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Capter 3

Echoes of the Self: A Neurophenomenological Journey into the Shifting Realms of Selfhood in Neutral Hypnosis

Andrew A. Fingelkurts [a,*], Alexander A. Fingelkurts [a]

[a] *BM-Science – Brain and Mind Technologies Research Centre, Espoo, Finland*

* Corresponding author: Dr. Andrew A. Fingelkurts, Ph.D., Co-head of research at the BM-Science – Brain and Mind Technologies Research Centre, Metsänneidonkuja 10, 02130, Espoo, Finland.
E-mail: andrew.fingelkurts@bm-science.com
Url: https://www.bm-science.com/index.php/basic-research/team/drs-fingelkurts

Abstract:

Neutral hypnosis offers a valuable state for researchers interested in the nature of consciousness. By minimizing external influences and suggestions, it allows for the investigation of the intrinsic qualities of hypnotic consciousness and its relationship to normal waking states. Studies have shown that neutral hypnosis can result in a significant shift in self-perception. Self-consciousness in neutral hypnosis is often characterized by distortions in the sense of self, fluctuations in self-awareness, and alterations in the experience of agency and body ownership. However, despite these clear effects, the field has largely overlooked the importance of these self-alterations, leading to a notable gap in the literature. In this chapter, we aim to address this gap by examining the existing research on self-consciousness in neutral hypnosis, emphasizing the need for more focused and well-structured studies utilizing the neurophenomenological methodology. Specifically, we propose to apply the neurophysiological three-dimensional model of complex experiential Selfhood, which conceptualizes the self as composed of three dynamically interacting aspects – first-person agency, embodiment, and narrative-reflection – each associated with three distinct sub-networks of the brain's self-referential network. These sub-networks are assessed through EEG operational synchrony analysis, providing a functional measure of their integration. Additionally, we outline several promising avenues for future research, accompanied by testable predictions regarding neurophenomenological alterations in Selfhood as a function of the depth of neutral hypnosis.

Keywords:

Neutral hypnosis; self-referential brain network (SRN); default-mode network (DMN); altered states of selfhood (ASoS); subjective sense of Self; first-person perspective; electroencephalogram (EEG).

1. Introduction

Hypnosis is a mesmerizing phenomenon that, despite being an object of controversy (Kihlstrom, 2018), has enchanted the minds of practitioners, researchers, theorists, and the public alike for centuries (Knafo & Weinberger, 2024). In its "classical" form, it is a unique relationship between the hypnotized person and the hypnotist, during which the hypnotized subject becomes deeply absorbed and focused on the hypnotist's voice, disconnecting from extraneous stimuli and letting thoughts go (De Pascalis, 2024). The hypnotic inner experience is typically characterised by profound alterations in sensation, perception, emotion, and thought (Nash & Barnier, 2008). For example, as enumerated by Kihlstrom (2018), people responding to hypnotic suggestion might not feel pain (analgesia), fail to notice real stimuli (negative hallucinations), or perceive things that aren't there (positive hallucinations); they may not recognize familiar objects (agnosia), feel like children again (age regression), follow suggestions unconsciously (post-hypnotic suggestion), or forget what happened during hypnosis (post-hypnotic amnesia); even basic actions, like moving an arm, feel involuntary, as if influenced by external forces. While it is clear from this brief overview, that all those experiences involve an obvious alteration in self-awareness and self-control, the changes in the experiences are not spontaneous (unsuggested) and are "contaminated" by the confounds of specific suggestions or directions conveyed by the hypnotist (Orne, 1959).

The phenomenology of neutral hypnosis offers a distinctive and valuable opportunity to study *self-consciousness* – the awareness of oneself as an individual and the source of agency – in its altered states (Cardeña & Winkelman, 2011; Tart, 1970). Unlike traditional hypnosis, which typically involves suggestions aimed at changing behavior or perception, neutral hypnosis induces a state of the *spontaneous lived experiences* associated with *what it is like to be in a hypnotic state* without direct suggestions (other than to become hypnotized) or specific directions from the hypnotist (Cardeña et al., 2013; Kihlstrom & Edmonston, 1971). Clearly, as pointed by Cardeña et al. (2013), there is no such thing as a completely "neutral" form of hypnosis, as simply labeling a procedure as "hypnosis" increases suggestibility more than when the same procedure is described as "relaxation" (Gandhi & Oakley, 2005). Nevertheless, this approach still helps minimize potential biases or artifacts that might arise from specific suggestions often embedded in standard hypnotic inductions or from suggestions incorporating specific imagery, relaxation cues, or directive content given later in the process (Cardeña et al., 2013). Though not entirely free from contextual

influence[1], this *minimalistic* approach still serves to reduce confounding effects linked to more elaborate inductions and suggestion structures, providing a closer approximation to the intrinsic qualities of the hypnotic state (Orne, 1959). This creates an attractive condition in which to explore how self-consciousness transforms *spontaneously* in the absence of external stimuli or guided instructions (Edmonston, 1986). Therefore, in the remainder of this text, the term "neutral hypnosis" will refer to this minimalistic form of induction.

Although changes in self-consciousness during hypnosis are well-documented, they have never been the primary focus of research (Cardeña, 2010; Kihlstrom & Edmonston, 1971). Notably, despite these findings, there remains a surprising lack of rigorous studies specifically exploring self-related alterations within the context of neutral hypnosis.

This lack of attention is concerning because understanding self-consciousness or experiential Selfhood during neutral hypnosis could unlock deeper insights into the workings of human consciousness and subjective experience. The lack of well-designed studies focusing on the self in neutral hypnosis limits our ability to map out the full spectrum of Selfhood alterations that occur during altered states (Fingelkurts et al., 2023). Most hypnosis research has traditionally focused on behavioral outcomes or the efficacy of suggestions, leaving the study of self-consciousness during neutral hypnosis in the shadows (Cardeña et al., 2013). As a result, the mechanisms driving these self-alterations remain underexplored, despite their clear relevance to both theoretical and clinical applications. By delving deeper into how Selfhood changes during neutral hypnosis, researchers could gain insights into broader questions of identity, consciousness, and the brain's role in constructing the complex experiential Selfhood (Fingelkurts et al., 2020).

In this chapter, we aim to explore key phenomenological findings from previous and current research, and discuss how future *neuro*phenomenological research with a special focus on the experience of Selfhood could build on these foundations to provide a more comprehensive understanding of how self-consciousness is altered during neutral hypnosis.

2. Key aspects of the phenomenology of neutral hypnosis

Overall, the phenomenology of neutral hypnosis offers a unique lens through which to study consciousness and self-awareness, providing insights into how individuals experience altered states spontaneously, without the guiding influence of external suggestions (Cardeña et al., 2013). To label these states, we have proposed the term *Altered States of Selfhood* (ASoS) elsewhere

[1] This encompasses factors such as cultural influences, environmental cues, personal beliefs, and individual expectations (Cardeña & Terhune, 2019).

(Fingelkurts et al., 2022). In such spontaneously emerging ASoSs, "the altered phenomenal contents of self-consciousness that the person experiences are a consequence of the pure altered state that is a result of the background mechanisms of self-consciousness only and not due to confounding factors such as (1) intentional mental effort with biases of particular practice exercise or conceptualisations of the respective traditions, (2) drug-induced neurochemical alterations, or (3) brain activity manipulation by magnetic or electrical stimulation" (Fingelkurts et al., 2022; p. 257).

As we will see later, neutral hypnosis brings about significant and profound changes in the experiential Selfhood[2]. According to Metzinger (2007), phenomenal Selfhood is essential for the subjective experience to occur. More specifically, this phenomenal sense of Selfhood is constantly changing in the course of the stream of consciousness. Furthermore, the phenomenal sense of self is not monolithic, it is complex and multifaceted (Millière et al., 2018; Musholt, 2015). One important aspect of it is the phenomenal first-person perspective (Blanke & Metzinger, 2009). The other is the phenomenal sense of "mineness" or "ownership", that is the *pre-reflective* feeling that certain bodily sensations, intentions, actions, and thoughts internally belong to or are generated by *my*self *from within*, rather than being imposed by external forces or others (Gallagher, 2000; Zahavi, 2002). This understanding aligns closely with Sartre's view that experience of self is implicitly self-given, as a mode of being of intentional consciousness *for itself* (Sartre, 1967; 2003). Yet, the other aspect is the *self-reflection* – the cultural–linguistic "narratizing" and constant building of autobiographical self-narrative (Damasio, 1999; Gallagher, 2000; Jaynes, 1976). Importantly, this reflective mode always presupposes the pre-reflective mode: one can only reflect upon oneself because one is already pre-reflectively self-aware (Sartre, 2003; Zahavi, 2011). A more nuanced description of these aspects of complex experiential Selfhood is provided in Section 3.1 below.

We now turn to the changes in phenomenal experience that neurotypical individuals typically report during hypnosis, particularly in the context of neutral hypnosis. Additionally, we will explore a possible connection between these changes and the aspects of phenomenal Selfhood.

2.1. Early studies

Already early research on hypnosis (despite not employing the neutral type) revealed that individuals often experienced spontaneous alterations in self-consciousness like body image and sensations, a distorted sense of space and time, diminished agency, and a fading perception of

[2] By "experiential Selfhood", we follow Zahavi (2011) in referring to the idea that all experiences an individual undergoes share a fundamental characteristic: they are self-given in a first-personal mode, revealing what he terms the experiential core self.

external reality (Gill & Brenman, 1959; Ludwig & Levine, 1965; Tart, 1970). For instance, Erickson (1952) described a sense of profound disconnection from the body during deep[3] (plenary) hypnosis, attributing it to a pattern of slowed psychological and physiological processes. In another study by Erickson (1965), participant Aldous Huxley recounted the onset of hypnosis as a gradual withdrawal from external concerns, followed by changes in bodily sensations, then synesthesia, and ultimately a loss of personal identity, accompanied by a lack of mental content.

Gill and Brenman (1959) observed that many participants experienced noticeable changes in body image as they entered hypnosis, such as sensations of their head, mouth, or arms swelling, along with alterations in body sensations like dizziness and feeling of floating further in the session. Participants also reported a diminished sense of external reality. As the hypnotic state deepened, these experiences became increasingly individualized and unique to each person (Gill & Brenman, 1959). Hilgard (1968) conducted interviews with 159 participants after a hypnotic session, and subjects reported a marked spontaneous reluctance to speak, move, or think, along with a compelling urge to follow suggestions and notable alterations in their bodily sensations and self-perception.

Along similar lines, Tart (1970) asked a highly hypnotizable individual to enter as deep as possible into hypnosis, without providing further specific suggestions or instructions. The participant described the experience involving a gradual loss of body and breathing awareness, complete blackness, time distortion until it became meaningless, a cessation of spontaneous mental activity, loss of sense of identity and rise of a sense of potentiality, and a feeling of oneness with the universe. Tart's findings of a single subject were later replicated in a group setting. Sherman (1971) reported almost the same experiences in highly hypnotizable individuals, including intense spontaneous subjective changes during deep hypnosis, such as difficulties in speaking, a sense of oneness with everything, a loss of personal identity, and episodes of complete mental silence and emptiness. During medium hypnosis, subjects experienced emotional responses and simple imagery, while in light hypnosis, they exhibited normal everyday verbal thinking (Sherman, 1971).

Feldman (1976) observed similar findings to those of Sherman, noting that early stages of hypnosis were primarily marked by changes in body image and sensations. As hypnosis deepened, participants reported more profound experiences, such as bodylessness and a sense of oneness with their surroundings, immersion in a complete void, and feelings of awe and wonder (Feldman, 1976).

[3] While hypnotic depth remains a commonly used term to describe the degree or intensity of the hypnotic state, the definition and measurement of hypnotic depth remain highly debated. Traditionally, it has been associated with observable phenomena such as responsiveness to suggestions, subjective absorption, and dissociative experiences. Various scales, including behavioral and phenomenological measures, attempt to quantify it, yet there is no consensus on what precisely constitutes a “deep” hypnotic state. For instance, Terhune and Cardeña (2010) have argued that the concept may oversimplify the complexity of hypnotic experience.

Further, there are findings showing the evidence of changes in self-concept during hypnosis (Markwell, 1965), along with the inability to explicitly reasoning about it through a mentalistic (autobiographical) narrative.

Taken together, the reported changes in the phenomenology of subjective experience during hypnosis align with the perspective that hypnosis can be accurately described as an altered state of consciousness (Kallio & Revonsuo, 2003; Pekala, 2015), characterized by a profound modulation of the fundamental properties of the phenomenal sense of Selfhood (for a similar conclusion see also Rainville & Price, 2003).

2.2. Recent studies

Despite the consistency of reports about spontaneous phenomenological experiences of alterations in self-consciousness during deep hypnosis, earlier studies had a number of methodological flaws, which have been addressed in more recent research using neutral hypnosis (Cardeña et al., 2013). Although few, these well-designed and controlled studies not only confirmed previous findings but also generated new, more nuanced results. For example, Cardeña (2005) found that, compared to a non-hypnotic control condition, participants retrospectively reported experiencing significant spontaneous alterations in body image, time perception, and meaning during their perceived "deepest state" of neutral hypnosis – where no explicit suggestions were given during or after induction, aside from the instruction to become hypnotized. They also noted a heightened sense of being in an altered state of awareness, increased amount and vividness of imagery, but decreased self-awareness, rationality, voluntary control, and memory. Additionally, real-time assessments of hypnosis levels revealed new insights: self-reported *light* and *medium* levels of hypnosis were marked by alterations in body sensations and body image, often expressed as heightened perception ("tingling sensations", "my hands have been growing"). At *deeper* levels of hypnosis, these somatic alterations evolved into experiences of a disembodied self ("I don't have a physical body anymore", "mind leaving the body"), a shift from conceptual thinking to spontaneous imagery, a loss of time perception, absence of thought and cognitive emptiness ("having no thoughts"), accompanied by a general sense of euphoria, potentiality, meaningfulness, insight, and interconnectedness ("being one with everything") (Cardeña, 2005). This aligns with the findings of Pekala and Kumar (2007), who, using a standardized questionnaire across a series of studies, discovered that in "highs" (highly hypnotizable individuals), a hypnotic induction triggered spontaneous alterations in body image and sensations, time perception, meaning, affect, and imagery, along with a general sense of being in an altered state of consciousness.

In another study, researchers compared the hypnotic depth and spontaneous experiences reported by “highs”, “mediums”, and “lows” in response to a neutral hypnotic procedure (Cardeña et al., 2013). The study revealed that neutral hypnosis elicited qualitatively different spontaneous experiences based on individuals’ levels of hypnotizability. “Lows” primarily experienced everyday thoughts related to current and daily concerns, while “mediums” reported changes in body image and sensations. In contrast, “highs” experienced vivid imagery, positive affect, and transcendent phenomena, along with a reduction in conceptual thinking. Importantly, these differences could not be attributed to varying levels of relaxation, as relaxation remained constant across all levels of hypnotizability (Cardeña et al., 2013). Remarkably, these distinct phenomenal patterns among “lows”, “mediums”, and “highs” closely mirrored the progression of subjective experiences from light to deep hypnosis observed in an independent group of “highs” (Cardeña, 2005) described above. Such dynamic nature of subjective experiences related to self-consciousness throughout the hypnotic session in the same individuals clearly indicates that alterations in phenomenological experiences induced by neutral hypnosis should not be viewed as a static phenomenon (see also Cardeña et al., 2013).

Furthermore, studies aiming to elucidate the potential mechanisms behind such phenomenological alterations in self-consciousness during hypnosis indicated that the sense of agency (the feeling that it is “*I*” who is the owner of “*my*” experiences, thoughts and actions) is reduced in highly suggestible individuals due to a temporary disrupted meta-cognition (Terhune & Hedman, 2017). Interestingly, atypical metacognition in highly suggestible individuals have also been observed at baseline (Lush et al., 2016), and may play a role in their heightened responsiveness to suggestion (Terhune & Hedman, 2017).

Cumulatively, the recent body of research observed above suggests that the key phenomenal dimensions that characterize self-consciousness undergo spontaneous significant changes following the induction of neutral hypnosis (e.g., reduced sense of self-agency, (dis)embodiment/dissociation, and disruption of thought processes and reflective awareness).

Summarising, specific unsuggested key aspects of altered phenomenology of self-consciousness *consistently reappear* across both early and recent studies on hypnosis. What neutral hypnosis alters is not just consciousness in general but *self-consciousness* in particular: Even when no content is suggested, the structure of subjectivity itself is reshaped. Thus, it can be argued that the majority – if not all – of the phenomenological changes observed in neutral hypnosis share a common characteristic: they pertain to aspects of self-consciousness. Moreover, the findings strongly suggest that different levels of hypnotic experience (e.g., light versus very deep) are more

appropriately viewed as distinct modes of experience rather than mere differences in intensity of the experience (Cardeña, 2005). For example, the initial heightened awareness of the physical body and the self appears to fade at a certain point, giving way to a sudden emergence of disembodiment, diminished agency, disruption in self-control, and a lack of thought during deep hypnosis.

We propose that these phenomenological changes in self-consciousness during neutral hypnosis should also be reflected in their neurophysiological underpinnings and further progress in studying the altered states of Selfhood should be pursued through a *neurophenomenological* approach (see also, Lifshitz et al., 2013; Jensen et al., 2017; Timmermann et al., 2023) that is a window into the architecture of Selfhood.

3. Neurophenomenological methodology

The neurophenomenological approach integrates specific *neuro*physiological third-person data (e.g., electroencephalogram – EEG) with specific first-person *pheno*menological data (e.g., subjective experience reports), allowing them to inform and complement each other (Berkovich-Ohana et al., 2020; Gallagher, 2003; Lutz & Thompson, 2003; Varela, 1996), thus establishing the foundations for a non-reductive research program (Northoff, 2016). Neurophenomenology is foundational to non-reductive research because it preserves the richness of conscious experience while engaging with neuroscience. Reductive neuroscience, in contrast, tends to dismiss or ignore qualitative aspects that are central to conscious experience (including the hypnotic experience). Further, reductive programs often lack tools to incorporate context-dependent, dynamic, and embodied aspects of experience that neurophenomenology of hypnosis emphasizes.

To date, only a few studies have applied neurophenomenological approach to neutral hypnosis (Cardeña et al., 2013; De Pascalis, 2007; Niedernhuber et al., 2024; Tuominen et al., 2021; Rainville & Price, 2003). While these studies have uncovered significant insights into the neural basis of spontaneous changes in experience following a hypnotic induction, none have specifically focused on (or seek to address) aspects of self-consciousness. Consequently, they did not examine neurophysiological markers specifically in relation to changes in self-consciousness.

To address this gap, and given that spontaneous alterations in aspects of self-consciousness appear to be the primary stable and consistent phenomenological effects of neutral hypnosis (as reviewed above), we propose using the recently introduced *neurophysiological three-dimensional model of complex experiential Selfhood* (Fingelkurts & Fingelkurts, 2011; Fingelkurts et al., 2016a,b,c; for details, see Fingelkurts et al., 2020, 2023) as the "neural" component of our neurophenomenological approach. This model, grounded in EEG operational synchrony analysis

(Fingelkurts & Fingelkurts, 2008, 2015), was developed to account for the multi-faceted nature of self-awareness (Millière et al., 2018; Musholt, 2015). Specifically, it distinguishes three key phenomenological components of Selfhood that are commensurate with one another (Gallagher, 2013; Gallagher & Daly, 2018): (i) first-person agency, (ii) embodiment, and (iii) reflection/narration. Together, these three aspects form a unified sense of self (Fingelkurts & Fingelkurts, 2011; Fingelkurts et al., 2020, 2023).

We argue that employment of this neurophenomenological design will deepen our understanding of the mechanisms underlying changes in subjective self-experience during neutral hypnosis.

3.1. Neurophenomenology of the three core aspects of Selfhood

The following characterization is largely drawn from our previous publication (Fingelkurts et al., 2020) and represents a standard description of the model.

3.1.1. The triad model of Selfhood

The triad model of Selfhood (Fingelkurts et al., 2020, 2023) is based on neurophysiological evidence demonstrating that *three* spatially separate, yet functionally interacting, brain sub-networks – referred to as operational modules (OMs) – play a critical role in the subjective experience of self (Fingelkurts & Fingelkurts, 2011). Each OM consists of a set of brain regions exhibiting tight "functional connectivity" with one another (Fingelkurts & Fingelkurts, 2011). Collectively, these three modules form the brain's *self-referential network* (SRN), often referred to as the default mode network (Fingelkurts & Fingelkurts, 2011; Fingelkurts et al., 2012; Gusnard, 2005; Northoff, 2016; Raichle et al., 2001). The set of these three OMs include the anterior OM and two symmetrical left and right occipito-parieto-temporal OMs (Fig. 1), which can be reliably identified using operational synchrony analysis of the EEG signal (Fingelkurts & Fingelkurts, 2008, 2015).

According to the triad model of Selfhood (Fingelkurts et al., 2020, 2023), the *anterior module* of the SRN (Fig. 1) is linked to the *phenomenal* first-person perspective and the *phenomenal* sense of agency (Fingelkurts et al., 2020). This module is referred to as the "witnessing observer" or simply the "**Self**" in the narrowest sense (Fingelkurts et al., 2020) – the phenomenal non-conceptual core in the act of knowing itself (Blanke & Metzinger, 2009), or in the words of Velmans (2014), a sensed "centre of gravity", where one experiences being directly and immediately present as the

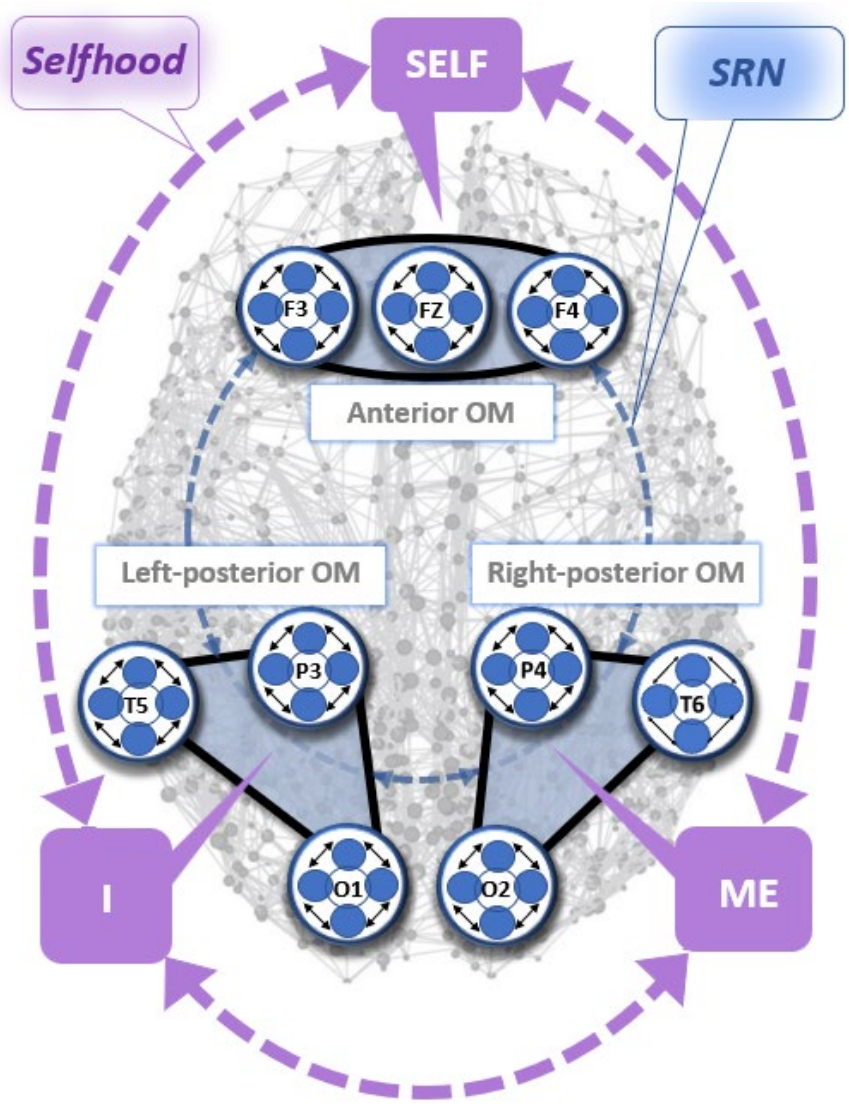

Figure 1. A schematic representation of the operational modules (subnets) that make up the self-referential brain network, along with their relationship to the three components of Selfhood. The operational modules (OMs) are depicted as blue-coloured areas, each involving operational synchrony among three standard EEG locations (indicated by white circles with EEG electrode IDs) mapped onto a schematic cortex map. This map illustrates the brain's functional connections, with dark grey spheres marking network nodes and light grey lines depicting their interconnections. The network nodes are displayed in their respective anatomical coordinates, maintaining the spatial arrangement of the network. Each OM has a clear nested functional hierarchy, with higher levels composed of lower ones. Specifically, each OM is a functional integration of several local brain fields (registered by the corresponding EEG electrodes), which themselves are the integration of yet smaller local fields generated by transient functional neuronal assemblies (Fingelkurts & Fingelkurts, 2008, 2015). Together, three OMs form a higher-level functional nested architecture known as the self-referential network (indicated by a dashed blue circle connecting the three OMs). Phenomenologically, these three OMs represent three distinct aspects of Selfhood, labelled as "Self", "Me", and "I", whose dynamic interaction creates the coherent experience of Selfhood (depicted by a dashed purple circle connecting "Self", "Me", and "I"). Abbreviations: EEG: electroencephalogram; OM: operational module; SRN: self-referential network; The double-pointed black arrows schematically represent the functional couplings of local fields generated by neuronal assemblies beneath a given electrode; Electrode positions (IDs): F3 – left frontal, Fz – frontal midline, F4 – right frontal, T5 – left temporal, P3 – left parietal, O1 – left occipital, T6 – right temporal, P4 – right parietal, O2 – right occipital. The Figure is adapted from Fingelkurts et al., 2022.

centre (or a focal point) of a phenomenal multimodal perceptual reality (Blanke & Metzinger, 2009; Metzinger, 2007; Revonsuo, 2006; Trehub, 2007). In this context, agency refers to the "sense of ownership" over one's thoughts, perceptions, and actions relevant to Selfhood (Blanke & Metzinger, 2009; de Vignemont & Fourneret, 2004; Metzinger, 2007; Hohwy, 2007); it is the sense that "I" am the one who is undergoing the experience in its implicit first-person mode of givenness (Gallagher, 2000; Metzinger, 2007; Zahavi, 2002). Research has shown that this "witnessing observer" (the *Self*) can be intensified as a symptom in certain pathological conditions, such as depression (Fingelkurts & Fingelkurts, 2017a) and post-traumatic stress disorder (Fingelkurts & Fingelkurts, 2018). Conversely, it also can be weakened or even disappear entirely, as for example, observed in patients with disorders of consciousness (Fingelkurts et al., 2012, 2016c; Fingelkurts & Fingelkurts, 2017b), or in non-pathological conditions like dreamless sleep (Thompson, 2015; Windt, 2015), specific meditative states (Josipovic, 2019), and under the influence of psychedelics (Millière et al., 2018). Additionally, trained meditation practitioners are able to intentionally alter or manipulate it (Fingelkurts et al., 2016a,b, 2020).

The *right posterior module* of the SRN (Fig. 1) is associated with the experience of self as a physical (alive) entity normally localized within bodily boundaries through integration of interoceptive, exteroceptive, and proprioceptive sensory processing (Fingelkurts et al., 2020, 2023). Here, interoception (internal bodily signals like heartbeat, gut sensations, breathing) plays a central role in fostering the sense of "being alive", providing emotional grounding, and supporting the encoding of autobiographical emotional memories (Seth et al., 2012; Fingelkurts et al., 2020, 2023). Exteroception (external sensory input like vision, touch, and sound) anchors self to external world and is essential for recognizing object boundaries and distinguishing the body from the world (Gallagher, 2005; Blanke & Metzinger, 2009). Proprioception (the perception of body position and movement independent of visual input) contributes to spatial localization of the body and, in combination with exteroception, it underpins a coherent, embodied sense of agency (Blanke, 2012; Proske & Gandevia, 2012). This module is referred to as the "representational-emotional agency" or simply "**Me**" (Fingelkurts et al., 2020). Unlike the phenomenal first-person perspective associated with the Self-module, the defining feature of the Me-module is a purely *geometric first-person perspective* that originates from within the body representation, thus signifying an egocentric spatiotemporal self-model (Blanke & Metzinger, 2009). In this context, the body is not just "seen" as one more object in the physical world, but as the "vehicle" that enables being a self in the world (Apps & Tsakiris, 2014; Gallagher, 2005; Hohwy, 2013; Seth et al., 2012). Research shows that this

sense of *Me* ("bodily self") can undergo significant alteration or become abnormal during certain pathological conditions, such as post-traumatic stress disorder (Fingelkurts & Fingelkurts, 2018), depression (Fingelkurts & Fingelkurts, 2017a), heautoscopic out-of-body experiences (Blanke & Mohr, 2005), depersonalization-derealization disorder (Fingelkurts & Fingelkurts, 2022), and in vegetative or minimally conscious states (Fingelkurts et al., 2012). On the other hand, within a normative continuum, experienced long-term meditators can intentionally manipulate this sense of "Me", often leading to a dramatic loss of bodily perceptions, described as "self-boundarylessness" or "bodylessness" (Ataria et al., 2015; Berkovich-Ohana et al., 2013; Fingelkurts et al., 2020, 2023).

The *left posterior module* of the SRN (Fig. 1) is involved in the experience of self-reflection and introspective thinking, encompassing momentary narrative thoughts, inner speech, and the reinterpretation of episodic and semantic memory events related to the self – essentially autobiographical storytelling (Fingelkurts et al., 2020, 2023). This module is referred to as "reflective agency" or simply "**I**" (Fingelkurts et al., 2020). It has been proposed that this capacity for narrative self-reflection is closely tied to the uniquely human capability for language (Budwig, 2000; Craig, 2004; Gallagher, 2000), and forms the foundation for the sense of continuity and invariance of Selfhood over time (Friston et al., 2017; Metzinger, 2003). Research has shown that such sense of *I* ("reflective agency") can be altered, either as (i) a clinical symptom in certain pathologies like schizophrenia, depression, post-traumatic stress disorder, or brain injury (Fingelkurts & Fingelkurts, 2017a,b, 2018, 2023), or (ii) a normative variation when intentionally modified through meditation techniques (Fingelkurts et al., 2016b, 2020).

The integration of the dynamics of these three SRN OMs enables the nonreductive intertwining of the three aspects of Selfhood (witnessing observer, representational-emotional agency, and reflective agency), resulting in a unified and coherent manifestation of the complex, unique phenomenal pattern – an experiential Selfhood (Fingelkurts & Fingelkurts, 2011; Fingelkurts et al., 2020, 2023). Therefore, this neurophysiological three-dimensional construct model of the complex experiential Selfhood treats the phenomenological distinctions between different aspects of self not as opposing, but as complementary and mutually commensurate (see also Gallagher, 2013; Gallagher & Daly, 2018).

In this way, the triadic model of Selfhood offers a plausible, neurophenomenologically grounded foundation for examining the shifting realms of Selfhood components spontaneously emerged during neutral hypnosis.

3.2. Neurophenomenology of Selfhood in neutral hypnosis

In line with the previously established causal relationship between the triad SRN OMs and the three aspects/components of Selfhood (Fingelkurts et al., 2020), the functional integrity of each SRN OM increases when the subjective sense of corresponding phenomenological experiences intensifies, and conversely, the OM's functional integrity decreases when the subjective sense of corresponding phenomenological experiences weakens[4] (see also Fingelkurts et al., 2023). Further, every "component of Selfhood comprises several low-level components. For example, the Me-component subsumes body image, body perception, body orientation, ownership, geometrical first-person perspective and physical agency; the I-component includes reflection, rumination, narration, autobiography, thoughts' structure and speed; the Self-component comprises phenomenal centre, phenomenal first-person perspective, epistemic certitude, witnessing observer" (Fingelkurts et al., 2022, p. 275). With this in mind, one could hypothesize that varying depths of neutral hypnosis (also paralleled by "lows", "mediums'", and "highs"), characterized by nuanced phenomenological description of spontaneous experience (as reviewed above), would correspond to predictable, distinct combinations of the functional integrity of the brain's SRN Self-Me-I components.

3.2.1. Proposed methodological design

The following overall methodological design could be proposed. A rest condition, with eyes closed and without executing any task, serves to record *baseline EEG* and gather *baseline subjective reports* and questionnaire responses about this baseline condition. Participants are then hypnotized using a simple, single-word post-hypnotic induction method without any further suggestions (Tuominen et al., 2021) – neutral hypnosis – to explore *spontaneous changes* in subjective experience of Selfhood and corresponding EEG dynamics *during hypnosis*[5]. Immediately after

[4] Specifically, the study demonstrated that voluntary up-regulation of the phenomenological expression of Self, Me, or I aspects was associated with a significant increase in the functional integrity (as measured by qEEG operational synchrony) of the corresponding SRN OMs. Conversely, down-regulation of these aspects led to a measurable decrease in their functional integrity (Fingelkurts et al., 2020). Moreover, these neurophysiological changes were consistently aligned with participants' subjective reports and significantly correlated with standardized questionnaire responses, establishing a meaningful correspondence between changes in phenomenology and brain activity (Fingelkurts et al., 2020). Additionally, a broader pattern has been observed across multiple studies, showing that changes in the functional integrity of the SRN OMs reliably mirror alterations in the experience of self in various neuropsychopathologies (e.g., depression, PTSD, brain injury) as well as in different altered states of Selfhood (for an overview, see Fingelkurts et al., 2023). Readers interested in a deeper exploration of the empirical basis are encouraged to consult the cited studies.

[5] Such a design is more likely to reliably induce altered states of Selfhood in highly susceptible individuals – often referred to as hypnotic virtuosos – and, to a lesser extent, in those with moderate susceptibility. In contrast, individuals with low hypnotic susceptibility may not exhibit notable shifts in self-consciousness under these minimal conditions.

participants return to a "normal" state, they provide subjective reports describing their experience during the hypnotic state in their own words, focusing on internal processes and specific aspects such as body awareness and sensations, vigilance, internal speech and narration, and the sense of witnessing. Participants are also asked to complete a set of questionnaires, including (i) Phenomenology of Consciousness Inventory – PCI (Pekala & Kumar, 2007), (ii) Altered States of Consciousness Rating Scale (Dittrich, 1998; Studerus et al., 2010), and (iii) Mystical Experience Questionnaire – MEQ (MacLean et al., 2012). The findings obtained through questionnaires can be further enriched and refined by subsequent microphenomenological investigation, which offers a nuanced, fine-grained approach to capturing the subtleties of subjective experience (Petitmengin et al., 2019).

To estimate the functional integrity of the three SRN OMs during the (i) baseline and (ii) hypnosis conditions, the recorded EEG data are used to extract nine operationally synchronized cortical areas specifically contributing to the three SRN OMs: the anterior OM – formed by EEG locations F3-Fz-F4; the left posterior OM – formed by EEG locations T5-P3-O1; and the right posterior OM – formed by EEG locations T6-P4-O2 (Fig. 1). This set of brain areas included in the triad model have previously been identified as part of the SRN (Fingelkurts & Fingelkurts, 2011). However, their inclusion in the SRN was not arbitrary. These regions naturally emerged as components of the three most stable task-unrelated spatiotemporal patterns (OMs) characterized by exceptionally high levels of operational synchrony[6] in neurotypical individuals. This finding has been replicated in two independent studies involving participants from two different nationalities and across two distinct sensory modalities (for details, see Fingelkurts & Fingelkurts, 2011). Two

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Indeed, as well-documented in the literature, alterations in self-related processing are especially pronounced in highly suggestible individuals (see, for example, Pekala & Kumar, 2007; Terhune & Hedman, 2017). But is this necessarily a limitation? We suggest otherwise. Rather than treating the absence of subjective change as a failure, it can be regarded as meaningful data in itself. This approach enables direct comparison of trait-level predispositions to Selfhood modulation across different susceptibility profiles. In this sense, the proposed design serves as a foundational baseline – a starting point to explore how Selfhood shifts under minimal hypnotic intervention. Future studies can build on this by introducing varying types of suggestion and comparing their effects across low, medium, and high susceptibles using more conventional, adaptive designs.

[6] EEG operational synchrony refers to the temporal coupling of quasi-stationary EEG segments across different brain regions. These segments, identified through adaptive segmentation, reflect *discrete operations* performed by local transient neuronal assemblies. When segments from different EEG channels align in time, it indicates functional integration across regions, forming unified functional units called Operational Modules (OMs). The degree of this synchronization, quantified as operational synchrony, is calculated based on the statistical likelihood of such temporal alignment. Stronger synchrony implies stronger functional connectivity of operations. Readers interested in methodological specifics and in-depth description of the EEG operational synchrony measure are encouraged to consult the original publications (Fingelkurts & Fingelkurts, 2008, 2015). It is sometimes argued that EEG analysis at the sensor level is susceptible to volume conduction, which can complicate the interpretation of EEG data in terms of functional brain connectivity. However, the operational synchrony measure has been specifically evaluated through modeling experiments to address this concern. These evaluations demonstrate that operational synchrony is sensitive to the morpho-functional organization of the cortex, rather than being influenced by volume conduction, EEG signal power, or the choice of reference electrode. For more detailed information, see Fingelkurts & Fingelkurts (2008, 2015).

important clarifications should be noted: (a) the midline posterior cortex, a key component of the SRN (Frewen et al., 2020), is represented in the triad model by the left and right precuneus, corresponding to EEG electrode positions P3 and P4 (this mapping is based on findings from Koessler et al., 2009); (b) although occipital areas – associated with visual processing and indexed by EEG locations O1 and O2 – are typically excluded from the SRN, many studies have reported their involvement (Gusnard & Raichle, 2001; Miall & Robertson, 2006; Mantini et al., 2007; Whitfield-Gabrieli et al., 2009). It is reasonable to speculate that visual systems contribute to the formation of internal visual imagery during self-referential processes, such as self-image, body representation, autobiographical memory, future planning, narrative comprehension, and self-reflection. Indeed, visual elements appear to be consistently involved in self-related processing, as supported by phenomenological reports. A concise summary of studies linking specific EEG electrode positions to their corresponding cortical brain regions is available in Fingelkurts et al. (2016c, p. 30). These associations have been confirmed using an integrated EEG-MRI sensor system and an automated cortical projection algorithm (Koessler et al., 2009).

The differences in EEG operational synchrony strength across the three SRN Operational Modules (OMs), as well as changes in questionnaire ratings between the baseline resting state and the neutral hypnosis condition, are presented as percentage changes relative to the baseline. Changes in questionnaire ratings and subjective reports help to cross-validate the proposed links between the three phenomenological aspects of Selfhood and the integrity of three SRN OMs, as estimated by EEG operational synchrony.

3.2.2. The expected results (hypothetical scenarios)

We propose that the following neurophenomenological results can be expected depending on the depth of neutral hypnosis (also theoretically paralleled by “lows”, “mediums’”, and “highs”).

As revealed by the analysis (see Sections 2.1 and 2.2) of the available literature on spontaneous phenomenology in neutral hypnosis, during light hypnosis (or in “lows”), participants tend to experience ordinary, everyday thinking, perception, and mentation. However, an increase in self-monitoring and focus on their inner experiences is frequently noted. For this state, and considering the previously established causal link between the triad SRN OMs and the three aspects of Selfhood (Fingelkurts et al., 2020), we anticipate the following result: presence of normal levels of functional integrity in the Me- and I-modules, accompanied by a simultaneous increase in the functional integrity of the Self-module of the brain SRN (Fig. 2A). Since the Me- and I-modules continue functioning normally, participants are expected to have spontaneous phenomenal experiences

related to both external stimuli and internal processes (brought about by the Me-module), as well to memories or future planning (autobiographical narration that is instantiated by the I-module). These experiences will be integrated within a first-person meaningful perspective (enabled by the Self-module), ensuring the phenomenal sense of being a spatio-temporal "agent" who observes and witnesses both the self and the world by directing its own attention toward oneself and the world in the present moment (Fingelkurts et al., 2020, 2023).

During medium hypnosis (or in "mediums"), participants often report alterations in body image, commonly described by heightened sensations such as "tingling", "spinning", and the feeling of "growing" or "swelling" of the head, hands, legs, and lips. There is a sense of time acceleration ("spinning"), along with increased attention to inner experiences. Participants also report an enhanced sense of wellbeing. For this state, we anticipate an increase in the functional integrity of the Me- and Self-modules, while the functional integrity of the I-module remains around baseline levels (Fig. 2B). Such changes in the functional integrity of the OMs triad, when considered in light of the previous study's findings on the causal links between the functional integrity of the three SRN OMs and their corresponding phenomenological aspects of Selfhood (Fingelkurts et al., 2020), may suggest that in this state participants are experiencing enhanced embodiment (Me-module), with slightly increased witnessing agency (Self-module), and normal levels of self-reflection and narration (I-module). An accelerated sense of time may be explained by the heightened sense of embodiment, as it is well established that the two are closely connected (Wittmann, 2013). In fact, it has been suggested that subjective time arises through the bodily self, which is experienced as a continuous embodied entity over time (Wittmann, 2013).

The most unusual and anomalous phenomenological experiences are associated with deep and very deep (or "highs") neutral hypnosis (see Sections 2.1 and 2.2). Participants report sensations of "self-boundarylessness" or "bodylessness", a feeling of floating, and a diminished sense of physical body and agency. The sense of voluntary control decreases dramatically. A common feature of these reports is the lack of thoughts and conceptual thinking, as well as difficulties with memory. Many transpersonal or spiritual experiences are also reported, including a sense of timelessness, loss of identity, and "being one with everything". For this state, we expect to observe a decrease in the functional integrity of all three (Self, Me, and I) SRN modules (Fig. 2C). The exact degree of the OMs' functional disintegration should be proportional to the extent of the lack of related phenomenal experiences (Fingelkurts et al., 2020, 2023). Overall, these observations would suggest that participants do not experience themselves as fully embodied entities with an automatic and immediate sense of physical agency, leading to a reduced first-order experiential sense of ownership (that it is me who owns the body), as well as diminished body self-location, body orientation, body

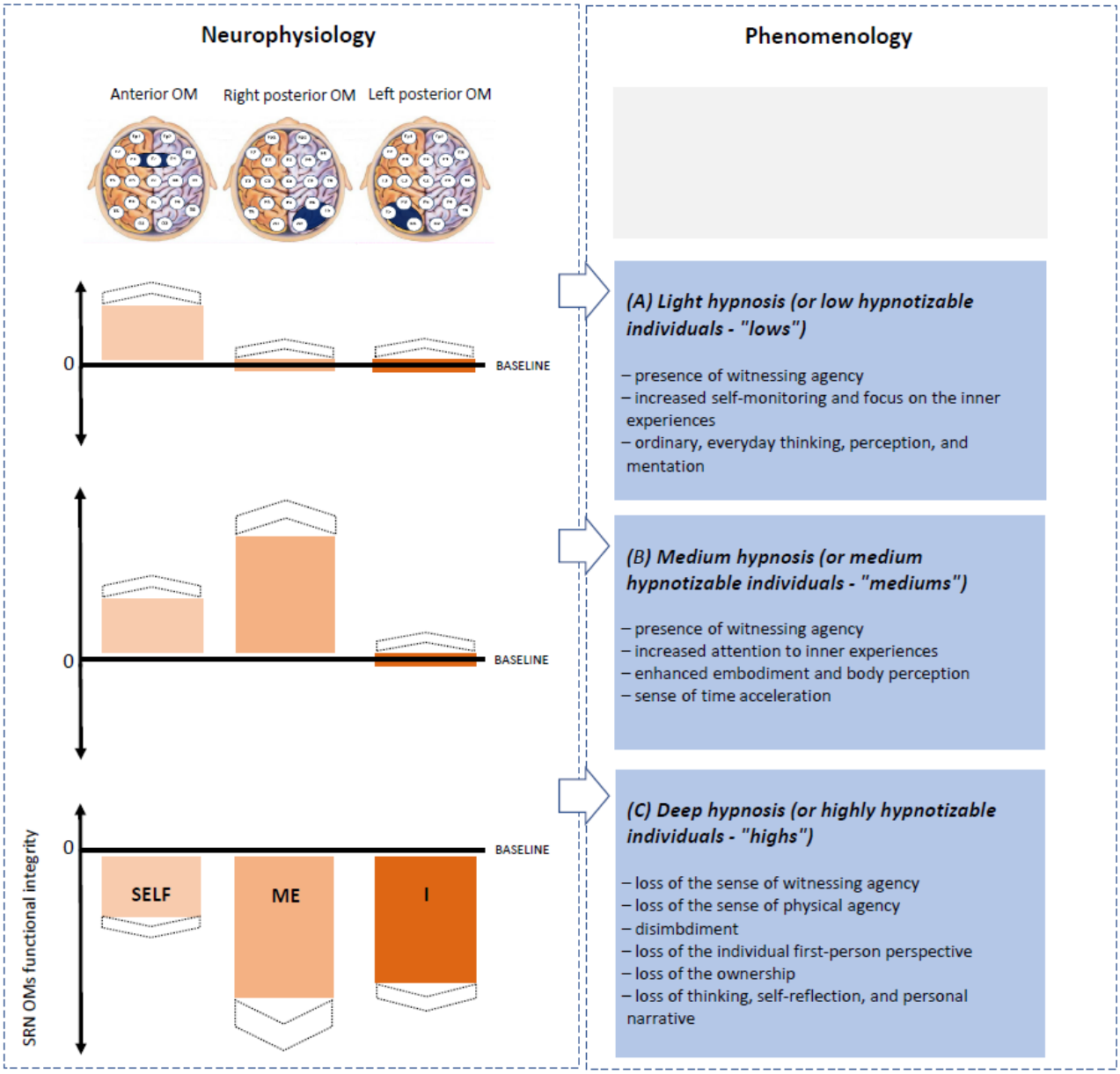

Figure 2. A schematic illustration of the hypothesized correspondence between the neurophysiology of Self-Me-I operational modules (OMs) and the spontaneous phenomenal alterations in the sense of Selfhood across different phases (or depths) of neutral hypnosis. Abbreviations: OMs: operational modules of the brain self-referential network; SRN: brain self-referential network. The horizontal axis represents the functional integrity of OMs in healthy, fully self-conscious subjects during the resting state (BASELINE), which is taken as a "0" for each OM. Doted arrows indicate the potential variability in the functional integrity of each individual OM. The schematic brain cortex maps positioned above the graphs depict the locations of the three OMs (represented by dark blue shapes). (A) refers to light hypnosis, (B) refers to medium hypnosis, (C) refers to deep hypnosis. Further details are provided in the text.

image, and body schema (Me-module). These changes are accompanied by an increased sense of involuntariness, characterized by the lack of deliberate control and the feeling that sensations and thoughts are not self-generated (Self-module). A stated profound alteration in time perception, often described as a feeling of timelessness, is commonly reported during various altered states of

consciousness (Ataria et al., 2015; Berkovich-Ohana et al., 2013; Winkelman, 2024). As previously mentioned, since the sense of time is connected to the sense of the body (Wittmann, 2013), the feeling of disembodiment is responsible for the phenomenal loss of the sense of time, which is closely tied to the experience of bodilessness (Fingelkurts et al., 2020, 2023). Furthermore, the diminished integrity of the I-module would lead to distortions in thought processes, autobiographical reflection, and narrative. Previous studies have shown that the weakening of the autobiographical self and personal narrative tends to follow initial changes in the bodily self and is also linked to changes in time perception (Fingelkurts et al., 2020, 2023). In general, this altered state of deep neutral hypnosis resembles the so-called transcendental states, characterized by clear, rational-thought free consciousness, marked by the dissolution of self-boundaries and accompanied by a feeling of "oneness" with everything (Winkelman, 2024).

It is important to note that specific spontaneous alterations in the phenomenal experiences of Selfhood during neutral hypnosis (or any other condition) are determined not only by the direction of functional changes in the neurophenomenology of Selfhood components but also by the magnitude of these changes and the interrelationship between these components (Fingelkurts et al., 2022; for a similar conclusion, see Gallagher & Daly, 2018; Millière et al., 2018). Future research will determine whether the hypothetical scenarios presented here are valid.

4. Conclusion

Despite its long history and broad appeal, the precise mechanisms driving hypnosis continue to be a topic of active scientific investigation and theoretical debate (Knafo & Weinberger, 2024; for comprehensive coverage of hypnosis, see Nash & Barnier, 2008). A distinct issue in the field of hypnosis is the spontaneous (unsuggested) fluctuations and alterations in the phenomenology of self-consciousness. Given the limited research on this topic, we can, at this point, only speak about the "echoes" of Selfhood phenomenon during hypnosis. This said, our review establishes that individuals under hypnosis consistently report alterations in many dimensions of self-consciousness, including changes in body image, time perception, sensations, rationality, and sense of agency, even when no specific suggestions for these effects are given. This fluidity of Selfhood appears to be very systematic and probably the most consistent shift in phenomenology produced by the neutral hypnosis.

Further, our exploration expands into neuroscientific insights of Selfhood, offering a modern lens through which we can glimpse the intricate relationship between the brain and mind (neurophenomenology) as it weaves the ever-changing realms of Selfhood during hypnosis. This

research program has the potential to not only provide deeper insights into the nature of Selfhood alterations during hypnosis, but also to enhance our understanding of its role in other non-ordinary phenomena (Timmermann et al., 2023), such as meditation and psychedelic states (Millière et al., 2018), spiritual, mystical or religious experiences (Winkelman, 2024), and broad varieties of anomalous experiences (Cardeña et al., 2014; Fort et al., 2024).

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