



The Nature of Consciousness Characterized by Means of Hypnosis

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Abstract: This paper is a report anchored in prior experiments and aims to describe consciousness using hypnosis as an application of a methodology drawn from experimental science. Three premises were posited. The first, epistemological in nature, assumes that all reality experienced and created by the individual belongs to an internal representational reality. The second, that hypnosis is capable of acting precisely on this representative reality with profound effects on all its dimensions. The third, that mental representations have a receptor basis. The consequence of these three hypotheses is the ability of hypnosis to act on the receptor system with a consequent effect on representations. While it is now known that there is a strong correlation between the central nervous system, the endocrine system, the immune system, and the subject's representational world, the precise nature of these correlations and, consequently, how hypnosis works, is still unknown. The same is true for receptor systems. While the individual systems are known, their mutual interrelationships are much less well understood.

INTRODUCTION

Background: Theories and Facts, and The Material Nature of Consciousness

The study of consciousness represents one of the central issues in current philosophical, anthropological, psychological, and neuroscientific reflection. Although this topic has been addressed within various disciplines, the most interesting debate currently takes place within neuroscience, and is primarily focused on 1) what is called subjective experience, and 2) investigating the relationship between processes involving the physical substrate of thought. The physical reality of thought is identified in at least 50% of cases with the nervous system (brain, spinal cord, cerebellum, nerves, and sense organs) [Casiglia, 2025b] and with a reality that we can define as *subjective representation*. Reality, as explored through our sense organs, is processed through complex physiological processes and experienced through representation.

Neuropharmacology and neuroscience have shown that 1) a deeply interaction exists between subjective representation and the neuronal, biological and organic processes, and that 2) receptors and their ligands play a crucial role in all the neuronal processes [Casiglia, 2024]. Scientific studies and medical experiences have demonstrated that it is possible to modify the *subjective representation using* pharmacological ligands [Casiglia, 2024]. This highlights the deep relationship between the so-called physical phenomena and consciousness. Actually, the so-called physical phenomena are themselves representations of a reality that exists but is not given to us to know. With the term *subjective representation* we mean what Popper called *objects of world 2 and world 3*, that is, the

world of mental, subjective and psychological states and the world of the objective content of thought [Popper, 1974].

The article presented herein aims to provide a brief overview of current theories of consciousness, and proposes hypnosis as a tool for investigating the subjective representational world using the scientific method criteria.

NEUROSCIENTIFIC THEORIES OF CONSCIOUSNESS

An Overview

At this moment the most important theories about consciousness are elaborated in the field of neuroscience. There are many theories, but the most important are the following, which can be classified based on the paradigms to which they refer. The most known are 1) the cognitive functionalist paradigm known as GNW (see Table 1 for all acronyms) [Baars, 1988; Dehaene et al., 2011], 2) those linking consciousness to the existence of a higher-order representation of the mental state such as the HOT [Rosenthal, 2005], 3) those focusing on the emergence of consciousness from the internal structure of the system and from the integration of information such as the IIT [Tononi, 2004], and 4) those based on quantum physics such as Orch-OR [Hameroff & Penrose, 2014; Penrose, 1994].

Table 1: Rapid acronyms list (in alphabetical order).

AI	Artificial Intelligence
Adr	Adrenaline
nArd	Noradrenaline
BA	Brodman Area(s)
BDZ	Benzodiazepine(s)
D	Dopamine
DAT	Dopamine Transporter
DMT	N-N-dimethyltryptamine
EEG	Electroencephalogram
fMRI	Functionl Magnetic Risonance Imaging
GABA	γ-Aminobutyrrate
GNW	Global Neuronal Workspace
HOT	Higher-Order Theories
HT	Hydroxytryptamine
IIT	Integrated Information Theory
LADI	Left Anterodorsal Insula
LORETA	Low Resolution Electromagnetic Tomography
LSD	Lysergic Acid Diethylamide
NET	Norepinephrine Transporter
NMDA	N-metil-D-aspartate
OBE	Out-of-Body Experience(s)
Orch-OR	Orchestrated Objective Reduction
PMI	Plastic Mono-Ideism
TAAR	Trace Amine-Associated Receptors
THC	9-Δ-Tetrahydrocannabinol
TNGS	Theory of Neuronal Group Selection

Neural Darwinism

To ground our reasoning, we will consider the fundamental assumptions of TNGS [Edelman, 1987, 1993], according to which the relevant functional unit is not represented by single neurons but by neuronal groups organized into distributed maps and circuits. The functional organization of the nervous system is structured according to natural selection operating on neural configurations during development, learning, and experience. A primary repertoire of connections and neuronal groups is formed during neurobiological development and is characterized by marked microanatomical and connective variability. Variability is a prerequisite since without structural and connectivity differences there is no material on which functional selection can act. Evolution produces a population of possible configurations that are then selected on the basis of experience. Activity and interaction with the environment select certain configurations of the primary repertoire, strengthening its stability through plastic mechanisms (synaptic modulation, functional reorganizations, etc.). From this perspective, memory is not a mere archive of copies but a context-dependent process of recategorization and recall, consistent with the dynamic nature of perception and action. Edelman attributes a central role in the study of consciousness to the thalamocortical system, understood as an integrated node of recursive (reentrant) circuits that coordinate cortical activity and contribute to the selection and stabilization of conscious experience contents [Edelman, 1989, 2003; Tononi & Edelman, 1998]. The core is *dynamic* because its composition changes rapidly. It does not coincide with a fixed anatomical region but with a functional coalition that forms and dissolves over short time scales based on context, value, and activation history. This approach is consistent with the selectionist idea that conscious contents emerge as the result of competition/coalition between populations of neurons and not as the output of a dedicated module. A distinctive element is the role of value systems (neuromodulators and subcortical circuits linked to homeostasis, motivation, reinforcement, and salience, etc.). Value signals guide which neural configurations are selected and stabilized, linking learning and biological adaptation. This component makes neural selection not purely statistical but functionally linked to the survival and goals of the organism.

These approaches highlight the profound interaction existing between biological substrate and psychological processes. The process are reciprocal: while the neural matrix is the basis for the development of representational reality, the converse is also true as both representational reality and psychological processes influence the neural substrate. Since physical reality *in and of itself* is not knowable except through our senses, which represent it, we can hypothesize the existence of a single representational world that encompasses the representation of physical reality and all the cognitive, emotional, and relational processes arising from inhabiting this representational space. This approach allows us to act experimentally within a single representational space that encompasses representations of the internal and external world. In order to avoid misunderstandings, it is in the authors' interest to underline that this approach does not deny *per se* the existence of physical reality, nor the complex interactions between it and psychological processes, but identifies the unitary set of representations that man creates from the analysis of external reality and his own internal experiences as a unitary field in which to apply the experimental method. The main definitions are shown in Table 2.

Consciousness from the Perspective of Psychological, Anthropological and Social Sciences

Consciousness is difficult to define and study because it is just little more than a metaphor and has the characteristic of being both *subject* and *object*, being able to contemplate the world but also to contemplate itself in a process of self-reflection. Self-reflection (such as that which occurs in the case of mirrors placed one in front of the other) is the basis of recursion [Casiglia, 2020; Jaynes, 1976], a function that could even be consciousness itself. Another problem is that consciousness derives from (and largely is) the autobiographical memory, a function still little known and difficult to study scientifically also because it cannot be reproduced in animal models, being typical of *Homo sapiens*: the other human species that existed and are now extinct - perhaps 19 - did not possess it or placed it externally or within the group; and the *Homo sapiens* itself has only recently acquired it. Finally, as Julian Jaynes and his heir Marcel Kuijsten argue [Jaynes, 1976; Kuijsten, 2006, 2012], studying consciousness using consciousness (something that we contemporary humans cannot avoid, having renounced symbolic thought) is equivalent to looking for light using a flashlight: wherever you turn, the flashlight will project light, which will make you think light is everywhere even if darkness reigns around. The same goes for consciousness, which seems ubiquitous and pervasive but is not everywhere, is not always present and is divided into separate spots united by a metaphor we call *Ego* [Casiglia, 2020, 2025a].

The relationship between consciousness and the *Ego* is vague and undefined, and the boundaries are indistinct. Although we sometimes speak of the *Ego of consciousness*, there are those who speak of *consciousness of the Ego*; this is the case of Carl G. Jung, who considers the *Ego* a complex, that is, a separate part of the personality [Jung, 2015]. It is plausible that the best solution, at least for the moment, is to suspend this probably artificial subdivision and affirm that *Ego* and consciousness, two recursive products of language [Casiglia, 2020], are synonymous. This will be done in this paper. We know consciousness is diachronic and non-local [Jaynes, 2015], that is, there is no specific brain area for consciousness. In fact, it's not even certain that the *Ego* must necessarily be located in the brain, and in fact about a half of people place it in other positions [Casiglia, 2025b].

Anyone can place the seat of consciousness outside the body, for example in the upper left corner of the room they are in [Jaynes, 1976]. This will not prevent them from continuing to live, work, and interact normally, because the *Ego* is a linguistic metaphor that - like literature, another product of language - can be located wherever thought occurs, also in a book, a film, a memory, a hallucination, or anywhere else.

Anticipating the role of hypnotism in the study of consciousness, a topic that will be fully addressed later, this spontaneous phenomenon can be very easily achieved under hypnosis using specific commands.

Table 2: Main definitions (in alphabetical order).

Autobiographical memory	A set of spots of memories separated by more or less long periods of amnesia, apparently united from a subjective point of view by a still scientifically unexplored function called <i>Ego</i> . This non-local function begins to appear in spots at 3-4 years of age and begins to present itself as falsely continuous at 5-7 years of age (in reality it is discontinuous). It
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	can be partially erased (relatively to a certain period) or even completely following accidental traumas or deliberately with chemical methods or with hypnotic commands. The loss of autobiographical memory obviously entails the loss of the subject's history and therefore of his consciousness [Tulving, 2005].
Egoic consciousness (or subjective consciousness or simply consciousness)	<i>Ability to respond to external stimuli while having a qualitative internal experience of existing.</i> An exclusively human phenomenon, a recursive metametaphor [Jaynes, 1976] with physical bases, dependent for the <i>sense of the external</i> on the dorsolateral prefrontal and posterolateral cortex, and for the <i>sense of the internal</i> on the posterior cingulate cortex, the precuneus and the anterior and medial prefrontal cingulate cortex.
Hypnosis (or hypnotic trance)	A physiological and dynamic modification of consciousness resulting from a relationship between the person inducing and managing hypnosis (the hypnotist) and the participant (the subject). The relationship is two-way and the result of a combination of rapport and communication. In hypnosis, which is accompanied by a predominance of the emotional representational function and the non-dominant hemisphere, modifications of exteroception and interoception, alterations in the perceptions of space and time, and an enhancement of cognitive and intuitive abilities, logic is always preserved; the reduction of criticism allows for the acceptance of the meaning of words and non-verbal communication. By virtue of and within the context of this modification of consciousness, which for the subject is not intellectual but rather experiential, psychic, somatic, and visceral changes are possible, which are achieved through plastic monoideisms.
Hypnotism	Procedure to obtain hypnosis in a deliberate setting.
Ligand	Effector molecule that interacts specifically with a receptor through weak, usually reversible chemical bonds (ionic bonds, hydrogen bonds, van der Waals interactions). The ligand-receptor binding (<i>docking</i>) physically modifies the receptor's structure, resulting in a different but predictable functional state.
Plastic monoideism	Maximum focus of attention on a single idea rich in emotional content and endowed with a creative component. This concentration is so intense that monoideism becomes plastic, capable of producing effects consistent with psychic, behavioral, and physical phenomenology. It is precisely from the manifestation of this phenomenology that we understand that monoideism has become plastic and that hypnosis is realized. Plastic monoideism has recently been demonstrated as a real entity and measured by neuroimaging at the University of Padua [Casiglia et al., 2019].
Pseudoligand	A mental / emotional condition that activates some adrenergic / noradrenergic, opioid, corticosteroid, endorphin, endozepine, or other system, which in turn acts through endogenous mediators on its own receptors, generating a cortical-initiating effect. The combination of pseudoligand and endogenous substance acts by physically modifying the structure of its receptor, resulting in a different but predictable functional state, just as occurs with exogenous ligands. In this paper the pseudoligands are the hypnotic commands, but this is not a novelty limited to the field of hypnosis as this is the basis of neuropsychoneuroendocrine pharmacology.

Unconscious	Part of mental activity not accessible to consciousness, probably developed in <i>Homo antecessor</i> around 30,000 years ago. It is not a container, but if it were it would contain experiences forgotten or only briefly conscious or repressed in the Freudian sense of the term, thoughts never reached the conscious level due to insufficient libido in the Jungian sense of the term, traumas not consciously absorbed, dreams not consciously absorbed due to awakening in non-REM sleep, forgotten sexual abuses, processes not relevant to mental life (Unconscious in the broad sense), shocking deaths, family secrets (so called <i>Hellinger morphic field</i>), experiences of other people or groups even from the past (so-called <i>Jung collective unconscious</i>). The Unconscious has recently been demonstrated as a real ontological entity and measured by neuroimaging and vascular devices at the University of Padua [Casiglia et al., 2016].
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Intelligence and consciousness are not strictly related constructs. Intelligence without consciousness exists in the animal kingdom, has existed in various extinct species of the genus *Homo* and even for hundreds of thousands of years in the species *sapiens*. Furthermore, the recent explosive development of AI has brought to the fore the evidence that intelligence without consciousness is possible. And AI, a distributed function, is non-local. We ourselves are conscious only for short stretches of our waking day [Casiglia, 2020, 2022b; Jaynes, 1976].

These studies offer important insights into better understanding consciousness. Modern neuroscientific theories have highlighted the close relationship between biological and psychological substrates and have led us to the possibility of defining a new field of study consisting of all human representations derived from the analysis of external reality and internal processes. Studies in the social sciences and anthropology highlight how this complex representational world, in its manifestations and processes, is only partially accessible to linguistic modules and that it is precisely the accessibility of representations to linguistic modules that determines conscious experience. Another important aspect is that this accessibility varies throughout our existence, even in our daily lives, and that this accessibility is influenced by complex interactions between the neural, hormonal, and immune systems, while simultaneously influencing these systems.

THE ROLE OF HYPNOSIS IN THE STUDY OF CONSCIOUSNESS

Hypnosis as a Tool

Hypnosis is a non-ordinary functional condition of central nervous system characterized by a process of selective attentional focus called PMI. This condition induces a modulation of neurophysiological activity with increased plasticity and accessibility of mental representations. Through the reciprocal restructuring of these cognitive schemas, hypnosis facilitates a significant recoding of the subject's perceived reality promoting potentially long-lasting clinical changes. Clinically, the hypnosis is a condition of intense ideational concentration capable of altering the reactivity of the nervous system. PMI allows for direct intervention on the patient's semantic and symbolic contents. Modifying the interconnections between these mental representations leads to a new perceptual paradigm overriding previous dysfunctional models of reality through a process of profound cognitive restructuring.

Even in neutral hypnosis, egoic consciousness is restricted, concentrated, focused, and coherent, like LASER compared to ambient light [Casiglia, 2015, 2025a]. This restriction, which is not a functional limitation, constitutes the PMI, whose existence we have experimentally demonstrated through neuroimaging studies [Casiglia et al., 2019]. The restriction can be accentuated in a structured setting through appropriate commands that bring the participant to a condition of increasingly accentuated concentration [Casiglia, 2025a]. The concentrated restriction of consciousness achievable in hypnosis produces experiences and allows the performance of tasks that would not be possible in normal consciousness, such as deliberate and oriented hallucinations and neglects [Casiglia et al., 1997, 2006, 2010; Facco et al, 2014; Priftis et al, 2011; Tikhonoff et al, 2018], analgesia [Casiglia et al., 2018, 2020; Facco et al., 2011, 2013], general anaesthesia [Casiglia et al., 2016], performance enhancement [Casiglia et al., 2025; Casiglia & Tikhonoff, 2021; Tikhonoff et al., 2012] and other conditions that will be discussed below or have been discussed elsewhere [Casiglia, 2024; Casiglia et al., 1994, 2019, 2021b]. Just this ontological characteristic of hypnosis could make it a useful tool for investigating consciousness. Studies on hypnosis highlight how mental images made plastic in hypnotic trance [Casiglia et al., 2019] release mediators and transmitters that produce the effect; an effect which, however, compared to ordinary non-hypnosis-controlled endogenous effects, is more effective, more coordinated, more addressable, more finalized, as it is inserted in a predefined rapport [Casiglia et al., 2022b]. Many studies have investigated the physical effects of hypnosis and their neuroanatomical basis, demonstrating not only psychological but also physical effects. Below, we report some phenomena induced through hypnotic induction that highlight the close relationship between the mental images induced in hypnosis and the related physical phenomena: the shutdown of consciousness, hallucinations, revivifications, amnesia and *Ego* expansion.

Table 3: Receptors and ligands associated to hypnotic phenomenology (in alphabetical order).

Phenomenology	Receptors, ligands and areas involved	Endogenous ligands and mechanism	References
Amnesia	GABA	endozepines	Forman, 2022
Analgesia/anaesthesia	μ (perhaps δ too) blocking algic stimuli with no activation of brain sensitive areas	endorphins	Casiglia et al., 2016, 2018, 2020
Ansiolysis	GABA _{A2α}	GABAergic system	Beck et al., 2021; Farzampour et al., 2015; Mohlet et al., 2002
Conversation with ancestors, sense of the sacred, attribution of consciousness to inanimate objects	k+GABA _A and σ_1	opioid and GABAergic systems	Facco, 2014; Vortherms & Roth, 2006
Dissociation	D ₂	dopaminergic system	Kalmoe et al., 2020; Kapur & Seeman, 2001
Ego expansion	k (KOP), NMDA, σ_1 and 5-HT ₂	endoKOPergic, endoopioid and	Forstmann & Sagioglou, 2025

		serotonergic systems	
Hallucinations	DMT, NMDA, 5-HT ₂ and TAAR ₁	serotonergic system (mainly)	Casiglia et al., 2006; Chien et al., 1996
Hypnotic trance	DAT, NET, A _{2A} , μ and σ_1 ; prefrontal areas (BA 9, 25, 32, 47 and cerebellum)	adrenergic and opioid systems; plastic monoideism	Casiglia et al., 2019; Forman, 2022
Increased performance	k (KOP), Adr, nAdr and A _{2A}	adrenergic and endoKOPergic systems	Tikhonoff et al., 2012
OBE	k (KOP)	endoKOPergic system	Casiglia, 2025b; Facco et al., 2019
Pseudonarcosis (also with amnesia)	μ , δ , GABA	endorphins; endoKOPergic and GABAergic systems	Casiglia et al., 2021b
Revivification	k (KOP)	endoKOPergic system	Giordano et al., 2012; Fromm, 1970
Sedation	GABA _{A1α}	GABAergic system	Casiglia et al., 2021b; Forman, 2022
Sense of divination	k (mainly)	endoKOPergic system	Vortherms & Roth, 2006
Unreal regression	k (KOP) and GABA	opioid, endoKOPergic and GABAergic systems	Conn et al., 1988; Ferracuti et al., 2002

Hypnotic Pseudo-shutdown of Consciousness

Although hypnosis is not sleep [Casiglia, 2025a], a subject under hypnosis can be placed in a condition similar to narcosis with retrograde amnesia [Casiglia et al., 2015]. Obviously, narcosis+amnesia means the absence of a trait of autobiographical memory, thus interrupting consciousness.

Now, there are brain areas (such as dFMC, LADI and claustrum) which, when electrically stimulated, deactivate consciousness, acting as something similar to an *Ego switch* [Koubeissi et al., 2014]. LADI is implicated in egoic consciousness through the integration of emotional and cognitive stimuli, while the claustrum plays a role in the network that supports subjective consciousness with intact sensorium, acting between external awareness and that of the *Ego* like a *common gate* or an *orchestra conductor* [Crick & Koch, 2005]: temporary deactivation of claustrum leads to a modification in integration between external events and introceptive experience. It certainly cannot be said these structures are the *Ego*, but they are necessary, though not sufficient, for an *Ego* to exist. In certain cases, the *Ego* can suddenly and spontaneously disappear, or reappear after decades, only to disappear again [Damasio, 2020; Jung, 1957], just as happens in hypnosis. No autobiographical memory exists from periods of interrupted consciousness, or at least the subject cannot access it.

If hypnosis acts from a phenomenological point of view as an *Ego switch* without exogenous drugs or electric shocks being involved, this is due to an agonism on the μ , GABA_A and δ receptors [Casiglia, 2024]. Mental images administered (for example *now you'll fall into a very deep and pleasant sleep and you'll not come out of it unless I ask you to*) are sufficient to produce a pseudonarcosis from endogenous mediators [Casiglia, 2024]. Moreover, just as hypnosis sometimes activates spontaneously [Casiglia, 2015], the μ endorphin system also activates spontaneously when appropriate and has the same physiological effects as the exogenous opioids used in therapy [Carli et al., 1981]. The administration of naloxone (a competitive antagonist of the μ effects of opioids) prevents the morphine-like effects of hypnosis such as analgesia, sedation and pseudonarcosis [Zachariae et al., 1988], and the G-carriers of the Asn40Asp polymorphism of the Oprm1 gene (a splice variant of the μ receptor gene encoding the μ_1 opioid receptors) are less responsive to exogenous and endogenous opioids [Presciuttini et al., 2018], identifying a subpopulation of subjects who will therefore respond to a lesser extent to both endorphins and the opioid effects of hypnosis and explaining the non-univocal results of some studies. Once out of hypnotic narcosis, the subject may (spontaneously or on command) remember nothing of the narcotic period (*autobiographical amnesia*), behaving as if the *Ego switch* had actually been activated.

Objective Reality of Hallucinations

In hypnosis, the participant can be induced to hallucinate things, perceptions, and situations.

In the *sapiens* species, hallucinations occur following a docking (ligand+receptor) that physically modifies the receptor's structure, resulting in a different but predictable functional state. Thoughts, images, and memories are formed in this way, even in hypnosis; in this case, the endogenous ligand is elicited by PMI. The action of these ligands on specific brain receptors generates entheogen psychic phenomena from the recruitment of NDMA, 5-HT₂, GABA_A, κ and β_1 . All these receptor-related phenomena can be produced without the use of physical agonists by an experienced hypnotist even in those who have never used such substances, and measured experimentally in units typical of human physiology [Casiglia, 2015, 2024, 2025a; Casiglia et al., 2006; Schiffer et al., 2020]. Hypnosis-induced endogenous agonism of serotonergic 5-HT₂ receptors reproduces the effects of ibogaine, mescaline, DMT or psilocybin [Kraehenmann et al., 2017; Madsen et al., 2029; Vanmakouopolou et al., 2023; Winkelman, 2014] and is accompanied not only by euphoria but also by psychotomimetic symptoms with auditory, visual and kinaesthetic hallucinations. It is known that modest amounts of DMT physiologically released during sleep by the pineal gland is responsible for the phases related to dreams (which are hallucinatory activities), demonstrating the existence of an endogenous DMTergic hallucinatory system; the same thing occurs in hypnosis, and we have produced in deep hypnosis many types of hallucinations and neglects [Casiglia et al., 1997, 2006, 2010; Facco et al., 2014; Priftis et al., 2011; Tikhonoff et al., 2018]. Even the hallucinations observed after administration of CB₁ or 5-HT_{2A} or TAAR₁ agonists [Amin & Ali, 2018; Wimhmann, 2014; Zou & Kumar, 2018] can be easily produced in hypnosis; confirming their real and objective role, during hypnotic experiences of CB₁ stimulation (with the command *you are smoking cannabis*), physical symptoms typical of THC such as mydriasis and scleral redness are constantly observed.

In short, hypnotic hallucinations have all the characteristics of reality, not only subjectively for those who experience them but also objectively for the experimenter who can observe, reproduce and measure them with the methods of human physiology [Casiglia et al., 2012b, 2018, 2019, 2020]. The picture is very complex and incompletely understood due to the aforementioned legal restrictions [Sellers, 2013].

Outside of hypnosis, hallucinations induced by the use of substances (agonists or antagonists) depend not only on the substance used but also on the participant's psychodynamic characteristics and the underlying state of the biochemical substrate. The same considerations apply to hypnotic hallucinations, where, for the reasons condensed below, it is impossible, at least for now, to know which hallucination depends on which ligand or which receptor system. *Ad hoc* biochemical studies (currently not even conceivable) will perhaps one day clarify this issue, and then we will be able to state that a certain particular hypnotic hallucination depends on the activation of one receptor rather than another. Today we don't know, just as we don't know whether what type of hallucination will result from the physical ingestion of LSD *now*, while *tomorrow or at some other time* a completely different hallucinatory picture will appear. At present, given the paucity of research on the subject, it is impossible to establish whether the hypnotic hallucinations described involve mainly α_1 or κ opioid receptors (ibogaine-like), serotonergic 5-HT₁ and 5-HT_{2A} receptors (mescaline- and psilocin-like), histaminergic H₂ receptors (LSD-like), CB₁ receptors (cannabinoid-like), or glutaminergic (NMDA-like) receptors [Chien et al., 1996; López-Gimenez & Gonzales-Maes, 2018; Lu, 2021; Mastinu et al., 2023; Varma, 1988]. It would be useful to be able to work with chemical agonists and compare their effects with those of the corresponding hypnotic commands in fMRI, something that is not currently. We know, however, that hypnotic hallucinations can be programmed, constructed, guided, finalized, directed to a purpose, and made more pleasurable than pharmacological ones, which are spontaneous, unpredictable, botched, and participant-dependent.

Hypnotic Revivification and Autobiographical Memory

Egoic consciousness is supported by (perhaps composed of) images and memories, which *are not a continuum but a series of spots* that are then connected by a selectively useful function from an evolutionary perspective. Between one spot and the next, there are amnesic periods that are normally inaccessible to consciousness. However, they can become accessible again under specific conditions without special interventions, or they can be revived through appropriate suggestions administered during hypnosis. This procedure is called *revivification*.

In deep hypnosis [Pernice & Casiglia, 2015], it is possible to make the participant relive experiences from their personal past [Casiglia, 2024, 2025a; Fromm, 1970; Giordano et al., 2012]. It is not a matter of remembering, but of *being there*, in a certain moment or period that can be spontaneously retrieved or suggested by the hypnotist. The suggestions administered to produce this receptor effect are simply of the type *now go back to your age of 6... now you are there... tell me what you see, who you are talking to*, etc. These mental images - in the frame of PMI - release endogenous mediators sufficient to produce revivification. Although interlocutory interpretations of revivification have been given [Kihlstrom, 1997], we have subsequently demonstrated with reproducible experimental

methods that the revivifying subject brought back, for example to the age of 6 preschool years, really has a childlike personality and intelligence, something measurable in units typical of human physiology [Giordano et al., 2012]. As known, this hypnotic phenomenology includes hypermnnesia (with increased recall and fixation abilities), increased reproductive fluency (i.e., recall in both a progressive and regressive sense of a fluid and orderly series of experiences), age regression (i.e., remembering the past with the personality of the present), and finally actual revivification (which involves assuming the age, experiences, and behaviours of the past with the personality of the past). Those who revivify under hypnosis think and behave like children, even being convinced (in dissociation) that they are children [Casiglia, 2024].

Here we are on a deeper and less studied level because the receptors recruited are those of the psychedelic group. In addition to the hypnotic setting, revivification occurs after taking κ -opioid receptor agonists (KOP) that are psychedelics such as salvinorin A or ibogaina; κ -opioid stimulation also causes a combination of *Ego* expansion + OBE [Facco et al., 2019] and a *sense of divination*. These experiences can be induced or not at the operator's discretion during hypnosis, whereas with chemical agonists they present themselves capriciously, depending on the context and the subject's personality. This KOP phenomenology suggests the existence of a cortically controlled endoKOPergic system, revealed by the hypnotic trance. This is so true that, with appropriate suggestions or sometimes even spontaneously, the participant in hypnosis mistakenly believes that he/she can go as far as regression to previous lives, a situation known as *unreal regression* [Conn et al., 1988; Ferracuti et al., 2002; Pyun, 2015]. Although a significant portion of humanity believes in reincarnation [Lester et al., 2004; Varma, 1988], we argue more modestly that in these cases a recruitment of the GABAergic system and other receptors that have been linked to atypical psychedelic phenomenology by endogenous substances (endorphins, enkephalins, dynorphins, natural alkaloids, etc.) is at play [Casiglia, 2024].

Amnesia

As mentioned, consciousness is a cord of separate memory spots. Amnesias between one spot and the next can be brief or long, more or less permanent. With drugs such as BDZ it is easy to induce retrograde amnesia, which is usually used in general anaesthesia to avoid the trauma of the surgical experience. BDZ are GABA_Aergic agonists [Bartholini, 1985; Jazvinscak & Vlajnic, 1985] able to induce 1) at low doses anxiolysis through agonism of the GABA_{A α 2} subunit predominantly present in the hippocampus, 2) at higher doses sedation through GABA_{A α 1} agonism especially prevalent in the thalamus and cerebellum, and 3) at even higher doses retrograde amnesia [Beck et al., 2021; Forman, 2022; Mohler et al., 2002].

Hypnosis can easily produce these three GABAergic phenomena by eliciting agonism from endogenous GABA-like pseudoligands [Casiglia, 2024, 2025a]. Indeed, we use GABAergic hypnotic suggestions in drug-free general anaesthesia, a procedure that results in an apparent loss of consciousness without pain [Casiglia et al., 2015] and without memory of the invasive event, allowing for the operation of any body part. Periods rendered amnesic by hypnosis will not enter autobiographical memory, which is the premise of conscious recall [Casiglia, 2025a].

Other procedures also activate the endocrine system, but less effectively. This is the case with prayer, yoga, autogenic training massage, and meditation [Anderson et al., 2016;

Kuhlman et al., 2005; McCaffrey et al., 2004; Qin et al., 2020; Streeter et al., 2012], all of which involve a sort of non-deliberate or unrecognized self-hypnosis with recruitment of GABA_A receptors. Today, it is known that the endozepine action activated by the cerebral cortex involves a measurable phenomenology: in deliberately induced hypnosis, thanks to the very high degree of concentration on the mental image and PMI [Casiglia et al., 2019], the sedative and anxiolytic effects of these systems are simply much more intense [Farzampour et al., 2015], although they never lead to true sleep, which would otherwise interrupt the hypnotic trance. The mental images that activate these endogenous systems and the related ligand+receptor bonds in hypnosis are simple suggestions such as *be relaxed*, *abandon your anxieties*, etc.

Ego Expansion

A subjective sensation of expansion, enlargement, and contact with the universe sometimes arises spontaneously in the daily lives of normal people or in the *individuation process* of analytical psychology [Jung, 2015]. In hypnosis, however, producing this sensation is very easy. Pharmacology teach that hypnotic *Ego* expansion is due to κ , σ_1 , or NMDA agonism and can be associated spontaneously or on request with 5-HT₂ agonism with an expansion or relativization of time and a sensation of reality as an illusion [Kaehenman et al., 2017; Vyklicky et al., 2014], to the combination of κ +GABA_A+ σ_1 [Casiglia, 2025b], subjective experience of conversation with ancestors, onset of a sense of the sacred and attribution of consciousness to inanimate objects [Facco et al., 2019]. This occurs in certain people even in everyday life due to spontaneous activation of the entheogenic receptors mentioned, and also in the *rêve éveillé dirigé* (guided waking dream, much closer to waking than to sleep) [Desoille, 1961] where increasingly brighter images appear together with euphoria, peace, benevolence and serenity that recall ancestral conditions [Jaynes, 1976; Jung, 2015]. This modification of consciousness with ego expansion and a sense of universal communion is more common than one might think [Casiglia, 2020, 2024].

A SUMMARY AND A TENTATIVE CRITICAL CONCLUSION

Current reflections on the origin and nature of consciousness are framed within the so-called hard problem originally formulated by philosopher David Chalmers. Although clinical research often focuses on the neural correlates of consciousness (NCC), the hard problem highlights the so-called explanatory gap, which has important consequences for many areas of medicine and psychology.

This paper proposed a move beyond reductionist models of consciousness by integrating current neuroscientific theories with contributions from anthropology, psychology, and the social sciences. The authors argued for a fundamental epistemological shift: the assumption that *objective reality is ontologically inaccessible except through the mediation of subjective and intersubjective representations* that individuals construct through perceptual, cognitive, and emotional processes.

From this perspective, the focus of scientific inquiry shifts from the search for absolute objectivity to the study of the representational world. The latter is understood not as a mere epiphenomenon, but as the central nucleus of conscious dynamics. Within this methodological framework, clinical hypnosis emerges as a tool of choice for experimental

investigation. Operating through the mechanism of PMI, hypnosis allows for the direct modulation of the subject's representations, inducing measurable alterations in physiology and neural connectivity. Hypnosis thus emerges as a powerful model of *in vivo neuroscience*, capable of demonstrating how the controlled manipulation of representational processes can influence biological correlates, offering new avenues for understanding the complex architecture of human consciousness. Studies on the receptor effects of hypnotic phenomena would appear to pave the way for this hypothesis.

Furthermore, in recent years, fMRI, the study of endogenous mediators, and the observation of the effects of certain substances on brain receptors have allowed us to understand something more about the structure of consciousness, its origin and its characteristics. For example, it is now established that consciousness can be suspended or switched off [Damasio, 2000; Koubeissi et al., 2014], resumed (as if the contents that appear lost were merely set aside) [Jung, 1957, 2015], and modified [Casiglia, 2025a] in the sense 1) of increasing as with the antagonists of the transporter DAT of dopamine reuptake and NET of noradrenaline and with the A_{2A} antagonists, 2) of reducing as in the case of μ and δ agonists, or 3) of greater or lesser polarization [Casiglia & Mazza, 2013; Clark, 1973; Jacobson et al., 2022; Presciuttini et al., 2018; Ribeiro & Sebastião, 2010; Vicente-Sanchez et al., 2016]. Many chemical ligands whose effect can also be produced under hypnosis are of plant or bacterial origin (think of digitalis glycosides, salicylates, muscimol, salvinorin, ibogaine, cocaine, caffeine, morphine, ergotamine, botulinum toxin, etc.) and have been used for centuries or millennia as poisons or remedies, even if they are now produced by industry and are then called drugs; this demonstrates that plant and animal receptors ready to bind with such substances have been introjected during evolution into the human nervous system and explains why the principles of the receptor action of hypnosis have been so firmly, albeit unconsciously, acquired in the imagination of the *Homo sapiens* species.

In this light, the expansion of the *Ego* to the whole world that can be observed after NMDA, κ and σ_1 agonists administration also takes on significance [Machado Brito-da-Costa et al., 2021; Vyklicky et al., 2021]. Although we are used to considering receptor effects as reactions to exogenous substances, the exact same effects also occur - for instance in hypnosis - through the action of endogenous ligands [Casiglia, 2024]. Not only that, but endogenous ligands can also be released following cortical signals, in short, following thought activity. Indeed, they often are plastic and have effects that are not only mental but also physical (just think of tachycardia from stress, horripilation from fear, erections from erotic thoughts, etc.).

Hypnosis acts on these processes through mental images, determining reactions similar, and in some cases superior, to those determined by exogenous ligands. Thanks to PMI [Casiglia et al., 2019, 2025a], in the condition of modified consciousness called *hypnosis* the receptor-based mental and physical effects of thought become more intense, more incisive, and more purposeful. The results are the same as those obtained with the psychoactive substances mentioned above (hallucinations, anxiolysis, sedation, increased performance, etc.), but they are much more polarized, less frayed, less ramshackle, more oriented and purposeful than with the substances themselves. EEG/LORETA and fMRI have shown that thoughts produced under hypnosis correspond 1) to measurable physical effects and 2) to specific brain activations [Casiglia et al., 2012a, 2020]. When scientific research with hallucinogenic, entheogenic, and entheactogenic substances can resume safely and in

a controlled environment, it will be easy to definitively associate each effect and each activation.

As a consequence, hypnosis now presents the ultimate existential challenge: does an objective reality exist independently of the observer, or observation forces nature to choose its own state? This almost seems like a quantum hypothesis [Schrödinger, 1935], but the answer is that we don't know. We are all certain that we exist, but what we think we observe, touch, smell, or taste we only have mental images of. Hypnosis easily demonstrates this since it allows the participant to observe, touch, smell, and taste even what certainly doesn't exist there for them. Won't this be the case with everything else? Couldn't everything be produced by our, by my mind?

This hypothesis doesn't rule out the existence of some form of reality, but it does rule out its investigability because everything we define as objective or physical reality is nothing other than the fruit of a representation that is partly personal and partly shared. Tracing the ontogenesis of *Homo sapiens'* representation of the world, we note that with conception, an entity is born whose main property is to create representations based on a predetermined program, relationships with the representations of others, and relationships with physical phenomena that are also unknowable. When this sapiens entity is born, its first representations are predominantly corporeal and affective (voices, smells, faces) and fused with those of the caregiver. Over time, these representations become increasingly rich, shaped by experience and early object relationships. Thus, endopsychic structures are formed, representations that arise from relationships with the representations of others. The internal representational world expands on the basis of contact with increasingly broad social representations, languages, cultural representations, laws, and theories. It is hypothesized, based on experience and especially the practice of hypnosis, that the properties of this representational world are comparable to those identified in the theories of Edelman and Tononi. Indeed, they represent all internal and external reality, they modify and combine based on interactions with the external/internal environment and with the representations of others, they are charged with an affective component and can have verbal or symbolic structures. In short, consciousness would be the product emerging from the dynamic interactions between the objects of representative reality, not representing a stable reality but rather an experience that constantly changes over time, influenced by the complex interaction of the represented elements. For those who practice hypnosis at a sufficiently deep level, this hypothesis is consistent with the phenomenology of hypnotic phenomena (indeed, it is the only consistent one). Hypnosis is, in fact, a particular state of consciousness that occurs when subjective representation is reduced, through attentional processes, to one of its elements. In this particular condition, a particular state of consciousness emerges that has the characteristic of making any object of subjective representation accessible to change, which therefore becomes plastic [Casiglia et al., 2019]. The change concerns objects linked to memories [Giordano et al., 2012] but also representations of internal processes, representations of external reality, and space↔time representations.

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