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COMMENTARY



## Functional neurological disorders: the common ground of early development, neuroscience and psychoanalysis. Reply to Solms

Lisa Ouss

### ABSTRACT

This paper discusses Mark Solms' article "Function in Functional Neurological Disorders: The Common Ground of Neuroscience and Psychoanalysis," on the phenomenon of FND. It is done from the child psychiatrist's perspective, focusing on insights from child development that can contribute to Solms' reflection. It specifically addresses three points. Starting from the notion of "lesion of ideas," it examines the respective roles of sensation and idea within the theoretical framework Solms employs, namely predictive coding. The author proposes, as Breuer and Freud did, that FND is primarily and essentially a pathology of reminiscence rather than of ideas. This position is supported by demonstrating that there are not just one but several identified mechanisms for symptom production, three of which Freud had already described. These descriptions are supported by FND cases observed in children and adolescents. Finally, the author discusses the question of homeostasis: should it be considered from the perspective of the biological system of the individual, or from that of the developing subject within the early dyadic matrix necessary for survival? Developmental insights provide essential perspectives for understanding FNDs, rehabilitating an approach based on sensorimotor and early childhood experiences.

### ARTICLE HISTORY

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### KEYWORDS

FND; predictive coding; child; embodiment

My aim is to discuss Mark Solms' article "Function in Functional Neurological Disorders: The Common Ground of Neuroscience and Psychoanalysis," on the phenomenon of FND. I will do so from my perspective as a child psychiatrist, focusing on insights from child development that can contribute to Solms' reflection.

I will specifically address three points. Starting from the notion of "lesion of ideas," I will examine the respective roles of sensation and idea within the theoretical framework Solms employs, namely predictive coding. I will propose, as Breuer and Freud did, that FND is primarily and essentially a pathology of reminiscence rather than of ideas. I will argue for this position by demonstrating that there is not just one but several identified mechanisms for symptom production, three of which Freud had already described. These descriptions are supported by FND cases observed in children and adolescents. Finally, I will discuss the question of homeostasis: should it be considered from the perspective of the biological system of the individual, or from that of the developing subject within the early dyadic matrix necessary for survival? Developmental insights provide essential perspectives for understanding FNDs, rehabilitating an approach based on sensorimotor experience.

### Are FNDs "lesions of ideas"?

Solms' article begins with a lengthy introduction tracing the historical trajectory of the concept of hysteria, emphasizing that it has not disappeared but rather manifests in different contemporary forms. His central claim is that "hysterical lesions are not physiological but rather psychological," stating that "they are lesions of ideas" (p. 5).

The problem is that Solms constructs his entire argument on this premise, grounding it in clinical observations: if a paralysis of the arm does not follow the nerve trajectory of the arm, then the idea of the arm must be damaged. As he points out, he prioritizes clinical description over physiological explanation. I will therefore also start from clinical descriptions – those of young children – to progress toward physiological explanation. This clinical perspective allows us to consider that there is not just one mode of symptom production in FND, as Solms suggests with his concept of a lesion of ideas, but also other modes of symptom production rooted in sensorimotor experience.

We propose that an arm paralysis is not always linked to the **idea** of the arm; it may instead be linked to the subject's sensorimotor experience of that arm, an experience that the body retains as a

memory – a sensation or perception not conditioned by the physiological organization of the body as in an organic nerve lesion. It is quite common for paralysis or sensory disturbances of a limb to arise following a prior injury (a sprained ankle, a painful trauma to a body part, an assault on a body part, etc.) or an internal sensation (a fainting spell, poorly localized painful afferences, etc.). It also happens that the bodily manifestation corresponds to a similar injury in the patient's environment, a phenomenon known as the "borrowed symptom." In such cases, the impairment is not related to the idea of the limb but to a prior experience – either directly lived or observed by proxy. The absence of an objective neurological pattern does not then indicate a lesion of the idea of the arm or limb, but rather a direct link with a lived or observed experience. The symptom thus does not signify an idea or symbolic representation of the limb but instead re-produces the experience identically. Other FND symptoms, which are less systematized, such as pain, tremors, or fainting, may emerge. These symptoms do not correspond to an idea of bodily function but rather to previously experienced events, of which the body retains a sensorimotor memory. Freud (1896) (Freud, 1961) proposed: "Our psychical mechanism has come into being by a process of stratification: the material present in the form of memory traces being subjected from time to time to a *rearrangement* in accordance with fresh circumstances – to a *retranscription*." Our main proposition is that certain circumstances prevent these experiences from undergoing this rearrangement and retranscription. The conjunction of predisposing factors, reactivated by specific precipitating factors, leads these traces to be reactivated identically, or even to be "predicted" as likely to recur.

The process described by Solms certainly exists, but it does not preclude other processes from existing as well. Solms borrows a metaphor from Freud: "[T]hat is how peripheral bodily organs become ideas; they are letters arranged into poems" (p. 4.) It is a beautiful metaphor, but FNDs are not always poems; they are more like inscriptions of letters forming onomatopoeia: a trace that is audible but not directly comprehensible, whose content can be inferred from its prosodic characteristics (pain, complaint, surprise, excitement ...) but not always, or rarely, from its secondary nature, which a poem also contains.

### What comes first: the idea or the sensation?

Building on this initial premise, Solms introduces crucial questions: the metaphysical mind-body problem, the issue of consciousness, but above all: (1) What sort of

physical process turns an anatomical structure into an idea? and (2) What sort of physical process renders ideas conscious?

In a brilliant demonstration, Solms proposes his conception of the transition from sensory input to the construction of an idea. He refers both to early development and to successive and subsequent transformations. He primarily relies on the conceptual framework of predictive coding, which he describes as the prevailing reference model in neuropsychanalysis. To briefly summarize, Solms develops the notion of predictive hierarchy within a highly simplified schema. He introduces Freud's conception of memory systems. While I will not summarize this model here, it is certainly elegant but involves significant simplifications. His claims: "Freud's 'unconscious' memory system is equivalent to the 'nondeclarative' system (its contents *cannot* become conscious); his 'preconscious' system is equivalent to the 'declarative' system (its contents *can* become conscious); and his 'consciousness' is equivalent to the 'short-term' memory system (its contents *are* conscious)" (p. 6; emphasis in the original) deserve further elaboration. According to Solms, "when these innate predictions (reflexes and instincts) fail to achieve their expected outcomes, individualized *learning* occurs" to reduce uncertainty (p. 8; emphasis in the original). There is a progressive automation of the process of sensory information processing, hierarchically managed first through autonomic reflex, then instinct, then learning, in systems belonging first to long-term nondeclarative memory, then to declarative memory, and finally to short-term or working memory, thereby becoming conscious.

However, while his reasoning follows the trajectory proposed by Edwards et al. (2012) in their excellent article, "A Bayesian Account of Hysteria", it applies to the general mechanism of trace transformation but diverges in its conceptualization of FNDs. In our view, by considering FND as a "lesion of ideas," Solms reverses the question. Like Edwards, he emphasizes the fundamental role of attentional focus: "In this view, *'conversion' is a matter of attentional focus*. Predictive work demanded by a distressing *emotional* concern is, due to rising free energy, shifted upwards in the hierarchy onto a *bodily* concern (e.g. onto the idea of the arm). In this way, an emotional concern is rendered less – and **a bodily concern more salient**" (p. 12; italics emphasis in the original, bold emphasis added). However, Edwards et al. (2012), referring to the same theoretical framework of predictive coding, proposes a different hypothesis: "The fundamental pathology in FNDs is the presence of overly precise priors at intermediate levels of the hierarchy, which

may lead to the overweighting of bottom-up inputs that accord with those priors"; thus, "**salient sensory data arising from precipitating events** are afforded excessive precision (weight), and this instantiates an abnormal prior belief at an intermediate level in the cortical hierarchy trying to explain or predict those sensations – and that abnormal belief or expectation is rendered resistant to extinction through the unusually high levels of precision (synaptic gain) enjoyed during its formation."

For Edwards, it is the sensory input that is salient, then predicted, then reproduced. An interesting approach, leading to the same clinical conclusions in FNDs, has been developed: that of a deficit in interoceptive processing, which immediately grants excessive salience to sensory input. These authors (Heniquez et al., 2023) found a lower interoceptive accuracy score than in the general population (33% error vs. 20%), linked to avoidance, depression, and difficulties in expressing emotions. In Solms' perspective, bodily concern comes second. Solms assumes that these traces have undergone the rearrangements and retranscriptions proposed by Freud, leading him to postulate a sort of equivalence between: bodily concern – idea of the arm.

### **Hysterics mainly suffer from reminiscences, and sometimes from ideas**

Let us pause on Solms' distinction that "ideas are conceptualized as 'beliefs' (i.e. as probability distributions) and memories are conceptualized as 'predictions'. Memories are *about* the past, but they are *for* the future; learning is for *predicting* the future" (p. 6; emphasis in the original). I understand this proposition in the sense employed by Breuer and Freud: "hysterics suffer from reminiscences" (Freud et al., 1956) more than from ideas. Based on what we have just described, an interruption of the transformation process of sensory traces, we will develop why this proposition seems to better reflect the clinical phenomena of FNDs as encountered in children and adolescents, before they are reconstructed by secondary processes.

One of the main reasons why understanding the etiological factors of FNDs has often been challenging is that researchers have frequently sought a single mechanism. Furthermore, most studies focus primarily on adult clinical cases and reconstruct past events by assuming early childhood phenomena without direct access to them. We have proposed in two previous neuropsychanalysis conferences, first in Berlin in 2011 and then in Trieste in 2024, to describe the different mechanisms found in children's conversion phenomena. We will detail them here.

The mechanism traditionally described in FNDs is the prototype of hysterical conversion described by Freud, linked to repression or "defense hysteria." A representation (what Solms calls an "idea") is conscious but unacceptable to the subject, who tries to push it away from consciousness through repression. However, this attempt fails and produces a physical symptom. In this phenomenon, the transition from non-declarative to declarative memory occurs, but the very nature of the representation causes it to be unconsciously repressed. Solms' described process takes place here, and early traces undergo a transformation process.

The problem is that most conversion phenomena, especially in children, do not follow this mechanism. Freud described two such processes in which the primary trigger is not the lesion of an idea but rather the interrupted fate of a previous sensorimotor experience, either directly lived or observed. It is indeed not uncommon to observe that sensory, painful, or motor impairments affect an organ that had previously been injured, with immobility of the limb and sensory disturbances, such as a "sock-like" complex regional pain syndrome. The FND may reactivate an approximately localized pain and an impairment of the organ that previously rendered the limb impotent.

The first alternative model, found in many adult FNDs but much more rarely in children, occurs when traumatic, unpredictable events overwhelm the system's capacity for absorption, disorganizing the predictive coding system and preventing the process described by Solms from reaching declarative memory systems. This is what Breuer and Freud described (Freud et al., 1956) as a "hypnoid state," in which the traumatic experience remains untransformed, with no return to the initial state and with the characteristics of traumatic repetition. The non-compliance with neurological innervation in this case would be due to the identical repetition of sensory and physical experiences lived during the traumatic event: tremors, loss of consciousness, impairment of an organ that had been attacked, painful impairment ... In this scenario, it is not an idea at stake but rather a motor and sensory experience that could not be transformed in the system proposed by Solms.

The second alternative model, described by Freud as "retention hysteria" (Freud, 1923), concerns primary experiences that remain untransformed by a declarative system due to their occurrence during the preverbal period, making them unrecalable but unforgettable. Some FNDs stem from these experiences, whose traces remain recorded in sensorimotor form. These salient early experiences, not necessarily traumatic and more complex than simple sensory events, do not become

ideas because they occur before the infant's ability for secondary processing, prior to declarative memory inscription, in what Freud (1923) called the "third unconscious," covered by infantile amnesia. The particularity of these early experiences is that they can only be recalled when there is a similarity between the recall and encoding modalities, as demonstrated by Alberini (Alberini & Travaglia, 2017) in a murine model. These traces then become mobilizable and replay identically, metonymically, and sensorimotorically, in the manner in which they were lived.

A third scenario, which I have named "functional neurological disorders by proxy," occurs in young children. It consists of the parental projection of unresolved conflicts, or what Laplanche (1987; see also, Freud et al., 1956) calls "enigmatic signifiers": charged with meanings that can only be deciphered with maturity, often sexual, in adults, these projections remain incomprehensible to the child. The parent's anxiety and intrapsychic conflict are projected in an unsymbolized manner, activating the child's stress system. The child becomes the receiver of this projection through a phenomenon described by Tronick as "dyadic expansion of parental consciousness." This mechanism usually produces a functional disorder affecting instinctual functions such as sleep or eating disorders. However, it can sometimes produce a more complex symptom through the "paralysis" of the child's transformation-retranscription system. The child replays a previously lived or observed experience through low-level control systems such as attentional or motor control (e.g. torticollis).

Finally, the last system, which I have named "FND by attachment," consists of the automatic reactivation of non-declarative experiences or procedural memory traces. We link this phenomenon to the construction of attachment in young children. The repetition of predictable interactive patterns between the child and their caregiver allows the child to internalize a secure base, face difficult situations, and explore their environment. A child initially develops procedural attachment behaviors (e.g. welcoming their caregiver in the case of secure attachment, ignoring them, protesting). If the caregiver fails to provide predictability, the child will be unable to develop consistent strategies and may become disorganized in response to new stressful situations. Certain situations that trigger attachment can lead to FNDs in children by reactivating these unorganized procedural strategies. A growing body of recent literature has identified specific attachment patterns – often insecure – among adolescent and adult patients with FNDs. This phenomenon may be akin to what Freud described in 1915 as *primal repression*: "a first phase of repression, which consists in the psychical

(ideational) representative of the instinct being denied entrance into the conscious."

### How does one "choose" their symptom?

Neither of the two models of FNDs within the predictive coding framework – Solms' model, which firmly assumes that FNDs arise from "suffering from an idea," nor Edwards' model, which attributes them to overly precise sensorimotor predictions – directly answers the question: *Which symptom, and why?* Edwards himself acknowledges this limitation: "The top-down effect of attention only changes the precision of these prior beliefs – it does not predict their content" (Edwards et al., 2012). Thus, we must return to clinical observations.

An interesting avenue is proposed by Kozłowska within an ethological framework (Kozłowska & Williams, 2009): conversion symptoms in childhood may involve sensorimotor components linked to two types of attachment organization. Animals have at least two strategies for escaping dangerous situations: **inhibition** (playing dead) and **activation** (appeasement defense behavior). Kozłowska demonstrated a continuity between the inhibition strategy in attachment assessment and functional loss symptoms in FNDs, as well as between the activation strategy and positive symptoms in conversion disorders in children and adolescents. This suggests a phylogenetic continuity between stress response styles and attachment strategies. This perspective is particularly compelling and warrants further investigation.

### A baby alone does not exist

Solms posits that "unpredictability is obviously *bad* for a self-organizing system" (p. 11; emphasis in the original) grounding his homeostasis model primarily in species survival. "[A]t this low level of the hierarchy, it is not a prediction that was learnt but rather one that was provided innately by natural selection, as the action most likely to return the system to its expected state" (p. 8). This return to the expected state holds true if we consider the "expected state" as a homeostatic one, driven by survival. Solms argues that the infant transitions from autonomic reflexes to instinct: "If a stereotyped instinctual action does not return the organism to homeostasis, what is the organism to do? (There are a great many situations like this – i.e. novel situations – which cannot be predicted by natural selection.) The only available alternative is random behavior" (p. 11). This would be valid if the infant were an isolated being. However, as Winnicott famously stated, "*a baby alone does not exist*" (Winnicott, 2018).

The main objection to this view is the assumption that the infant is a self-organizing biological system, akin to an organism in a Petri dish – whose sole task is to compensate for “unmet needs.” The idea that the organism seeks homeostasis is valid when considering biological survival. However, in a dyadic system where survival is regulated by the caregiver, the balance of pleasure and displeasure is not merely about survival but about establishing a stability point. Notably, due to early experiences, an infant, a child, or even later, an adult, may not always perceive this stability as a state where displeasure is reduced to zero. In the same passage, Solms states that the subject seeks to return to “preferred states” or to “homeostatic needs,” which are not necessarily the same. If we consider the infant as part of a dyadic system with a caregiver, unpredictability is not necessarily detrimental to self-organization – it can even drive the infant’s development, allowing them to explore and experiment within a framework that still respects the homeostatic dimension Solms describes.

There are alternatives to “random behavior,” such as curiosity-driven attraction and exploration, present from birth. The baby actively seeks new experiences and is naturally attuned to interact with others. Some researchers have even hypothesized that fetal twin interactions in utero suggest an early capacity for social engagement. Nagy demonstrated that newborns can engage in imitation and provocation, highlighting the sophistication of their biological mechanisms, which allow them to actively seek interactions rather than passively receiving stimuli – especially social ones. The seeking system does not drive random exploration but rather enables the infant to build a broad repertoire of experiences, which Solms refers to as “preferred states.” By around 12 months, predictive coding helps form attachment behavior patterns, allowing the infant – after internalizing a reliable caregiver (who ensures survival-related homeostasis) – to pursue novelty-seeking in a stable manner, shaped not by randomness but by their early experiences. Their “preferred states” develop in relation to the dyad, rather than in isolation.

“Unpredictability is obviously *bad* for a self-organizing system” – this is partially true. We know that an unpredictable caregiver is a risk factor for disorganized attachment, which is detrimental to child development. However, this is only part of the picture. Preferred states do not necessarily guarantee homeostasis; on the contrary, they may even lead to neurotic or painful fixation points. Stanislas Dehaene has shown that even premature, sleeping infants can perform Bayesian computations on their environment, react positively to novelty, and integrate new experiences into their existing repertoire before defining them as an ideal state to reach.

## Conclusion

FNDs in children and adolescents provide a unique opportunity to observe the early and authentic stages of the conversion disorder process. We must be cautious when retrospectively “reconstructing” infantile life and experiences in adult patients. Understanding FNDs requires an embodied, multilevel framework that can inform therapeutic interventions.

Solms’ ambition, with his monist, dual-aspect framework (or complementary approach, unavoidable yet non-simultaneous), is illuminated by the Bayesian paradigm. However, our approach remains rooted in clinical observation, which should guide theoretical development rather than being constrained by it. In this respect, we align with Freud and Solms in emphasizing the central role of clinicians in shaping our theories.

Perhaps it is time for a metapsychology that no longer considers the subject in isolation but fundamentally in relation to others – what some have termed a “third topography.” The concept of functionality could then be understood in a broader sense.

There appears to be a renewed movement toward embodied cognition, recognizing that early sensory, interoceptive and motor experiences do not necessarily need to be transformed into more elaborate cognitive modules integrated into declarative memory. Instead, they may represent highly precise cognitive systems in their own right.

“Most cognitive scientists working within the predictive processing paradigm forget – all too readily – that the mind is *embodied*” (p. 10; emphasis in the original). Solms only acknowledges this point toward the end of his article. If we aim to understand early developmental processes and their lasting impact, then insights from developmental psychology and infant research – which emphasize sensorimotor contributions – are absolutely indispensable.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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