it to characterize another exemplar.

In the case of the *Freudian theory of hysteria*, those general axioms are the following:

Axiom 1:

“For any patient with signs of hysteria, there are events that sexuality -homo or heterosexual- turns traumatic; their repressed representations become unconscious, and they are exteriorized as hysterical symptoms, dreams and symptomatic acts.”

We may add a methodological principle that expresses the possibility of extending the theory beyond the paradigmatic cases:

“Any other case of the *Freudian theory of hysteria* will be similar to Dora, its paradigmatic case, and it will present a similar structure”.<sup>20</sup>

It is almost unnecessary to remark that the relationship of similarity or resemblance refers to the structures that are defined by the Freudian theory –not to Dora's physical or social peculiarities-.

These similarities should be contemplated in each application, comparing it with Dora or with other cases of hysteria, so that there is no *general*, i.e. *universal* notion of similarity.

Finally, we find in Freud' theory another very general rule that relates –associates- current representations –**Ra**- to representations of the past, and even of childhood –**Rp**- which are *privileged* unconscious representations in Freud's view.

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<sup>20</sup> This principle is implicit in Kuhn's and structuralistic use of paradigmatic cases –following Wittgenstein's resemblance nominalism- and allows us to apply Dora's structures to other cases. We make it explicit, in a similar way as Hume does when he introduces the inductive principle.



Let us express it as a diagram:

**R a** —————▶ **R p**

I will make an additional reflection. It is implicit in the characterization of the *actual applications* that there is no inconvenience in thinking of *theoretical* cases of a theory, precisely the *actual applications I*. After all, *partial applications* are *actual applications* of a previous theory in which they possess all their theoretical functions, and in the structuralistic conception there is no doubt of its –relative- empirical character. Nothing different is postulated for the theory under consideration. Of course, this implies some kind of *internal realism*.

### **Constraints:**

The structuralistic conception of theories introduces some relationships among the different models of the theory that are termed *constraints*. They are proposed to unite models in a specialization and models of different specializations derived from a more general “theory element”, for instance, cases of hysteria and cases of paranoia, being both of them specializations of a general theory of psychoanalysis.

In this article, I will only mention a very general relationship that unites the cases of hysteria, and allows us to apply its structures to new cases. It is also a condition of possibility of the whole psychological knowledge. It could be expressed in the following way:

“Human beings possess similar psychic apparatus, and react in an analogous way in similar situations.”

Without this basic tenet there would be no psychological theories; only possible inferences about each specific social agent's performance.

### **Intertheoretical links**

Without intending to do a formal analysis of the theories that are more closely related to the psychoanalytical theory of hysteria, let us point out that it is related to neurophysiology – organic base of hysteria -, with physiology in general and specially with the organic bases of sexuality, with psychology and with psychiatry.

### **The pragmatic empirical claim**

In the pragmatic empirical claim, the steps described by the reconstruction of the theory are a kind of instructions that an epistemic subject must follow so as to use the theory as a tool for exploring the factual world.

“When Freud or another epistemic subject perceives that a person presents similar signs to those of Dora, it makes sense that he/she should investigate whether that person experienced and then forgot traumatic sexual events that are similar to Dora’s. If that happens, then that person has *psychoanalytical hysteria*”.

If all these conditions are fulfilled a new case is added to the (open) group of patients already known.

Even when we speak of epistemic subjects, this is not a relativistic claim, since they are part of an epistemic community that trained them in shared standards, and their discoveries are tested by the other scientists. The knowledge they possess became objective –intersubjective- in the circulation among the members of the community.

### **Beyond theory, techniques**

I leave out of the structure of the *Freudian theory of hysteria* two key elements of the whole theoretical frame of psychoanalysis.

The first one is the psychoanalytical *interpretation* of dreams, symptomatic acts or symptoms, because it is a tool of exploration of the unconscious –therefore a method- with the same epistemic status as other technical devices, as dissection for anatomy, the use of the telescope for astronomy, or the scales. I will add that this method possesses its own system of validation of the interpretation operated by the psychoanalyst, when the patient agrees with it, or when symptomatic acts and of symptoms disappear.

Let us remember that the roads that go from the repressed representations to their exteriorizations under the guise of dreams, symptoms or symptomatic acts follow the logic of symbolic thought, associating images to each other. Much later it will be said that the mechanism follows the rules of metaphor and metonymy. Freud points to another mechanism that does not belong to these rules, since sometimes the exteriorization appears as the opposite of what is repressed. When Dora expressed that her father is a man of (many) resources, she thinks that his resources are actually scarce, in allusion to his impotence.

Repressed representation is a Gestalt with multiple accessory facets associated to the main event that became exteriorized during the interpretation process. Such is the case with the smoke of Dora's dream that remits to the smell of tobacco in K's breath when he tried to kiss her.

The second aspect that we put outside of the theory is the *transference notion*. Freud introduces it in the end of his article –the Poscript- as a situation that occurs in therapeutic conditions, when patients unconsciously reproduce an entire series of previous events when they interact with the therapist. Freud states that it is central to interpret them so as to "avoid the delay in the cure", and thinks that because he was not aware of this notion Dora's treatment ended so suddenly.

From that moment on, it is obvious that psychoanalysis has an artificial experimental situation -the therapeutic context itself- in which to test directly its hypotheses about the past of the patient and the repressed representations analyzing the material produced in his/her relation with the psychoanalyst.

From the theoretical point of view, transference can be considered summarized by the additional axiom that relates representations of the past with events that occurs in the therapeutic relationship.

The reasons why we separate these two instances, interpretation and transference, from the theoretical body of hysteria are clear now. They are techniques and methods of exploration of the unconscious, and as such, they are not part of the theory.

On the other hand, it is the strategy followed by Freud when he refers to them in the Postscript. There he says that he also omitted all reference to the technique by means of which he extracts the content of unconscious ideas that are integrated in the total mass of spontaneous associations of sick persons.

### **Illness and normality**

As in the notion of illness in Claude Bernard's physiological theory, according to Freud normality and pathology are not radically different; rather, they share the same mechanisms.

According to Claude Bernard, illness occurs when there is a deviation of the normal parameters, as result of a hyperfunction or a hypofunction of an organ. It is interesting to note that the physiological method of exploration of the normal function consists mainly on extirpating the organ responsible for the function that is explored, and then observe the alterations that it originates. Usually they coincide with a defined illness; that is to say, this method causes an artificial production of an illness, in fact the one that is produced by the absence of the organ, and of course, also by its hypofunction. In the paradigmatic case of the studies on the function of the pancreas, its extirpation produces diabetes. This hypothesis has to be corroborated, and the method is completed in two ways. One of them consists in restoring the organ –perhaps as an extract- and observing if the illness is cured. The other way, is to cause its hyperfunction. In this case, that should cause the opposite dysfunctions produced by the extirpation. Again, in the case of the pancreas, the injection of insulin replaces the function of the pancreas, normalizing the levels of sugar, and the excess of insulin produces hypoglycemia.

Similarly, in Freud's view the mechanisms of hysteria and of normality do not differ, and as with the physiology of the pancreas, he can investigate the normal functions of the psyche by studying its illnesses. When Freud speaks of hysteria, he also informs us about the normal mechanisms of the psychic apparatus, and of its deviation in this illness.

It is no coincidence, then, that the correct interpretation of the material that surfaces in analysis and its corroboration by the patient, lead to the disappearance of the hysterical symptoms and of the symptomatic acts, and therefore to the patient's cure.

It will be remembered that when, following its interpretation the repressed representation becomes conscious, the patient is cured. When there is no more repression the normal psychophysiology is restored, and it causes no more symptoms.

### **Theoretical background of hysteria**

Of course, this it is not Freud's first article, nor his first theoretical reflections. Even when he does not mention them explicitly –or too seldom- his assertions should be understood within a theoretical background that embraces the whole psychoanalytical theory, as it was formulated at the time. I refer mainly to the postulation of a psychic structure, the notion of libido or the Oedipus complex<sup>21</sup>.

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<sup>21</sup> The psychoanalytical theory experienced several developments and changes in the course of time. I will refer exclusively to those that happened before the article on Dora's Case.

Although all of those notions are assumed knowledge whose reconstruction is not the purpose of this article, I will characterize them briefly within the conceptual frame introduced up to this point.

In Freud's article there are not many elements of a psychic structure. We already saw that the notion of the unconscious appears as representations that are repressed, and that Freud obviates the notion of consciousness, simply mentioning that they are remembered otherwise.

About the libido notion that he introduced years before, we can see it as a function of sexuality. It has no significant role in Freud's article.

The Oedipus complex is mentioned very briefly when Freud speaks about Dora's relationships with her father. Without attempting its reconstruction, I will suggest that it can be understood by referring to a similar interpretive structure as the one sketched above, stating that the elements of the Oedipus complex are specifications of those of the theory of hysteria, namely people, facts, representations, repression, etc.

### **Psychoanalytical practice**

I had already mentioned that the empirical claim of the theory expresses the possibility of extending the paradigmatic case to other cases, and at the same time it points out the steps that Freud follows when he invents-discovers the theory, and also when it is applied. That is to say, it establishes the steps of the genesis and the use of the theory.

I may not have stated explicitly enough that when I mention the characteristics of the use of the theory, I am indicating at the same time that the psychoanalytical diagnosis follows those same stages. And lastly, when this diagnosis transforms a hysterical patient into a psychoanalytical one with clinical investigation covering the phases specified by the empirical claim, the successive corroborations that the analyst receives from the patient cures him. That happens because they are of such a nature that the repressed material goes from unconscious to consciousness.

Genesis of the theory, diagnosis and psychoanalytical cure coincide in their structure with the pragmatic empirical claim that results from reconstructing the theory as applications, following the text of the paradigmatic case, Dora.

### **Addendum**

We started our journey with a brief report of Dora's Case, and now finish it with a physicalist reconstruction of the psychoanalytical theory of hysteria.

In the course of this analysis, we found out that Freud follows a sequence of steps when he turns Dora on his paradigmatic case of *psychoanalytical* hysteria, and notably, those steps coincide with the stages required to make an empirical claim of the theory, i.e. its use.

Although the empirical claim allows us to reconstruct the way scientists use their theory when they explore its field of application, in our analyses we notice that it is a central tool to understand also the stages of constitution of the theory, its genesis.

This is crucial to establish the impossibility of postulating that the theory can be appropriately characterized by means of abstract models –without interpretation- since it begins with empirical applications, and in the progressive construction of the theory they never lose their factual meaning. The structural core of the theory can not consist of empty, mathematical models.

On the contrary, it persuades us that if we want to be fair to what a theory is, we should stick to the reconstruction of those empirical structures that at the beginning only have non-theoretical elements, afterwards, their theoretical elements, and finally, satisfy certain law-like axioms that relate all the elements. Briefly, a reconstruction of applications of the theory that first are *partial*, then *potential*, and finally, *actual* applications, always in the level of the characterization of physical systems, and without resorting to mathematical models.

We could therefore characterize the *Freudian theory of hysteria* by means of its applications, its constraints, and its inter-theoretical relationships, such that:

T P of H = [ Ipp, Ip, I, C, L ] Dora being I<sub>0</sub>

Such that:

- i. Ipp are *partial applications*
- ii. Ip are *potential applications*
- iii. I are *actual applications*
- iv. I<sub>0</sub> is a paradigmatic application in the initial time 0 of the theory: Dora
- v. C are constraints
- vi. L are inter-theoretical relationships

We need nothing else to characterize the theory.

It is unnecessary to appeal to abstract, non-interpreted structures.

A factual theory does not begin or involve the presence of those mathematical structures – models- that were thought indispensable, as the core of the condition of possibility of experience.

We also show that the structural knowledge of the paradigmatic applications is actually the condition of possibility, the one that facilitates its expansion to other cases, when an epistemic subject perceives structural resemblances among them.

Although we employ a more general language using letters such as *I, Ipp*, words as *applications, links*, etc. they do no point to an abstract entity, we are always describing Dora, the paradigmatic application, and by doing so, any other case of hysteria, including fictional ones. Perhaps this is the last stage of the process of invention of theoretical terms, simplification and generalization that begins with the notes that Freud writes during the treatment, continues with his article and finishes with our reconstruction. This process goes from the details of a description, to the most general forms of philosophy of science.

Upon doing so, we come to a kind of language and of structure that allows us to describe any possible case of hysteria, including fictional ones. This does not differ from what happens in physics, or other disciplines, when students are trained by means of fictional exercises, and do

not need to test the results in laboratories.

When we speak of fictional cases, we do not deny physicalism. They exist as physical events in the form of thought-language<sup>22</sup> of the epistemic individual that proposes them, or as statements spoken or written in a paper.

Not only fictional cases challenge nominalism. The presence of *potential applications* in the reconstruction outlines the problem of its ontological status, since they *might be* interpreted as a possibility that refer to non-spatiotemporal entities. From the physicalist point of view, there is no such a thing as non actual physical systems. The presence of theoretical elements in a patient –or in any physical system- is a *hypothesis* stated by the psychoanalyst, and justified if the patient follows the laws of the theory. It is no only the case that this hypothetical statement is as physical as the fictional ones; it differs from them because it refers *to a physical system* and not to a mathematical entity and therefore keeps in the process this ontological condition.

It may be noticed, just as I said at the beginning, that central elements of the structuralistic approach are kept in the reconstruction, expressed in physicalist terms –and in physicalist ontology- fulfilling Wittgenstein’s nominalistic strategy that is in the basis of the semantics of structuralism, and in the application of a theory. We also saw that this nominalistic use of the theory coincides with the diagnosis, the treatment, and the recovery of the patients, since turning a hysterical patient into a psychoanalytic one, implies his full diagnosis as such. Its corroboration by means of becoming conscious of the repressed representations restores the normal physiology of the system, and therefore the recovery of health.

Although this view diverges from the standard presentation of the structuralistic conception, it does not constitute a radical heterodoxy.

From time to time, we read manifestations that point in the same direction, although they are not fully developed.

Let us see how C.Ulises Moulines (1998, p. 154) states it:

“And if authors like Goodman, Field and others are right, then in factual theories we never need those terms (the mathematical). We could do without them when dealing with knowledge of empirical reality (that is to say with "genuine" knowledge) and we could spare ourselves the metaphysical headaches they represent for us.”<sup>23</sup>

He stated before (p. 148):

“It is not absurd to imagine that the essential aspects of SMM (Structuralistic Meta-theory Methodology) can be reproduced in the general frame of a (strong enough) nominalistic or intuitionist system.

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<sup>22</sup> I use thought-language in the same sense than Neurath (1983, p. 67) when he states: “We speak not of “thinking” but straight away of “speech-thinking”, that is, of *statements as physical events*.” This is a general physicalist solution to ontological problems of language –and of logic and mathematics-. This strategy denies the existence of abstract entities such as types, ideas, etc, proposed by Platonists. Of course, some statements refer to physical systems and others do not refer at all.

<sup>23</sup> English version of CL

We coincide totally with these words. We believe, indeed, that “we can do without them (the mathematical structures)”, and it is not absurd to imagine a reconstruction of a theory in the general frame of a nominalistic system.

Also we coincide with the comment he makes further down, concerning the ontological nature of mathematics (cit. p. 154):

"The debate is still open, and this is not the place to risk anything substantial about it."

Our proposal constitutes a reply to those concerns, taking a decidedly physicalist stance, relegated by the Platonic positions that predominate unnecessarily in philosophy of mathematics and logic, and in consequence, sometimes in those philosophies of science that employ formal tools to elucidate the structure of science.

This is our homage to Otto Neurath. We propose an updated physicalist view of contemporary philosophy of science, using physicalistic and nominalistic tools to reconstruct a factual theory. In so doing we keep the distinctions that have been forged since Neurath's time and that cannot be neglected by philosophers of science who are interested in the structure of scientific knowledge.

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