

# A NEUROPSYCHOANALYTICAL APPROACH TO THE HARD PROBLEM OF CONSCIOUSNESS

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## ABSTRACT

A neuropsychanalytical approach to the 'hard problem' of consciousness revolves around the distinction between the *subject* and *objects* of consciousness. In contrast to the mainstream of cognitive science, neuropsychanalysis prioritises the subject. The subject of consciousness is the indispensable page upon which its objects are inscribed. This has implications for our conception of the mental. The subjective *being* of consciousness is not registered in the classical exteroceptive modalities; it is not a cognitive representation, not a memory trace. Cognitive representations are 'mental solids,' embedded within subjective consciousness, and their tangible and visible (etc.) properties are projected onto reality. It is important to recognise that mental solids (e.g. the body-as-object) are no more real than the subjective being they are represented in (the body-as-subject). Moreover, pure subjectivity is not without content or quality. This aspect of consciousness is conventionally described quantitatively as the *level* of consciousness, 'wakefulness'. But it *feels like* something to be awake. The primary modality of this aspect of consciousness is *affect*. Some implications of this frame of reference are discussed here, in broad brush strokes.

*Key words:* neuropsychanalysis, hard problem, consciousness, subjectivity, prediction error, Freud.

## 1. INTRODUCTION

I welcome this opportunity to sketch my approach to the hard problem of consciousness. I call this approach neuropsychanalytical. I could also call it metaneuropsychological. I will explain later what I mean by these terms.

## 2. VISUAL CONSCIOUSNESS VERSUS CONSCIOUSNESS ITSELF

I believe that the approach to consciousness taken by the mainstream of cognitive neuroscientists has been hampered by an excessive focus on exteroceptive forms of consciousness, especially *visual* consciousness. That approach gave rise to the 'hard problem' in the first place (Chalmers 1995). I think we will find the going easier if we focus instead on consciousness *itself*.

My starting point is the distinction between the *subject* of consciousness and *objects* of consciousness. Visual consciousness, like all exteroception, pertains to objects. However

consciousness of objects cannot exist without consciousness itself -- without a conscious subject. Objects of consciousness must always be perceived by a conscious subject. If the subject loses consciousness, the objects disappear. The converse does not apply. That is why I prefer to focus on the subject of consciousness; it is the nub of the matter.

I am not saying that things in the world do not exist in themselves, independently of consciousness. All the evidence points in the opposite direction. I am saying only that in the absence of consciousness in general there can be no visual consciousness.

### 3. CONSCIOUSNESS OF OBJECTS VERSUS THE REALITY OF THINGS

This is a useful place to remind ourselves that things in themselves (as opposed to our perceptions of things) do not possess visual quality. Vision is a property of the subject (cf. Zeki 1993). We tend to think of objects as if they consist ontologically in the forms by which they are presented to us visually. We think of our visual image of the world as if it were, in a word, *reality*.

That is because human perception is dominated by vision, which happens for good reason: vision (especially at the cortical level) generates 'mental solids' which yield more stable renditions of things than do any of the other modalities of perception (Solms 2013).

Nevertheless we think of reality – of the material world -- as if it were defined by the qualities bestowed by these modalities. We think of 'matter' as being characterised by (visual) solidity, (tactile) tangibility, etc. We would think differently if we were bats (cf. Nagel 1974). We would likewise have a totally different conception of reality if we possessed, say, only a sense of hearing; then we would presumably think that reality consists essentially in sound waves.

The quality we bestow on things depends on our observational perspective. For example: when you observe lightening visually, you see a flash; when you observe it aurally, you hear a clap. What, then, does lightning itself consist in? It consists in neither of these perceptual objects; *in reality* it is a geo-electrical process that manifests differently in different sense modalities. The best description of the real state of affairs requires *abstraction* from the perceptual data -- in this case an abstraction called 'electricity' (the flow of electrons from positively to negatively charged fields).

If we extend the boundaries of human sensory capacity through artificial aids (like electron microscopes) we find that matter is something quite different from how it looks to the naked eye. When we probe it to its core, we are driven to descriptions that transcend the properties of perception. In the end, we are driven to abstractions like 'quarks', 'weak force', 'strong force', etc., and the very materiality of matter (its solidity, tangibility) disappears. This is a significant fact for the hard problem of consciousness, and I will return to it later.

For now I want to conclude that the material attributes of objects are not absolute, they are relative. They can be shown to vary in relation to the observing subject, just as Einstein showed that the properties of space and time vary in relation to the velocity of the observer. The perceived materiality of reality varies in relation to the magnitude and position of the observer. If you increase the magnitude of the object by means of an electron microscope (thereby decreasing the magnitude of the subject, relatively speaking) matter loses its solidity and tangibility. Likewise if you change the position of the object relative to the sensory surfaces of the observer, it acquires different 'material' qualities: for example, when you listen to an object rather than look at it, it becomes wave-like.

Since perceptions of reality must be distinguished from reality itself, I also want to conclude from what I have said that the distinction between real and mental does not coincide with the distinction between perception and idea. Perception of reality is part of the mental domain, no less than cognition is (remembering reality, imagining reality, etc).<sup>1</sup> This much is obvious, but it is not the way we commonly think. Common sense can be misleading – even (perhaps especially) to scientists.

The mental, then, consists in both perception and cognition. But that is not all it consists in. I will return to this point in Section 7.

#### 4. CONSCIOUS VERSUS MENTAL

Before I shift focus from perception and cognition -- which pertain to objects of consciousness -- and address the subject of consciousness, the nub of the problem, I must draw another basic distinction that was overlooked by the philosophers who laid the foundations of modern psychology. If the findings of recent cognitive science have taught us anything, they have taught us that it is necessary to distinguish between conscious and *unconscious* mental processes. Not all mental processes are conscious. This was, of course, Freud's great insight.

This has massive implications for psychology. That is one of the reasons why I call my approach neuropsychanalytical. If mental processes are not defined by consciousness, then what distinguishes mental from non-mental processes? What is the defining property of the mental? Freud's teacher, Brentano (1874) suggested that it was intentionality – 'aboutness'. But all representations are about something, including purely mechanical ones like photographs (Strawson 1994). Furthermore, the concept of aboutness is too bound up with the objects of consciousness. I think the mental is more intrinsically bound up with subjectivity.

The fact of unconscious mental processes applies equally to perception and cognition. It is possible to see without awareness (blindsight), recognise without awareness, read without awareness, learn without awareness, remember without awareness, make decisions without awareness, and so on. In fact, just about every perceptual and cognitive task can be performed without awareness (Bargh 2014).

Please note that such tasks pertain to the processing of representations. This implies that not only associative but also representational processing can operate unconsciously. Reading of words and recognising of faces, for example, can readily occur with zero-prime subliminal presentation of the stimuli, where the subject is completely unaware of having perceived any stimulus at all (i.e. where there is no visual consciousness of the stimulus). But such tasks require detailed and precise representational mapping and symbolic decoding of the spatial configuration of the stimulus; in other words they require cortex.

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<sup>1</sup> A defining feature of Descartes' *res extensa* – namely extension or dimensionality -- applies also to his *res cogitans*, to the extent that it consists in representations derived from the outer world (in the 'impressions' of Hume and Locke). This conclusion is supported by recent mental imagery research; perception and imagination utilize the same representational structures. That is why, for example, the time taken to mentally rotate three-dimensional designs of increasing complexity tallies with the time taken in reality (Shepard & Metzler 1971). Object representations are measurable, at least in principle. I believe that Descartes drew the distinction between mind and matter wrongly; he misconstrued the mind/body problem.

These facts have two implications. First, they lead to the conclusion that higher cortical functions are not intrinsically conscious. Second, they beg the question: what is consciousness for? What does consciousness add to the already impressive capacities of unconscious perception and cognition?

## 5. HIGHER CORTICAL FUNCTIONS ARE NOT INTRINSICALLY CONSCIOUS

Actually this has been known for a long time. Moruzzi & Magoun (1949) demonstrated decades ago – to their own surprise -- that decorticated cats remain conscious. The same applies to all other animals, including humans; as Penfield & Jasper (1954) found when they concluded that human consciousness depends upon the integrity, not of cortex, but rather of the upper brainstem -- of what they called the ‘centrencephalic’ region. The most striking evidence for this conclusion is provided by accounts of the behaviour of hydranencephalic children, born without cortex (Shewmon, Holmse & Byrne 1999; Merker 2007). These children (like decorticated cats) possess a normal sleep/waking cycle. They also show absence seizures, in which consciousness is lost and regained. They also display a full range of basic emotions, such as fear, joy and anger. In fact, decorticate creatures are excessively emotional (Huston & Borbely 1974).

The main thing to notice is that the representational functions performed by cortex – the so-called ‘organ of the mind’ – are *not intrinsically conscious*.

## 6. THE HARD PROBLEM VERSUS THE EASY PROBLEM

Before turning to the question ‘what is consciousness for?’ I want to address another issue that has just arisen. When I say that consciousness depends on the integrity, not of cortex, but rather of upper brainstem structures, I am locating the generation of consciousness in space (I am *correlating* mind with matter; the easy problem). I am also attributing the generating of consciousness to neuronal processes that occur in that space (matter *causing* mind; the hard problem).

I believe it is a mistake to do this, to say that neuronal processes ‘generate’ consciousness. This mistake gives rise to the hard problem, which derives from our conflation of matter (solidity, tangibility, etc.) with reality, in the sense described above -- caused by our privileging of exteroceptive ways of thinking. Because we privilege vision, we imagine that the object of the mind *as perceived visually* (i.e. the brain) causes or generates all the other modalities of consciousness, even consciousness itself.

In exteroception, everything depends on the relative position and magnitude of the observer – on the observational perspective of the subject. In the case of the mind/body problem, that observational perspective is reflexive. The subject is looking at itself in the (mainly visual) form of an external object. The subject of consciousness thereby represents itself as an object of consciousness.

Subjective consciousness arises from being the portion of reality that generates consciousness. The relationship between *seeing* that portion of reality – representing it visually as, say, the centrencephalic region – and simultaneously *feeling*<sup>2</sup> it, is not a causal relationship. They are two manifestations of the same thing. It makes no sense to ask: how does an object of consciousness cause the subject of consciousness? (This is the hard problem.) That question (the hard problem) is

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<sup>2</sup> In the sense of what it feels like to be that thing; the consciousness of being that thing.

even worse than asking: how does a flash of lightning cause a clap of thunder? I say 'even worse' because the (visual) flash and (auditory) clap are at least *parallel* objects of consciousness, whereas the anatomy of the centrencephalic region is a visually perceived and remembered object *embedded within* the subjective being of consciousness – which is, if anything, a hierarchical relationship opposite to the one dictated by common sense. Consciousness causes (or enables) a perceptual solid; not the other way round.

Be that as it may, consciousness (in all its manifestations) must in reality be generated by processes that lie beyond consciousness. We can only *infer* those processes from the data of consciousness.

In doing so, we would of course be well advised to make use of the data provided by *all* the modalities of consciousness, including what it feels like to be conscious. Moreover, we would be well advised to describe the processes underlying consciousness in terms that transcend the qualities of the sense modalities; that is, we should describe this portion of reality – like all others -- in abstract terms. We should describe the reality of the mind (the lawful relations that we infer from the data of consciousness) in non-perceptual language, ultimately using terms like 'energy', etc., as the physicists do. The reality described by physicists and biologists and psychologists is, after all, the same old reality; and the laws inferred via our different perspectives on it must eventually be reconcilable with each other. The mind is not made of different stuff from the rest of the universe. The only difference about the mind is that we have an additional perspective on it; because we *are* the mind, we know what it feels like to be a mind.

This is the essence of the neuropsychanalytical approach. It makes use of both objective and subjective data of consciousness, and where necessary it prioritises the subjective (the ground of experience). This is also why I use the term metaneuropsychology. A metaneuropsychological account of the mind goes beyond (meta) our material (neuro) and subjective (psychological) observations of it; it describes the real unconscious stuff of the mind in abstract terms, as a 'mental apparatus' -- following Freud (1900).

I hope what I am saying is clear. It is not easy to set out the neuropsychanalytical approach, because we are not used to thinking like this. Common sense dictates that reality is identical with what we see. Seeing is indeed believing, but it is not reality. Seeing takes place in the mind.<sup>3</sup>

## **7. SO, WHAT IS CONSCIOUSNESS FOR?**

I will begin to answer the question from the exteroceptive (representational, mnemonic) end of the mental apparatus, although I actually believe that consciousness is an endogenous property (and something fleeting and fugitive).

What consciousness bestows on the objects of perception and cognition is *attention*. Consider the phenomenon of 'attentional blindness': if you do not attend to something in your visual field (even a person in a gorilla suit) it does not enter your consciousness. The same applies to cognition. Remembering, recognising, judging, navigating, thinking, etc., go on all the time, but these processes

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<sup>3</sup> Ironically, naïve materialism turns out to be a kind of crypto-idealism in which the mental nature of conscious seeing is overlooked, and the qualities of matter-as-it-looks are conflated with those of reality itself.

only becomes conscious when we pay attention to them. And we only pay attention to them when we *need* to. So the question, 'what is consciousness for?' may be recast: why do we pay attention to some perceptual/cognitive processes but not others?

The answer is that we pay attention to the salient ones, to the ones that matter to us. What matters to us living creatures -- we infer, following Darwin -- are at bottom the things that affect our chances of surviving to reproduce. But this cannot mean that we pay attention to everything that matters to us. That would be impossible. We know empirically that consciousness is a very small place (Bargh & Chartrand 1999). The purpose of conscious exteroception, then, is to *master* the things that matter to us, in such a way that we *no longer* need to pay attention to them -- in such a way that we may render them unconscious again. Conscious processing of object relations is a temporary state. The ultimate aim of all cognition is zombiedom. In other words, we seek through consciousness to establish predictive algorithms that render consciousness redundant. We seek to establish algorithms that work *automatically*: 'when that happens, I do this'. Freud (1911) called this achievement the 'reality principle': through learning from experience, we establish internal models of reality so as to be equipped to meet our needs there. Realistic solutions to life's problems only require the conscious presence of the subject when they fail; when things do not go according to plan.<sup>4</sup>

Salient things, then, are the things we did not, or cannot, predict -- the things that generate *uncertainty*. Friston (2010) calls such things 'surprises'.

There are two types of surprise. Things either go better or worse than expected. The determining of this distinction, it appears, is what consciousness is for. Consciousness informs the subject, in real time, of what to make of unexpected events (of their *meaning*). It enables the subject to feel its way through unknown quantities (deviations from homeostatic set-points) by answering the question: 'is this good or bad for me?'. The answer to the question -- is this good or bad for my survival and reproductive success? -- is provided by feelings: the things that are good for us feel 'good' (pleasurable) and the things that are bad feel 'bad' (unpleasurable).

It is no simple matter to calculate the biological meaning of unexpected events, as they happen, across the multiplicity of vital needs: nutritional, thermal, sexual, etc. This is what feelings provide. They provide an immediate global valuation of biological 'state' (Mesulam 2000). And they orientate the subject to what it should do in response to the unexpected events (e.g., approach versus withdraw). They provide a global assessment along the lines: 'this is what the current situation means to me'.

It is important to recognise that this assessment is determined interoceptively -- subjectively: 'what does this mean *to me*?'. This assessment of the state of the subject is then 'extended' (Damasio 2000) onto the data of perception and cognition: 'I feel like this (good or bad) *about that*'. This is what consciousness adds to exteroceptive perception and cognition.

It adds subjective feeling and valence.

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<sup>4</sup> Freudian repression consists in the *premature* automatization of such algorithms, before they meet the dictates of the reality principle. This leads to the constant threat of 'surprise' (and therefore affect) and the return of the repressed (Solms 2013).

The adaptive value of consciousness is obvious. Feelings determine the subject's response to events that were not predicted by evolution (by 'reflex' or 'instinct') or by prior individual experience ('conditioning'). Most events, of course, cannot be predicted by evolution and responded to automatically. Our enhanced capacity to deal with unpredictability (learning guided by feelings) is what distinguishes us humans from, say, ants.

## 8. THE ANATOMY OF CONSCIOUSNESS

It is no surprise, in light of what I have said, to find that the neural correlates of consciousness (the so-called generators of consciousness) *are located in the upper brainstem, in close proximity and in tight connection with the brainstem structures that monitor the state of the visceral body (i.e. the subject) – the state of the internal milieu, of our vital functions* (Damasio & Carvalho 2013). As Freud (1911) surmised, the function of conscious feeling – of pleasure and unpleasure – is to detect oscillations in the tensions of our internal drive needs. The resultant feelings, in turn, have a compulsive influence on our actions. This is the 'pleasure principle'.

'The id, cut off from the external world, has a world of perception of its own. It detects with extraordinary acuteness certain changes in its interior, especially oscillations in the tension of its instinctual needs, and these changes become conscious as feelings in the pleasure-unpleasure series. It is hard to say, to be sure, by what means and with the help of what sensory terminal organs these perceptions come about. But it is an established fact that self-perceptions – coenaesthetic feelings and feelings of pleasure-unpleasure – govern the passage of events in the id with despotic force. The id obeys the inexorable pleasure principle.' (Freud 1940, p. 198)

When Moruzzi & Magoun (1949) originally identified the anatomical location of the brainstem generators of consciousness, they made the mistake of describing their function in purely quantitative terms, in terms of the *level* of consciousness, or 'wakefulness'. They assumed that the *contents* of consciousness attached only to cortical processes. It fell to more recent investigators (Panksepp 1998, Damasio 2000) to recognise that *it feels like something to be awake*. These investigators recognised that the background state of consciousness – the subject of consciousness, being conscious – is intrinsically *affective*. Affective consciousness is secondarily extended upwards, to sample the outside world, and thereby to determine the meaning of perceptions and cognitions (see Solms & Panksepp 2012, Solms 2013).

'Cathetic innervations are sent out and withdrawn in rapid periodic impulses from within into the completely pervious system [for perception]. So long as that system is catheted in this manner it receives perceptions (which are accompanied by consciousness) and passes the excitation onwards to the unconscious mnemonic systems; but as soon as the cathexis is withdrawn, consciousness is extinguished and the functioning of the system comes to a standstill. It is as though the [id] stretches out feelers, through the medium of the system [for perception], towards the external world and hastily withdraws them as soon as they have sampled the excitations coming from it.' (Freud 1925, p. 231; with acronyms spelled out in square brackets)

It is nothing short of astonishing that cognitive science overlooks the affective states that colour the whole of experience -- provide the global background of all experience -- the page upon which exteroceptive consciousness is written.

It is important to recognise, though, that this background state of consciousness consists in more than the pleasure-unpleasure series, generated (in the sense clarified above, in section 5) at the level of the upper brainstem. That simple form of consciousness appears to have evolved at least 500 million years ago, as it is shared by all vertebrates. It is not surprising that evolutionary pressures gave rise to more subtle affective distinctions; there are more than two meanings in the world (good vs. bad) demanding than more than two types of response (approach vs. withdraw). That is why we find, above the upper brainstem, a variety of instinctual-emotional circuits giving rise to a great many other affects and attendant actions. These range from simple 'homeostatic affects', like hunger and thirst, to the so-called 'basic emotions', which Panksepp (1998) capitalises as SEEKING, FEAR, RAGE, etc. These latter circuits provide hard-wired psychological links between the inner and outer worlds. (We cannot afford -- biologically speaking -- to each of us learn from experience how to forage, flee and attack). These circuits also include what Panksepp calls the 'sensory affects': pain, surprise, disgust, etc.

Added to all this, by dint of the precise and detailed representational capacities afforded by the vast memory space of cortex, is the extended consciousness of everyday perception and cognition -- the mental solids of working memory, which threaten to hide everything else from view. (One is reminded of Plato's cave.) As I have said already, this form of consciousness (object consciousness) arises when consciousness itself (the subject of consciousness) samples representations of the external things affecting it: 'I feel like this about that'. Representations of the 'thats' in question can be held in mind (in working memory) while we try to master the feelings associated with them (i.e. while we master their biological impact on us). Then, once we have mastered them, i.e. when we have established a predictive algorithm that works, and automatised the adequate response pattern, we pay no further attention to them, and we render them unconscious once more. This important function -- temporarily conscious perception/cognition -- is not to be sneezed at, but as already stated: it unfortunately tends to blind us as to the actually invisible, subjective, affective nature of consciousness itself.

The objects of consciousness are the stabilised imprints that meaningful sensory constellations make on our affects. However, since the purpose of such imprints (mental solids) is for us to learn how to meet our needs in reality, they are far from unimportant. That is why decorticate animals are excessively emotional.<sup>5</sup>

## **9. THE PHYSIOLOGY OF CONSCIOUSNESS**

The hard problem now boils down to trying to abstract the underlying processes that we experience as consciousness. We have two points of access to these processes: one provided (mainly) by vision and the other by affect. That is, we have 'solid' images of the relevant cellular processes and we

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<sup>5</sup> In humans, there is the very important additional regulatory function of language -- symbolic re-representation -- the bedrock of Freud's 'secondary process' (see Freud 1911).

have feelings that correlate with them. The common denominator between these two terminal points of our knowledge appears to be *uncertainty*. This is the abstraction we are looking for.

In this connection I would like to cite Freud's dictum: 'consciousness arises instead of a memory-trace' (Freud 1920, p. 25). When you know what to do (have already learnt what to do), there is no need for affective presence, and therefore no need for consciousness. The memory trace does its job automatically.

It is only in the presence of surprise – in Friston's sense -- that the memory trace (the perceptual/cognitive representation) must be brought back to awareness, through hyperactivation by upper brainstem mechanisms, and evaluated afresh. This amounts to a *temporary dissolution of the established LTM algorithm* (to consciousness arising instead of a memory trace). Physiologically speaking, this process coincides with the re-emergence of *lability* within the cells -- and cellular networks -- until the (revised) trace is 'reconsolidated' (Tronson & Taylor 2007).

There is of course a great deal more to be explained, especially with regard to the physiological details. However, it is important to remember that what we must discern behind these details is an abstraction. The requisite abstraction will explain all the observable facts, including our testable predictions. That is how science works.

## 10. HALLUCINATORY WISH FULFILLMENT

Since I am attempting here to sketch my neuropsychanalytical approach only in broad outline, so as not to lose sight of the wood for the trees, I will limit myself -- before closing -- to the following further point.

Perception, according to Friston et al (2012) following Helmholtz (1866) is an active process of hypothesis testing, by means of which we seek to confirm our predictive models of the world. I have argued that *conscious* perception occurs when our predictions are *disconfirmed* -- or in conditions where prediction is impossible -- that is, in conditions of uncertainty.

I would like to add that this means we constantly SEEK (in Panksepp's sense) to confirm our predictions. SEEKING (which manifests mainly as foraging in lower animals) is expressed largely as saccadic eye movements in humans (Panksepp & Biven 2012). Saccadic eye movements may be considered a visual form of foraging (just as whisker twitching is a proxy for SEEKING in sleeping rodents).

The role of *dopamine* in such behaviour is well established. Of special interest therefore are the implications of this form of uncertainty – SEEKING to confirm predictions – for the mechanism of hallucination and delusion (for 'wishful thinking'). The analogy with REM sleep and dreaming is obvious (Perogamvros & Schwartz 2012).

Of incidental interest in this connection is the fact that completely immobilized eyeballs rapidly become blind; the photosensitive cells give rise to no new stimuli (to a completely predictable state of affairs, as far as the central organ is concerned).

## 11. CONCLUSION

Consciousness registers the state of the subject within a biological scale of values. The primal form of consciousness is affect. Pleasure means 'biologically good' and unpleasure means 'biologically bad'. There are many sub-varieties of pleasure/unpleasure with subtler meanings (e.g., panic means 'potential loss of an attachment figure').

Perceptual/cognitive representations are intrinsically unconscious sensory-motor algorithms (predictions as to how biological needs can be met in the world). Consciousness samples such representations in order to bestow meaning on them. Object representations are stable sensory-motor configurations which may be held in mind; they stabilise and shape consciousness into mental solids. Once meanings are established, the resultant predictions are automatized and rendered unconscious once more.

Prediction errors attract attention to the salient representations. This occurs through the generation of what Friston (2010) following Helmholtz (1866) and Freud (1911) calls 'free energy': entropy, lability and uncertainty. This may be *visualised* as a cellular process – e.g., as decomposition of PKM $\zeta$  (Sacktor 2008) – but it is *felt* as consciousness. Consciousness persists, then, until a revised predictive model is reconsolidated (until the free energy is 'bound'). Consciousness of representations is *prediction work in progress*. But, as we know, much of reality is unpredictable most of the time.

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