The hysterical symptom: a proposal of articulation of the Freudian theory and the Bayesian account

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ABSTRACT
The Freudian theory of the hysterical symptom conceives it as a form of symbolic solution to an unresolved psychic conflict that has been repressed. A large section of Freud's early psychological writings is dedicated to the theoretical discussion of how a part of the body can be used as a symbol. This theory establishes a correlation between bodily experience and the experience of psychic conflict. This correlation can be contingent or metaphoric, and makes the bodily experience the symbol of the conflict. This theory fits the proposal of the Bayesian brain approach to the conversion symptoms (or Functional Motor and Sensory Symptom, FMSS). The precision of prior beliefs and prediction errors in the generation of what we perceive is modulated by attention. The cause of the FMSS can be considered as produced by abnormal priors to which excessive precision is given, thus leading to false perceptual inferences to explain the emergence of belief at the intermediate level. In the psychic conflict, too much precision is given to the sensory evidence coming from the desire, increasing uncertainty. As this fact results in the impossibility of experiencing the conflict and managing the affective overload, the attention is directed to the organic symptom that was available concomitantly to which the excessive precision is transferred. This paper intends to approximate the Freudian view of the conversion symptom and the Bayesian approach, showing that the articulation between symbolic reading and neuroscientific reading complement and clarify each other.

KEYWORDS
Hysteria; conversion symptom; symbolization; cognitive semantics; Bayesian brain; free-energy principle; repression

1. Introduction

In this paper, we propose an articulation between the Freudian theory of the hysterical symptom and the Bayesian approach. The Bayesian approach to the hysterical phenomena is presented by Edwards, Adams, Brown, Parees, and Friston (2012), where the authors discuss the possible neural basis of the symbolic mental mechanism identified by Freud. Recently, Michael (2018) elaborated on that proposition, pointing out the role of Freudian repression in the development of symptoms, a perspective which is totally convergent with the one we present here[1]. In this paper, we aim to demon-

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[1]It should be noted that Edwards and colleagues (Edwards et al., 2012) criticize Freud's theory as they think it presents a one-dimensional approach to the causes of Functional Motor and Sensory Symptoms (FMSS), i.e.,

strate how conversion occurs as a way of dealing with free energy, starting from Freud's concept of symbolization.

In the period up to the first half of the 20th century, a group of symptoms now classified as conversion disorders was labeled as hysteria. Freud introduced the term conversion to describe the physical symptoms that result from the displacement of repressed psychic conflicts into the body (Breuer & Freud, 1895). In this paper, we do not intend to discuss disorders but will focus instead on precisely how the mechanism of conversion, as described by Freud, produces symbols in the body: the hysterical symptoms. For this reason, we will preserve the use of the term hysterical symptoms, or use the term Functional Motor and Sensory Symptoms (FMSS) proposed by Edwards et al. (2012). Both include sensorial and motor symptoms that comprise the presence of abnormal movements, or the absence of normal sensations and movements, and exclude functional symptoms that involve autonomic dysfunction or arousal. This choice is supported by clinical experience showing that these symptoms often appear on an occasional basis, for a longer or shorter period, regardless of syndromes[2].

The Bayesian hypothesis suggests that the brain is an inference machine that uses hierarchical models to predict its sensory input and calculate its motor discharge in order to minimize the amount of free energy (Carhart-Harris & Friston, 2012). According to Carhart-Harris and Friston (2012), free energy is an informational and theoretical quantity that corresponds to the Freudian notion of psychic energy regulated by what Freud called "the principle of constancy." According to the free-energy principle (K. Friston, 2009), the latter can be considered a general principle of biological organisms' function to minimize free energy. This approach has proved to be a possible unifying theory of psychology and neuroscience and has been considered to offer the potential of full consilience with psychoanalytic concepts (Connolly, 2018; Hopkins, 2012, 2016). Michael (2018) argues that applying this model to the Freudian theory of hysteria can help achieve a more satisfactory formulation of metapsychological-psychoanalytical concepts and shed light on other neuropsychoanalytic correlates.

We will first present some fundamental elements of Freud's symbolic theory, relating it to a well-known theory of cognitive semantics and its application to the hysterical symptom, by discussing its concepts in the case of Elisabeth von R. presented by Freud in *Studies on Hysteria* (Breuer & Freud, 1895). Next, we will present the key concepts of Bayesian theory that allow us to approach the conversion phenomena. The proposed articulation intends to show how the Bayesian approach adequately describes the Freudian observations allowing an articulation of the concepts of both theories.

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they result from psychological conflicts arising from traumatic emotional events experienced during childhood. They claim this is a simplistic idea, as it is "(..) based on a specific (and perhaps simplistic) interpretation of the concept of conversion disorder introduced by Breuer and Freud in 1893-95." (Edwards et al., 2012, p.3501). However, Freud's theory of conversion is far more complex and cannot be reduced to a one-dimensional factor. Moreover, pointing out the psychological factors involved does not mean excluding the neurobiological factors. On the contrary, this articulation is possible, as we intend to demonstrate in this paper.

[2]In the last 20 years, a vast amount of literature on neural correlates of Conversion Disorder (CD) has been produced through neuroimaging studies and their relationship with dissociative disorders, but not many directly addressing Freud's theory (Aybek et al., 2014; Boeckle, Liegl, Jank, & Pieh, 2016; Ejareh Dar & Kanaan, 2016; Nicholson et al., 2016). Since our proposition focuses on the conversion mechanism and proposes an articulation of the Freudian theory and the Bayesian approach, it goes beyond the scope of this paper to discuss that literature here.

2. The basic elements of the Freudian theory of the symbol

Our interest in this article is to elucidate the conversion mechanism, that is, how a bodily event can be used as a symbol of a mental event. For this reason, we start with Part II of the Project (Freud, 1895), where Freud's primary interest lies in showing that the hysterical symptom is a symbolic formation, understandable in the field of meaning.

Freud presented here one of the basic mechanisms of his symbolic theory that he would then develop in chapter VI of *The Interpretation of Dreams* (Freud, 1900) and used to interpret dreams and clarify the mechanism of neurotic symptom formation. It is the displacement, the transference of the sum of affection from one idea to another. The other mechanism is condensation, the compression of two or more ideas in one single formation.

Let us take Freud's example. He calls the symptomatic manifestation "idea A." It is an excessively intense idea that determines a compulsion, incomprehensible and inconsistent with the linear flow of consciousness and involving bodily reactions. To understand it, one should access the thoughts that cause it, which he calls "idea B." For example, a woman has nausea and vomits (idea A) because she experienced a painful emotion (idea B) during a meal, but she is unaware of the connection between the two ideas. Thus, her compulsive nausea and vomiting are incomprehensible to her conscience. Freud considers that B stands in particular relation to A, for there has been an event which consisted of B+A. A was a subsidiary circumstance (the digestive processes during the meal), while B was well calculated to produce a lasting effect (the painful emotion). When this emotion is activated in memory, the intensity of B is subtracted and added to A, characterizing a process of displacement. "A has become a substitute, a 'symbol' for B" (Freud, 1895, p. 406), and B does not come to consciousness.

Freud also sees displacement in the formation of common symbols of everyday life: "A soldier will sacrifice himself for a piece of coloured cloth on a pole because it has become the symbol of his native country, and no one considers this neurotic." (Freud, 1895, p. 407). This piece of colored cloth is the flag (idea A), the symbol of one's homeland (idea B). However, the homeland is an intense idea. In its semantic field, there is a strong presence of meanings that evoke family, paternal home, protection, and warmth from home, which coherently leads the subject to experience these feelings and act according to them. In the formation of the symbol, the affection evoked by the homeland is transferred to the flag. When the soldiers follow the flag on the battlefield, they are not following a piece of colored cloth; they are taken by all the significance of their homeland that is embodied in that cloth.

The Freudian displacement is not just a semantic process but has an energetic side: intensity transfer from one representation to another. Therefore the symbol does not merely represent the symbolized element but is actually as if it were the element itself. The symptom as a symbol not only represents the conflict, but it also realizes it in the here and now. The difference between a cultural symbol and the hysterical symbol is that in the latter, the connections with the idea that causes hysteria are disconnected from the associative access. With the cultural symbol, the semantic field is activated without needing to come to consciousness. However, nothing prevents it from accessing consciousness. "But the hysteric who is reduced to tears by A is unaware that this is because of the association A-B ... In this case the symbol has taken the place of the thing completely." (Freud, 1895, p. 407). This difference is caused by repression.

This approach of the symbol[3], in the way Freud conceived it, coincides with the one currently explored by cognitive semantics, conceptual blending theory, presented in (Fauconnier & Turner, 2002) and Turner (1996). Conceptual blending is a cognitive operation that integrates elements and relations from diverse scenarios in a unique structure with new emerging properties. It is the fundamental operation for the production of meaning in everyday life, including symbols and conceptual metaphors.

The symbol (the symptom, the flag) is formed by the compression of elements from different domains. In the flag, we have a domain where there are concrete elements (cloths of different colors) and another where there are abstract elements (the semantic field of the homeland). These elements are connected and integrated into a singular new element that did not exist in the previous domains: the flag as a symbol of the motherland. These connections are possible thanks to their relationships with the generic space, which contains the abstract structure of the entire network, in this case, the representation relationship. This new formation, the blend, inherits the original elements' structure and has its own emerging structure. The connection between the elements of the domains, which Fauconnier and Turner (2002) call vital relationships, can be of various types, such as simultaneity, analogy, cause-effect, and identity. It is crucial to point out that of all this complex cognitive operation (here much outlined and reduced to its minimum structure), only the blend comes to consciousness, everything else remaining unconscious. The connection between the elements of these domains - the piece of cloth and the idea of the homeland; the subsidiary circumstance (idea A) and the painful emotion (idea B) - and the compression of these elements for the formation of the new element in the blend (the flag and the symptom), are equivalent to the two mechanisms that Freud describes, in Chapter VI of *The Interpretation of Dreams* (Freud, 1900): displacement and condensation[4]. It should also be noted that in order to obtain the Freudian displacement effect in the blend theory, the two operations are necessary: the connection between the elements and their compression in the blend. As illustrated in Figure 1, this is how a piece of cloth can become a symbol of the country and acquire a new name: flag. Or that a bodily event can become a symbol of a psychic conflict and receive a new name: symptom.

3. Hysterical symptoms: symbols in the body

It is in *Studies on Hysteria* (Breuer & Freud, 1895), especially in the clinical case of Fräulein Elisabeth von R. – in fact an exhaustive treatise on the conversion process – that Freud devotes himself to conceiving how a part of the body can be used as a symbol in a hysterical conversion. The symptom Elisabeth complained about was "(..) of severe pains and of early fatigue in walking as well as standing, so that after a brief

[3]The term symbol is very polysemic and its meaning varies according to the context of its use. Even Freud does not always use the term in the same sense. Here we are using this term to indicate the formation resulting from the fundamental operations of the conceptual blending, the connection (the Freudian displacement) between elements from different domains and their compression (the Freudian condensation) in the blend.

[4]The Freudian theory of the neurotic symptom will also be used to elucidate phobic and obsessive symptoms. See the discussion on Little Hans's phobic symptom in chapter IV in *Inhibitions, Symptoms and Anxiety* (Freud, 1925). The obsessive symptom as a symbol is treated in *Obsessive Acts and Religious Practices* (Freud, 1907) or in the famous case of Rat Man (Freud, 1909). Furthermore, displacement is the mechanism of fetish formation in fetishism (Freud, 1927). Although Freud describes other forms of symptom formation, such as the symptoms of traumatic neuroses (*Beyond the Pleasure Principle* (Freud, 1920)) or by hysterical identification (*Group Psychology and the Analysis of the Ego* (Freud, 1921)), throughout his work, he maintains the formation of the neurotic symptom associated with the mechanism of symbolization set in motion by repression. (See "Repression" (Freud, 1915) and Chapters 4 and 5 in *Inhibition, Symptom and Anxiety* (Freud, 1925)).

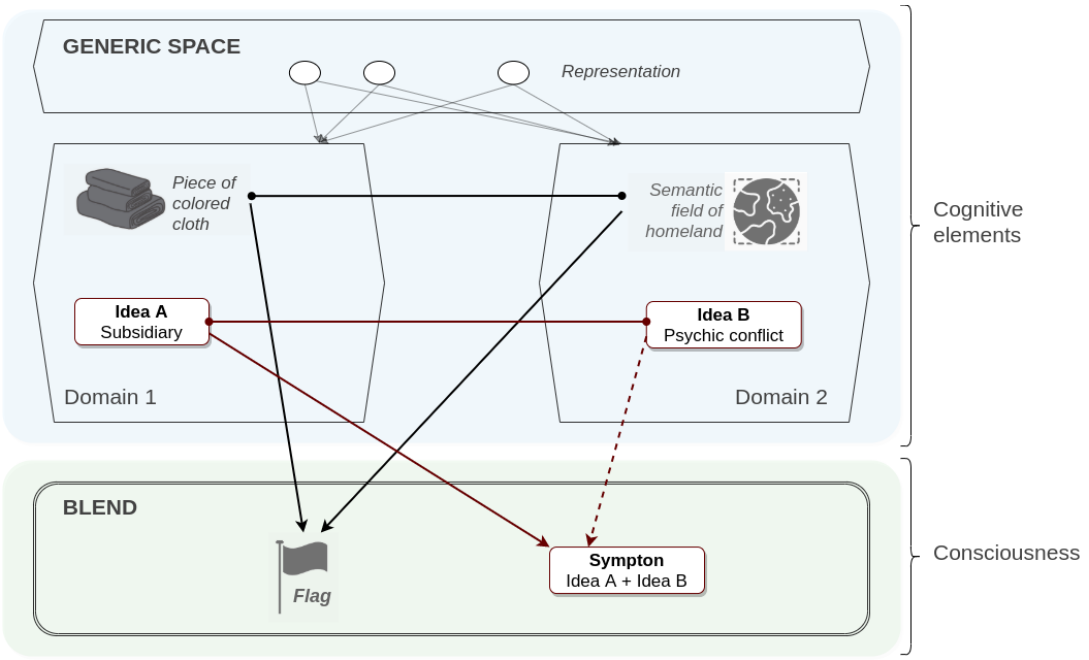

Figure 1. This diagram represents the formation of symbols (the flag and the symptom) in the blend. For simplicity, only two entry domains are partially represented by boxes (they can be multiple and highly complex). The generic space contains the abstract structure shared by the entry spaces – or domains. The lines represent the connectors between the elements and their compression in the blend. Note that, in the case of the symptom, the connection between idea B and the symptom is represented by a dotted line to indicate the impediment of conscious access.

period she had to seek rest in which the pains diminished, but by no means disappeared." (Breuer & Freud, 1895, location 1840) Freud's long and detailed investigation of this symptom shows that it was formed by simultaneity:

> *Why should just the pains in the legs have been selected to represent the psychic pains? The circumstances of the case point to the fact that this somatic pain was not created by the neurosis, but was merely utilized, aggravated, and retained by it. I will add that in most of the cases of hysterical algias into which I have been able to gain an insight, the conditions were similar, that is, there was to begin with always a real organically founded pain. It is always the most common, the most widespread pain of humanity that seem to be most frequently called upon to play a part in hysteria. . . . The first attack of pain which Miss Elisabeth v. R. had while she nursed her father I consider to have been organically determined, for I received no information when I investigated for its psychic motive, and I admit that I am inclined to attribute differential diagnostic significance to my methods of evoking hidden memories, if they are carefully applied* (Breuer & Freud, 1895, location 2443).

For a long period, Elisabeth lived in constant apprehension for her father's health and in constant physical exhaustion due to the care she had to devote to him. Taking this context into account, Freud identifies three reasons for choosing these pains to symbolize her psychic suffering. The first and most important was the simultaneity[5] between the occurrence of pain and the emergence of psychic conflict during caring for her sick father. Freud sought to determine in Elisabeth's story the moment when pain first appeared. She remembered the night she had gone out with a young man

[5]Note that what Freud here calls simultaneity is not a singular occurrence of two concomitant events.

she was interested in and who had accompanied her home after a party. She had hopes of a stable relationship with this young man, which was reciprocal, and had never felt so much affection for him as she did that night. When she got home, she found her sick father worse and reproached herself for abandoning him to have fun. She never left her father on his own any longer. It was during the period when she took care of his father that the pains in her legs appeared, which, in Freud's opinion, "I believed that I could assume that these first pains were due to a slight rheumatic attack and really had no psychic basis, and I could also discover that this organic trouble was the model for the later hysterical imitation, at all events that it occurred before the scene of being accompanied home." (Breuer & Freud, 1895, location 2024) All neurotic[6] symptomatic formation originates in a psychic conflict that has been repressed. When the psychic conflict arose – the incompatibility between her desire for the young man (her woman's side) and her duties as a daughter – the erotic idea was suppressed and the physical pain in the legs was used as a symptom, a symbol of the conflict.

The second reason is that this pain had been felt in many moments and in relation to many experiences of that time. "(..) because it was or could be connected in many ways with the ideation content of that time." (Breuer & Freud, 1895, loc.2443) That is to say it was very present mentally; it was a mental representation readily available and linked to several semantic networks[7].

Thirdly, as found in Breuer and Freud (1895, location 2443):

> *(..) Namely, the fact that for many days one of her painful legs came in contact with the swollen leg of her father during the changing of the bandages. The location on the right leg distinguished by this contact henceforth remained the focus and starting point of the pains.*

There are a whole context and a network of relationships that connect her aching legs to the sick father and the conflict she was experiencing at the time. Thus, of all the simultaneous events experienced during this period, the leg pain was a 'natural choice' because of the connection it had with the conflict. Elisabeth von R.'s aching legs eventually became a private symbol of the entire impasse she experienced in relation to the field covered by her conflict, let us say, the impasse with her femininity. In this regard, Freud reports that she deviated from the ideal expected for a girl and was very attached to her father, who used to say that this daughter was like a son. She was very unhappy being a woman and was angry at having to sacrifice her freedom and independence for marriage.

Her father's death left the four women in the family (Elisabeth, her mother, and two sisters) alone, awakening in Elisabeth a keen desire to help the family maintain happiness and cohesion. Furthermore, after her father's death, the young man she loved withdrew from her and their paths diverged, which added yet another loss to what had just happened.

The pains in the legs first appeared at the time of her father's illness – let us call this moment **scene 1** – but the permanent development of this symptom took place two years later, after a hot bath in the spa where she had spent a few days on holiday in the company of her relatives – this will be the **scene 2**. On that occasion, she spent a great deal of time in the company of her brother-in-law, for whom she

[6]The term neurotic is being used here in the sense of Freudian psychopathology. This form of symptom formation refers to the transference neuroses: conversion hysteria, anxiety hysteria (phobias), and obsessional neurosis.

[7]A very present idea at a given moment has its mental access facilitated. This heuristic is called "availability" by Tversky and Kahneman (2001).

felt an affection that went far beyond friendship. The analysis revealed that she felt attracted to him even when her sister had not yet married him. At that moment, she was exhausted (again) by the care of her mother, who had had a delicate operation on her eyes and was overcome by the desire for love, for a companion who could help her walk the hard paths of maintaining family's cohesion. In her words, "her obdurate self began to soften." (Breuer & Freud, 1895, location 2148) On a long walk, during which they talked about all matters, including the most intimate ones, her desire to have a husband like him was accentuated. As described in (Breuer & Freud, 1895, location 2160), some days after his sister and he were gone:

> *(..) She visited the point commanding the beautiful view which had been their favorite walk. There she seated herself upon a stone and again dreamed of her sister's happiness and of a man like her brother-in-law who could engage her affections. When she arose, she had pains which again disappeared, and only in the afternoon after having taken the warm bath did they reappear, remaining ever since.*

It is worth noting the time interval between the symbolic connection (**scene 1**) and the occurrence of the symptom (**scene 2**). Freud states that conversion symptom does not occur in connection with actual impressions at the time it occurs, but in connection with memories of them. "I even believe that such a process is not at all unusual in hysteria and regularly participates in creating hysterical symptoms" (Breuer & Freud, 1895, location 2347). Freud supports this claim with several examples. The case of Miss Lucy R., also described in the Studies (Breuer & Freud, 1895), presents this time interval with the unusual hallucinatory symptom of "burnt pudding smell." It also appears in the investigation of Dora's cough symptom. We, for our part, have found in clinical work this same temporal pattern in the formation of neurotic symptoms (in general, not just hysterical).

In Dora's case (Freud, 1901), Freud designates the possibility of a part of the body becoming a symptom, based on the famous concept of somatic compliance. With this concept, Freud intends to establish a theoretical framework for the observation of the simultaneity of occurrence between the conflict and the corporal event used as a symbol:

> *When everything that can be got rid of by psychoanalysis has been cleared away, we are in a position to form all kinds of conjectures, which probably meet the facts, as regards the somatic basis of the symptoms - a basis which is as a rule constitutional and organic.* (Freud, 1901, p.1378).

He follows by describing this organic factor as "the grain of sand around which the oyster forms its pearl." (Freud, 1901, p.1419).

Nevertheless, there are cases where the relation of simultaneity is not evident or traceable. Freud called these cases conversion by symbolization. Consider the examples: "psychic pain may result in neuralgia, or the affect of moral disgust may cause vomiting." (Breuer & Freud, 1895, location 102) In these cases, there is no simultaneity between the occurrence of the psychic conflict experience and the symptom. However, Freud argues that when the hysteric creates a somatic expression for an emotional experience, there is nothing individual or arbitrary about it. In their origin, these expressions are formed by the simultaneity of occurrence between a mental and a bodily experience.

> *For how does it happen that in speaking of an aggrieved person we use such expressions as "he experienced a 'stitch in his heart'," if the mortification was not actually accompanied by a precordial sensation that could be so interpreted and recognized? Is it*

not probable that the phrase, "to swallow something," applied to an unreturned insult, really originates from the sensation of innervation appearing in the pharynx when one forces back his speech, thus preventing a reaction to the insult? Breuer and Freud (1895, location 2541).

We could say that Freud is referring to what we call an established conceptual metaphor nowadays[8]. George Lakoff and Mark Johnson show in *Metaphors We Live By* (1981) that the connections between different elements from different domains that are compressed in the blend are the basis for the formation of conceptual metaphors, which far from being purely linguistic constructions are basic operations of our conceptual system, forging abstract concepts from concrete ones. Thus, a moral disgust can be represented by the symptom of vomiting because our conceptual system contains the metaphor IDEAS ARE FOOD[9] which produces a wide variety of linguistic expressions such as "I can't swallow that claim," "that argument smells fishy," and "he is a voracious reader." Here is a mapping between elements of the concrete realm of food and the abstract realm of thought. Our language is full of linguistic expressions of this type[10].

These connections are motivated because they start from bodily reactions that are integral to subjective experiences and form the experiential basis for the generation of our concepts and linguistic expressions. Our comprehensive metaphorical conceptual system is supported in the body in terms of what Grady (2010) calls "primary metaphors," patterns of one-way experiential correlations between direct perceptual, typically sensorimotor concepts, and more abstract non-perceptual concepts. We are upright bipeds. We look and move forward. We interact face to face with our fellows and manipulate objects within our field of vision. This experience determines what Lakoff and Johnson (1981) named orientational metaphors that give to concepts a spatial orientation: conscious, good, happy, health, and more are "up," and unconscious, bad, sad, sickness, less are "down:" "he sank into a coma," "things are looking up," "you're in high spirits," "he fell ill," "his income fell last year."

Of particular interest to us are the metaphors for emotion whose experiential basis lies in the perception of how our bodies function. Lakoff (1990, p.380) shows that the conceptual metaphors involving the emotion of anger are based on the popular theory of the physiological effects of anger: increased body temperature, increased internal pressure (blood, muscle), agitation, and interference with perception. As anger increases, its physiological effects increase. There is a limit beyond which the normal functioning of the body is compromised. As this theory is used to identify when someone is angry and whether the individual is feeling angry, a basic mapping is established: the physiological effects represent the emotion. The most salient feature of the popular theory of the physiological effects of anger is heat (increased temperature and internal pressure). This connection forms the basis of the more general metaphor for anger: ANGER IS HEAT, which combined with the general metaphor, the body as the mind's container, produces ANGER IS A HOT FLUID IN A CONTAINER. Most of the linguistic expressions that speak of anger originate from this metaphor:

[8]In this respect, Hopkins (2000, p.45) says: "Freud's work has made it possible for us to extend thinking involving such concepts as desire, belief and phantasy, and in a way which there is good reason to take as at least partly sound. In what follows I consider how this same work also extends thinking involving symbolism and metaphor, and how in this psychoanalysis is consilient with recent work on conceptual metaphor."

[9]In cognitive linguistics, conceptual metaphors are represented in capitals. The first term refers to the element of the target domain that constitutes the metaphor, and the second to the element of the source domain.

[10]A discussion of conceptual metaphors can be found in Lakoff (1990) and related to "psychoanalytic" symbolization in Thá (2007) and Hopkins (2000). In Malinowski and Horton (2015), there is a discussion relating the formation of metaphors to the assimilation of emotion in dreaming.

"you make my blood boil," "simmer down," "let him stew," "you are on fire," and so on. These same metaphors have been observed in languages and cultures as diverse as English, Hungarian, Japanese, Chinese, Zulu, Polish, Tahitian, and Wolof[11]. As linguistic usage suggests, we can suppose that:

> *(..) people appear to have very similar ideas about their bodies and seem to see themselves as undergoing the same physiological processes when in the state of anger, düh, ikari, nu, and so forth. They all view their bodies and body organs as containers.* (Kovecses, 2010, p.171)

It was exactly this type of connection with bodily experiences that Freud identified at the origin of hysterical symptoms. "It is always the most common, the most widespread pain of humanity that seem to be most frequently called upon to play a part in hysteria." (Breuer & Freud, 1895, location 2431) Thus, the precordial sensation that accompanies an offense is part of the construction of the meaning of that offense, and the linguistic expression that expresses it – "it was like a stitch in the heart" – condenses the abstract aspect of this experience with its emotional and bodily aspect.

This finding is also in the work of Naomi Eisenberger, who has shown that social experiences of pain (exclusion, rejection) are processed by some of the same neural regions that process physical pain. "If you listen closely to the ways in which people describe their experiences of social rejection, you will notice an interesting pattern: we use words representing physical pain to describe these psychologically distressing events." (Eisenberger, 2011). Freud sums this up in an intuition of extraordinary lucidity:

> *All these sensations and innervations belong to the "expression of the emotions," which, as Darwin taught us, originally consisted of sensible and expedient actions; at present most of them may be so weakened that their verbal expression seems to us like a figurative transformation, but very probably all this was once meant literally, and hysteria is justified in reconstructing the original literal sense for its stronger innervation. Indeed, perhaps it is improper to say that it creates such sensations through symbolization, perhaps it has not taken the usage of speech as a model, but like it draws it from a common source.* (Breuer & Freud, 1895, location 2542)

In his discussion of these two modes of symptom formation, he places the first, conversion by simultaneity, as primary and the second, conversion by symbolization, as secondary. However, we can see this not only as a matter of primary or secondary, but of public and private. A conversion by simultaneity, observed in a specific case, produces a private symbol, the meaning of which only the individual who produced it has access to (often only through free association). On the other hand, conversion by symbolization is based on common cultural symbols, which are part of the conceptual treasure we share with our fellow human beings. In this sense, we could say that Elisabeth von R. created the private metaphor: DESIRE IS PAIN IN THE LEG.

In terms of blend theory, we can say that the original experience that gave rise to the metaphorical connection between her aching legs and the conflict with her desire constituted a generic space that became the abstract structure that came to categorize all the experiences that relive that question, building categories based on metaphoric similarity. The symbol created there becomes the "name" of all her suffering. Freud documents that her pains have moved from the modal domain of the conflict – daughter versus woman – to her family relationships, her position in life, the vagaries of fate, and so forth. Freud gives an extensive account of these semantic extensions to which

[11] An African language spoken in Senegal and Gambia.

we refer the reader (Breuer & Freud, 1895, location 2024). In addition to all these connections, her leg pains were the basis for metaphorical considerations about her life: "being alone was painful"; the feeling that she "could not take a single step forward" in the face of frustrated attempts to establish a new life for her family.

4. The Bayesian account of the hysterical symptom

In what follows, we briefly review some of the key aspects of the free-energy principle, and then link it to aspects of the formation of hysterical symptoms. (Readers who are new to this terminology may wish to consult (K. Friston, 2010) for an extended discussion.) According to the free-energy principle (FEP), the objective of perception is the minimization of free-energy over time through a predictive coding of the probable causes of sensory data. Therefore, it aims to reduce uncertainty, which is the average surprise, represented in the model by prediction errors (PE) expected on all possibilities. PE replace sensory data in inference since they are the only relevant sensory information that cannot be ignored and need to be explained. The brain does this either by altering the sensory samples through action or by changing its predictions through perception. The failures in this process have a great impact because they result in the increase of entropy, violating self-organization and homeostasis principles (K. Friston, 2010).

Random fluctuations in the deterministic evolution of the states of the world play an essential role in the generation of sensory data. These fluctuations, or the uncertainty of the sensory data, are measured by the variance of the probabilistic distribution, represented by the possible average surprise. The inverse of uncertainty is precision, the inverse variance that encodes the reliability of PE. Precision determines the relative weights that are given to priors and PE in the optimization of posteriors. As the precision of priors and PE is not fixed, it is optimized by attention. Thus, if perception is the inference about the probable causes of sensory inputs, attention is the inference about the uncertainty (precision) of these causes (Feldman & Friston, 2010). Attention estimates uncertainty during hierarchical inferences about the likely causes of sensory inputs.

The precision of the sensory signals depends on the states of the world. Optimizing precision involves optimizing the states of the world that are inferred from the priors. That is, the potency of the priors (top-down) in relation to the sensory evidence (bottom-up) is controlled by the relative precision of the PE at each level of the hierarchy. The hierarchical process is continuously regulated by precision attributions, a kind of "fine-tuning frequency" at all hierarchy levels, either amplifying or attenuating its role in the process. Thus, precision determines the relative weights that are given to the priors and to the PE in the optimization of the posteriors (Edwards et al., 2012). Two cases may occur:

(1) Precise sensory data and imprecise priors. In this case, the mean of the posteriors will be close to the sensory data.
(2) Imprecise sensory data and precise priors. In this case, the average of the posteriors will be close to the priors.

The Bayesian approach of the FMSS considers that they derive from abnormal priors (abnormal beliefs about the disease) that are given excessive precision by attention. Abnormal priors play an essential role in this scheme. (Edwards et al., 2012, p.3499) list several factors that can determine the formation of abnormal priors: from body-focused

attentional bias to important cultural influences that induce disease, but underline the importance of a precipitate physical factor that is commonly reported near the onset of a specific FMSS and that this factor explains why a particular FMSS is developed[12]. This conception coincides with the Freudian clinical observations that formed the basis for his symbolic theory of symptom formation. As observed in the example of Elisabeth von R., it is important to point out the difference between the precipitating physical factor, present in **scene 1**, when the connection between the conflicting desire and the pain in the legs is formed, and the precipitating event itself, **scene 2**, when the symptom is permanently constituted. As we have seen above, the precipitating physical factor that will be used as a symptom is a physical condition that co-occurs with the psychic conflict, exemplified by the pains in the legs experienced by Elisabeth at the time of her father's illness. There is not a necessary relationship, only a contingency between both[13].

Excessive precision is attributed to the sensory data derived from this physical factor, leading to abnormal prior formation at the intermediate level within the hierarchy. This abnormal prior will be formed by displacing the precision, initially part of the activation of the conflicting desire, to the physical factor, as we will describe in the following session.

The consequences of abnormal priors with excessive precision are:

(1) False perceptual inferences, since top-down priors overwhelm the sensory bottom-up evidence.
(2) The higher levels must explain the emergence of belief at the intermediate level, leading to false attribution of agency.

When the symptom is formed (in **scene 2**), the pain is perceived instead of the desire, due to the abnormally high precision of the abnormal priors at this hierarchy level. This well-formed percept (the pain) with excessive precision becomes a source of increased attention but does not predict its content. Thus, attentive bias maintains the neuronal activity that encodes perception without any top-down prediction about its content or nature. Only the precision is amplified. It would be like having your attention drawn to a certain sensory part with no idea (predictions) of what is attracting the attention. The symptom explains the patient's failure to predict or acknowledge that they had caused the prior belief by giving too much precision to it. That rational attempt, which can be regarded as a secondary false inference, aims at explaining perceptions generated at intermediate levels in sensorimotor hierarchies that were activated but not predicted within higher hierarchical levels.

5. A proposal of articulation

The proposed articulation is based on two key concepts in the free-energy model: precision (the focus of attention is determined by the relative weight of the priors and the PE) and neurocomputational complexity (the choice of action to deal with

[12]Some examples are given: viral infections precede a chronic fatigue syndrome or neurasthenia, and somatic symptoms associated with panic attacks are commonly reported before the onset of non-epileptic seizures (Edwards et al., 2012, p.3500).

[13]The idea that the causes of the hysterical symptom are psychological (in Freudian terms, a psychic conflict) has been recently supported in an elaborately controlled study by Nicholson et al. (2016), demonstrating that critical events (potentially conflictive events) were present in 91% of CD patients examined. Curiously, in 88% of the cases, they had not been observed by the clinicians that had seen them prior to the study (see also the discussion in Michael (2018)).

free-energy). These two concepts rewrite the two key Freudian concepts of symptom formation: the displacement that determines the symbolization by simultaneity (precision), and its cause, the psychic conflict (complexity), which is impossible to solve.

What happened in the experience of the conflict lived by Elisabeth von R.? In that evening with the young man, she fell in love and arrived home dreaming of a life with him. We know what these experiences spark in the imagination and the imaginary worlds that are built in a few minutes, making promises of future happiness. This bottom-up input clashed directly with her role as the beloved daughter responsible for the care of her sick father. Her superego prohibitions rose against her rising love-desire, making her feel guilty. This opposition characterizes what Freud called a psychic conflict. Freud (1894) relates the psychic conflict with the possibility of expression or inhibition, not only of the access to consciousness of the conflicting drives but also of their motor expression. In cases like these, in which the conflict is beyond the possibility of a solution by the usual means (and we have no indication from the text to know why this conflict was beyond Elisabeth's control), repression is triggered. In the future, when this conflict is re-actualized with the love situation with her brother-in-law, the result will be the formation of the symptom.

A free-energy principle (FEP) approach to Freudian psychic conflict is offered in Hopkins (2016) and Connolly (2018). In this approach, Freud's theory of conflict can be seen as a form of neurocomputational complexity, which consists of the simultaneous activation of conflicting emotions that compete with each other to find motor expression pathways. The psychic symptoms are the products of the mechanisms that aim to reduce complexity. As we shall see, these mechanisms appeal to virtual reality, that is, to fantasy.

Each of the conflicting emotions at play leads to contradictory strategies of action aiming at having the satisfaction experience that would reduce free-energy. The expected free-energy is relative to the forecast of the stock results, whether they will reduce or increase it. According to K. Friston, FitzGerald, Rigoli, Schwartenbeck, and Pezzulo (2017), the nervous system can estimate the free-energy of different possible actions at the same time. Clearly, the chosen action will be the one that will minimize most of the free-energy of the system. However, the psychic conflict can be formalized by a situation in which the expected minimization of the free-energy of each motor expression of the emotions at stake is basically the same, which results in the loss of confidence of what to do, which path to take (Connolly, 2018).

Freud (1925) defines psychic conflict as the result of the incompatibility between the drives of the id (which are manifested in consciousness as desire) and the defense against these impulses arising from the moral standards of the superego. That way, we could describe Elisabeth's conflictual situation as follows: Elisabeth as a daughter, faithful to her father, convicted by the superego's judgment and feeling guilty, would conduct the action towards total dedication to the father and family by eliminating all the loving desire of Elisabeth as a woman. But the desire aroused in the woman would lead her to the exact opposite action: withdrawing her libido from the father and directing it to the man she was in love with. We observe in this case that the extremely rigid high level priors of the superego leave no room for alterations or questioning to accept the actions derived from the desire. Not being capable of fulfilling her desire, Elisabeth takes no action.

Parr, Benrimoh, Vincent, and Friston (2018) show how higher-order prior beliefs can be maintained with a high degree of confidence by reducing the precision ascribed to sensory information from lower levels of the hierarchy. That is what happened to Elisabeth for two years, during which her desire took a back seat and family chores

demanded her full attention. After her father's death, she devoted herself entirely to her mother, who suffered from a severe eye condition and occasional "nervous states." When the year of mourning passed, her older sister got married. This brother-in-law soon came into conflict with her mother, and Elisabeth felt called to fight for her. In addition, her sister's family moved to a distant city, leaving Elisabeth frustrated, feeling that she could not provide her mother with a substitute for the happiness she had lost and the impossibility of carrying out the intention she had had when her father died. Also, during this period, there was her mother's eye surgery, which resulted in Elisabeth feeling exhausted and depressed. At that moment, she, who thought herself strong enough to get by without the help of a man, found herself overwhelmed by her feeling of weakness as a woman and yearning to find a man she could love. In this state of mind, Elisabeth was deeply touched by the recent and happy marriage of her second sister, seeing all the affection that her brother-in-law showed her. The three families then got together at a vacation station, where Elisabeth was expected to recover and release her recent grief.

On this trip, Elisabeth's desire was awakened by the proximity with her brother-in-law, which determined the (re-)emergence of the psychic conflict. It means that the high confidence (accuracy) of the superegoic high-level model (i.e., its high precision) makes the discrepancies in the sensorial evidence – in this case, the interoceptive emotions activated by the desire – generate more free-energy. It follows an increase in complexity beyond the manageable, thus a dangerous increase in free-energy. The result is the triggering of anxiety, a state of alert comparable to a traumatic event. It is a situation in which the demand exceeds the body's regulatory capacity by dangerously increasing uncertainty. However, unpredictable inputs cannot be ignored because they substantially affect the subject's intentions and beliefs and cause surprise – in this case, those related to the activation of the desire involved in conflict generation. They are, therefore, salient, that is, biologically relevant. As a result, the attention is directed to those inputs. Since it represents an imminent danger, the attention (precision) has to be drawn from those inputs, and, according to the abnormal prior with excessive precision at the intermediate level within the hierarchy, the attention is directed to the pain.

According to Freudian theory, the formation of symptoms acts as a satisfaction experience the way it does in dreams. Pain acts here as this experience of imaginary or counter-factual satisfaction.

> *When a fictive experience of satisfaction serves to mitigate a conflict, it does so by reducing or eliminating some of the conflicting parameters involved, as Freud's dream of drinking temporarily eliminates his nocturnal thirst, and R's[Freud's Rat Man] imaginary torture temporarily eliminates the unconscious rage that conflicts with his love for his father, replacing it with anxiety and depression.* (Hopkins, 2016, p.7).

The transference of precision to the symptom temporarily eliminates the fundamental parameter of Elisabeth's conflict, the consciousness of the activation of the amorous or sexual desire. With eliminated conflicting parameters, complexity is reduced, reinforcing the accuracy of the superegoic priors. It produces an imaginary experience of paradoxical satisfaction. In terms of the free-energy principle, the satisfaction arising from the gratification of a drive can be understood as the pleasure resulting from the reduction of free-energy. According to Freud, this satisfaction is paradoxical:

> *Let us confine ourselves to the clinical experience we meet with in the practice of psychoanalysis. We then see that the satisfaction of an instinct under repression is quite possible; further, that in every instance such a satisfaction is pleasurable in itself, but is*

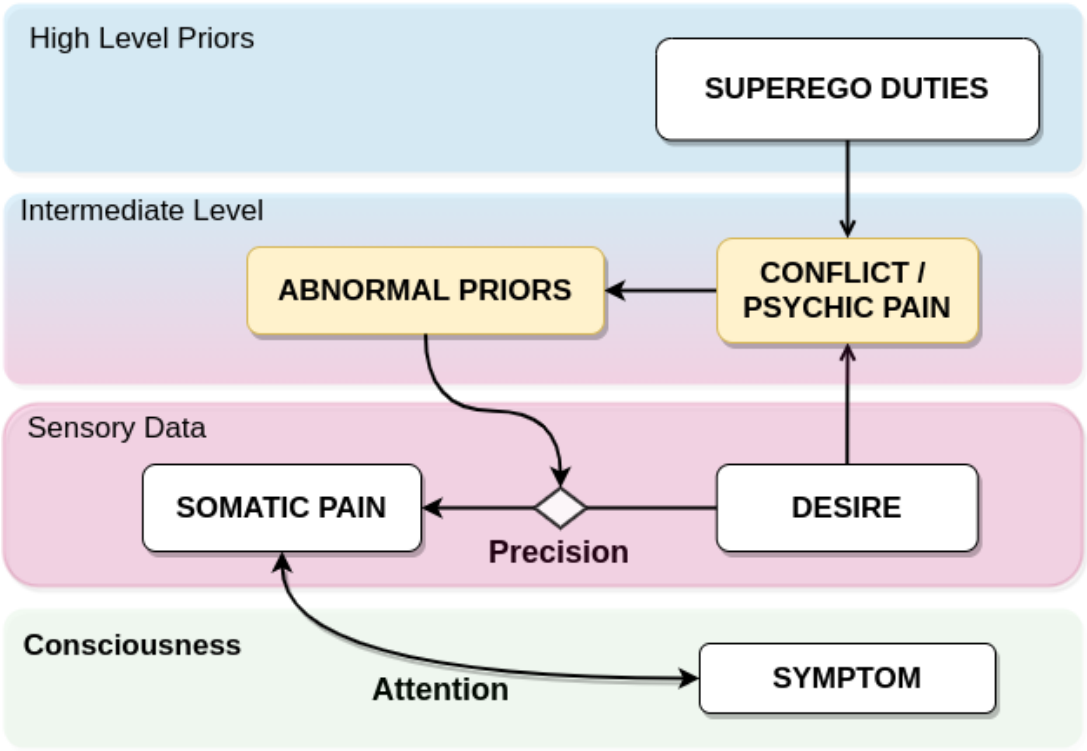

Figure 2. Schematic representation of symptom formation. The conflict between the superego duties (priors) and sensory data (desire) increases complexity beyond the manageable and, consequently, unbearable psychic pain. The precision of the sensory data is transferred to somatic pain because of the abnormal prior formed in scene 1 (indicated by the arrows connecting the elements). With the formation of the symbol, in this case, the symptom, conscious attention is directed towards it and away from the conflict, which is represented in the graph by the bidirectional arrows between the symptom and the pain.

> *irreconcilable with other claims and purposes; it therefore causes pleasure in one part of the mind and "pain" in another.* (Freud, 1915, p.105).

In conflicting events, attention is focused on the body as a strategy to avoid affective overload. The excessive precision given by attention increases the salience of the sensory data and facilitates the formation and retention of the abnormal prior (Edwards et al., 2012). Thus we can put forward the hypothesis that, in the impossibility of experiencing the psychic conflict by the excessive increase of uncertainty and the consequent affective overload (scene 2), attention is directed to the memory of the somatic pain to which the excessive precision – which is originally belonging to the activation of desire at the first time of experiencing this conflict (scene 1) – is transferred[14]. Such transference happens by the connection established at the intermediate level abnormal prior, symbolically represented by the metaphor DESIRE IS PAIN IN THE LEGS. This is a typical case of displacement, the mechanism described by Freud. Psychic pain becomes physical pain[15]. Physical pain becomes a symbol of conflict by gaining excessive precision, as illustrated in Figure 2.

[14]Michael (2018) alludes to this mechanism of transference of precision, thus of attention, to the symptom as a form of explaining the repressed sensations. We try to show here that this displacement follows established paths that Freud dealt with under the name symbolic connections.

[15]This raises the question of how this pain perception can be created *de novo*. We could not address this question here, but we refer the reader to Edwards et al. (2012); K. J. Friston (2005); De Ridder, Vanneste, and Freeman (2014)

As we have seen above, the consequences of abnormal priors with excessive precision are: firstly, the generation of false perceptual inferences, that is, the excitatory sensations processed by the lateral system are interpreted as pain by the medial system (Craig, 2014), and secondly, the higher levels have to explain the emergence of this abnormal prior, leading to a false agency assignment (Edwards et al., 2012). In this case, the use of physical pain as an explanation for the subjective pain/anxiety that is being generated by conflict. "What I feel is not desire, it is pain." Although the emotions linked with the awakening of Elisabeth's woman's desire are repressed, that does not mean that they are not as active. In this way, the abnormal prior formed in the conversion process becomes the prediction activated by the idea of leaving her duties bequeathed by her father to follow her feelings as a woman.

6. Final remarks

Our approach to the conversion mechanism comprises three complementary and interdependent levels, although they could be treated independently. The first is Freud's symbolic theory that considers the symptom a symbol of the psychic conflict from which it stems from its energetic counterpart, the displacement of the affective charge of the conflict to the symbol. The second, the conceptual blending and the conceptual metaphor theory allow us to understand the relationship between the symbol (the symptom, idea A) and the symbolized (the conflict, idea B). Eventually, at the third level, we find its neurocomputational basis represented by the creation of abnormal beliefs, the symptom, determined by the transference of excessive precision that drives the attention of the source of suffering.

We believe this demonstrates that the relationship of free-energy neuroscience and psychoanalysis is possible and offers excellent possibilities of enlightening our comprehension of the psychopathological phenomenon[16]. We would like to point out that this articulation not only benefits from the inclusion of Freud's metapsychological concepts, but mainly from the consideration of the theoretical research on the clinical experience of psychoanalysis. The material provided by the analytical investigation of patients is unique and irreplaceable. Identifying these two moments of symptom formation and the experiences of simultaneity, the basis of metaphorical constructions, would be impossible without psychoanalytical investigation.

To conclude, a word on the strategy of repression in this case. This strategy can be understood as the deviation of attention due to the excessive precision given to the abnormal prior. In Freudian terms, the intervention of the primary process's displacement mechanism produces a private symbol that ends up acquiring a life of its own. As it appears here in symptom formation, repression is about "I do not want to know anything about it."[17] Moreover, this is in agreement with:

(i) Freud's energetic point of view in Project: "It is plausible to suppose that repression has the quantitative sense of being denuded of quantity.... If so, only the distribution of quantity has been altered. Something has been added to A that has been subtracted from B." (Freud, 1895, p.407). In other words, only the attribution of precision (attention) has been altered.

(ii) Freud's definitions concerning access to consciousness. As it is controlled by

[16]Not only psychopathological but by and large human. See, for example, the possibilities opened up by free-energy neuroscience for studying the formation of symbols.

[17]Lacan (1966) calls this strategy 'ostrich strategy'.

attention, the focus on pain removes all the consciousness of desire.

(iii) The 1915 definition that repression separates the presentation of the thing from the presentation of the word. Repression does leave desire without a cognitive expression, without words, linking it to displaced beliefs and hiding it with a false interpretation.

It results in substituting the conflict for the symptom, or paraphrasing Freud, "the symptom completely replaces the thing." (Freud, 1895, p.460).

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